



NATIONAL WATER AND SEWERAGE CORPORATION

INTEGRATED WATER MANAGEMENT AND DEVELOPMENT PROJECT

ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF ADJUMANI WATER SUPPLY SYSTEMS



FINAL ESIA - WATER SUPPLY

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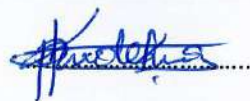


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ACRONYMS AND DEFINITIONS

AIDS	Acquired Immune Deficiency Syndrome
BoQs	Bill of Quantities
CABI	Centre for Agriculture and Bioscience International
CAPEX	Capital expenditure
CDO	Community Development Officer
C-ESMP	Contractor's - Environmental and Social Management Plan
CGV	Chief Government Valuer
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CIWA	Cooperation in International Waters in Africa
COVID-19	Coronavirus Disease of 2019
CPP	Catchment Protection Plan
CR	Critically Endangered
DBH	Diameter at Breast Height
DCDO	District Community Development Officer
DD	Data Deficient
DEA	Directorate of Environmental Affairs
DHO	District Health Officers
DL	Distribution Line
DLO	District Labour Office
DMM	Department of Museums and Monuments
DOSH	Department of Occupational Health and Safety
DWD	Directorate of Water Development
DWRM	Directorate of Water Resources Management
EAC	East African Community
EHS	Environment Health and Safety
EN	Endangered
EPA	Environmental Protection Agency
ESIA	Environmental and Social Impact Assessment
ESIS	Environmental and Social Impact Study
ESMP	Environmental and Social Management Plan
ESR	Elevated Storage Reservoir
EW	Extinct in the Wild
EX	Extinct
FAO	Food and Agriculture Organization of the United Nations
FDC	Flow Duration Curve
FDG	Focus Group Discussions
FSTP	Faecal Sludge Treatment Plant
GBV	Gender Based Violence
GIIP	Good International Industry Practice
GIS	Geographical Information Systems
GMC	Grievance Management Committee

GoU	Government of Uganda
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
Ha	hectare
HEP	Hydroelectric Power
ICPAC	Climate Prediction and Applications Centre
IEC	international Electrotechnical Commission
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
IWMDP	Integrated Water Management and Development Project
km	Kilometre
KPI	Key Performance Indicator
Lc	Least Concern
LC	Local Council
LVB	Lake Victoria Basin
LVI	Lake Victoria Initiative
LWF	Lutheran World Federation
MBR	Master Balancing Reservoir
MDD	Maximum Day Demand
MLD	Millions of Litres Per Day
MLHUD	Ministry of Lands, Housing & Urban Development
MoE	Ministry of Education
MoFPED	Ministry of Finance Planning and Economic Development
MoGLSD	Ministry of Gender, Labour and Social Development
MoH	Ministry of Health
MSDs	Material Safety Datasheets
MTBM	Micro Tunnel Boring Machine
MTTI	Ministry of Tourism, Trade and Industry
MWE	Ministry of Water and Environment
NAPAS	National Adaptation Programmes of Action
NBI	Nile Basin Initiative
NE	Non-evaluable
NEA	National Environmental Act
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NEMA	National Environment Management Authority
NGO	Non-Governmental Organisation
NT	Near Threatened
NWSC	National Water and Sewerage Corporation
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
OP	Operational Policies
OPM	Office of the Prime Minister
PAYE	Pay As You Earn

PPE	Personal Protective Equipment
PWD	Person With Disability
RAP	Resettlement Action Plan
RGC	Rural Growth Centre
RoW	Right of Way
RSCs	Refugee Settlement Camps
SE	Site Engineer
SEO	Socio-Environmental Officer
SEP	Stakeholder Engagement Plan
STD/Is	Sexually Transmitted Diseases/Infections
TBM	Tunnel Boring Machine
TL	Transmission Line
ToR	Terms of Reference
UBOS	Uganda Bureau of Statistics
UN	United Nations
UNBS	Uganda National Bureau of Standards
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNRA	Uganda National Roads Authority
URA	Uganda Revenue Authority
UTM	Universal Transverse Mercator
UWASNET	Uganda Water and Sanitation NGO Network
VAC	Violence Against Children
VAT	Value Added Tax
VECs	Valued Environmental Components
VU	Vulnerable
WASH	Water, Sanitation and Hygiene
WB	World Bank
WCS	Wildlife Conservation Society
WHT	With Holding Tax
WSPP	Water Source Protection Plan
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

1 INTRODUCTION

The Ministry of Water and Environment (MWE) together with National Water and Sewerage Corporation (NWSC) are implementing the Integrated Water Management and Development Project (IWMDP) with funding from the World Bank and Government of Uganda. The project aims at improving access to water supply and sanitation services, capacity for integrated water resources management and the operational performance of service providers.

The project focuses on improving water and sanitation services in small towns and rural growth centres (RGCs) with special attention to the vulnerable Northern and Eastern regions and those communities hosting refugees displaced from conflicts and famine. Under component 1.2 of the IWMDP, districts that host about 70% of refugees will be supported with provision of piped water supply and sanitation services. The target areas include Yumbe, Arua, Moyo (including Obongi district newly created from Moyo), Adjumani in West Nile, Lamwo in Northern and Kiryandongo in Central Uganda.

Under component 2 of the IWMDP, NWSC will undertake construction and rehabilitation of Water Supply and Sanitation infrastructure in Mbale Municipality; construction of Gulu-Karuma Water Supply Project; improve water supply and sanitation in Adjumani Urban Area, including support to refugees; and carrying out of environmental and social management activities to protect water sources and sensitize communities. The NWSC was established as a government parastatal organisation in 1972 to develop, operate and maintain water supply and sewerage services in the urban areas of Uganda. It operates under the MWE, and has a coverage of over 250 towns countrywide. NWSC has been operating under three-year renewable performance contracts with the Government of Uganda (GoU) since 2000 and is currently operating under the sixth performance contract, running from 2019-2022.

NWSC has allocated funds for implementation of the Water and Sanitation infrastructure measures in Adjumani Town Council (TC) and nearby areas under the proposed Adjumani Water and Sanitation Project in order to address the water supply and sanitation gap. Adjumani district is found in the Northern Region and West Nile sub-region of Uganda and is bordered by Obongi district in the West and North-West, Madi-Okollo district in the South-West, Amuru district in the South and East, Moyo district in the North and South Sudan in the North-East.

Proponents' Contact And Project Cost Estimate

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The overall project cost estimate for the water supply system is UGX UGX **51,573,215,088** (Fifty One Billion, Five Hundred Seventy Three Millions Two Hundred Fifteen Thousand Eighty Eight Uganda Shillings).

Objectives of the ESIA

The purpose of the full ESIA is to ensure that the proposed investments of Adjumani WSSP comply with the existing environmental protection laws, regulations and standards in Uganda, as well as with the World Bank's Operation Policies and Practices; and will not have a lasting adverse impact on the country's population and their livelihood, the natural environment or assets of particular cultural heritage value. The specific objectives of the ESIA include:

- i) To establish the environmental and social baseline conditions at project sites;
- ii) To provide outline of the project activities to be undertaken; conduct stakeholder meeting with the cross-section of stakeholders;
- iii) To identify, evaluate and assess project alternatives taking into account environmental, social, technological and financial considerations;
- iv) To identify, evaluate and assess the potential environmental & social impacts of the project;
- v) To propose feasible environment & social mitigation measures; and
- vi) To prepare an ESMP as well as Environmental and Social Monitoring Plan for the project..

Scope of Project

The scope of work involves carrying out a detailed ESIA for the proposed Adjumani WSSS which will be implemented specifically in the urban areas of Adjumani and Pakele Town Councils, and RGCs of Ciforo Rural and Dzaipi and selected Refugee Settlement Camps (RSCs) and their respective host communities in Adjumani district. Refugee settlement camps targeted include Pagirinya, Olua, Boroli, Olijji, Agojo and Nyumanzi RSCs. The sanitation component will be implemented specifically in Adjumani and Pakele TCs, and RGCs of Ciforo Rural and Dzaipi.

Under the Adjumani WSSS, the Consultant is required to prepare detailed ESIA for the water supply and sanitation components, respectively. Therefore, this ESIA is specifically for the Adjumani Water Supply System covering both surface water components (Intake and pumping station, Water Treatment Plant (WTP), Elevated Storage Reservoirs (ESRs), Feeder mains and Distribution network) and ground water components (proposed boreholes and pumping stations, transmission, ESRs and distribution network). Others include access roads, power supply and auxiliary facilities. The duration of the consultancy services contract is 10 calendar months.

2 TECHNICAL DESCRIPTION OF PROJECT COMPONENTS

Project Area

Adjumani district is found in the Northern Region and West Nile sub-region of Uganda and is bordered by Obongi district in the West and North-West, Madi-Okollo district in the South-West, Amuru district in the South and East, Moyo district in the North and South Sudan in the North-East. It lies between eastings of E322245, N329433 and E395307, N377025 to the west and East,

respectively while to towards the north and south, it lies between E393941, N397100 and E337829, N318180. The intake is located approximately 2.5 km upstream of the Laropi – Omi ferry crossing point along the R. Nile and about 16 km from Adjumani Town in Arra West. Other infrastructure will include WTP, MBR, ESRs, transmission and distributions lines and Boreholes.

Surface Water Infrastructure/System

The surface water supply system (SWSS) comprises of the water sources, transmission, treatment, storage and distribution. The sytem will have an Intake and pumping station of 12MLD at Arra West Village, Raw and Treated Water Transmission mains of 18.83 km long, Water Treatment Plant (WTP) of 8.0 MLD capacity in Mijale , Master Balancing Reservoir (MBR) in Mukolo West, Feeder mains of 29.73 km, and Distribution network of about 331.24 km.

According to the R. Nile flow regime at the intake, the lowest and maximum flow rates recorded were 607 m³/s and 1716 m³/s in the last 2 decades. The mean flow (Albert Nile) was 1201 m³/s whereas the Q90% was 810 m³/s. The 40% of Monthly Average Flow (MAF) is 473.5 m³/s throughout the year and the recommended e-flow is 473.48 m³/s. This implies an abstraction of only 0.03% of the MAF by NWSC at the proposed intake. Therefore, there is sufficient water from the proposed source and for the downstream communities in comparison with the e-flow of 473 m³/s given that lowest recorded flow of ever recorded was 607 m³/s.

The transmission mains shall be raw water transmission and treated water transmission mains from intake to water treatment plant (WTP) and WTP to Master Balancing Reservoir (MBR) respectively. The Feeder mains shall convey water from MBR to all the Elevated Service Reservoirs (ESR) by gravity. The distribution network would convey water from ESR to beneficiaries (houses) within the town. For the transmission mains, the DI pipes are proposed and for the distribution network uPVC and PE pipes are proposed. Table 1 shows the locations of the proposed surface water supply components in different areas across the project area. Table 2 gives the summary of the proposed surface water components under the Adjumani WSSP.

Table 1: Location of the proposed project components for surface water system

Hydraulic (Surface water) Component	UTM 36 M – GPS Coordinates	Village/Zone	Parish/Ward	Subcounty/Town Council
Raw water intake and pumping station	E366339, N390075	Arra West	Omi	Pachara
WTP	E366578, N382069	Mijare	Jihwa	Pachara
MBR	E364089, N374784	Mokolo West	Lajopi	Adropi
Ciforo ESR	E358228, N371292	Mocope	Mugi	Ciforo
Pakele ESR	E371318, N371666	Karelu	Pakele Town Board	Pakele
Dzaipi ESR	E383913, N374946	Dzaipi Central	Mgbere	Dzaipi

Table 2: Summary of component for surface water infrastructure

S/N	Component	Surface Water Supply System on River Nile
1	Water Source	River Nile (about 16 km from Adjumani TC)
2	Intake Capacity	12 million Litres Per Day (MLD) which is 0.03% of the recommended e-flow of 473 m ³ /s of R. Nile at the proposed intake point
3	Water Storage Reservoir	None
4	Raw Water Pumping Main (RWPM)	From the Intake to the WTP DI Pipe Class 40 DN-300mm, L- 8.83km for immediate stage
5	Raw Water Pump Station	Vertical Turbine Pumps 1 Duty and 1 Standby (Discharge 70.66 lps against 136 m head), Motor Rating - 140 kW for immediate stage
6	Water Treatment Plant	Total 8.0 MLD capacity. Module 1 - 4.0 MLD for immediate stage with the following units; Pre-Chlorination, Aeration Fountain, Parshall Flume, Distribution Chamber, Flash Mixer, Flocculator, Plate Settler, Rapid Sand Filter, Chlorine Contact Tank
7	Treated Water Pump Station	Vertical Turbine Pumps 1 Duty and 1 Standby (Discharge 66.49 l/s against 176m head), Motor Rating - 170 kW for immediate stage
8	Treated Water Pumping Main (TWPM)	From WTP to MBR cum Adjumani ESR DI Pipe Class 40 DN-300 mm, L-10.08 km for immediate stage
9	Gravity Feeder Mains	uPVC Pipe (Class PN10) 110 to 250 mm O.D, L- 29.93 km shall convey water from MBR to all the Elevated Service Reservoirs (ESR) by gravity <ul style="list-style-type: none"> • MBR to Ciforo ESR through DN150mm DI (Class C40) about 1.27 km and DN100mm DI (Class C40) about 6.19km • MBR to Pakele ESR through DN300mm DI (Class C40) about 8.46km long • Pakele to Dzaipi through DN 300mm DI (Class C40) about 2.32km and DN200mm DI (Class C40) about 13.73km

S/N	Component	Surface Water Supply System on River Nile
10	Master Balancing Cum Adjumani ESR	Capacity – 2No each 655 m ³ (1 Reservoir for construction in the immediate phase)
11	Elevated Storage Reservoir	Ciforo ESR (Existing 50 m ³ , staging height of 10m); Pakele (Existing 150 m ³ staging height of 12m) and Dzaipi 130 m ³ (for construction in immediate phase - staging height of 10m)
12	Distribution Network	Pipes will convey water from ESR to beneficiaries (houses) It will be a total of 48km (110mm to 315mm) uPVC pipe
13	Beneficiaries (Towns)	Ciforo (Loa and Mugi); Adjumani (Agojo, Lajopi, Palemo, Biyaya, Central, Cesia, Pereci (west), Marindi, Alere, Olijji, Jihwa); Pakele (Pereci (East), Pakele Town Council, Nyivura, Meliaderi, Boroli, Ibibiaworo); and Dzaipi (Mgebere), Adidi (Part), Logoangwa(part)
14	Beneficiaries Refugee Settlements	Adjumani (Agojo, Mirieyi, Olijji, Alere)

Groundwater Infrastructure

The groundwater supply system (GWSS) project area will be in the South East of Dzaipi is located at higher elevation compared to main towns and hence it is not feasible to supply these areas with surface water as pumps with a higher head and long pumping mains would be needed. For these areas, decentralized water supply systems with groundwater boreholes as target point water sources were proposed and identified (T1 – Logoangwa, T3 – Melijo and T4 – Ajugopi) based on hydrogeological modelling and geophysical surveys (Table 3). The GWSS will the independent boreholes (T1, T3 and T4) as water sources, transmissions (pumping main), storage and distribution network (Table 4) located in different areas. Table 4 gives the summary of the proposed groundwater components under the Adjumani WSSP.

Table 3: Location of the proposed project components for groundwater system

Hydraulic (Groundwater) Component	UTM 36 M – GPS Coordinates	Village/Zone	Parish/Ward	Subcounty/Town Council
T1 - Borehole	E388260, N373312	Pagirinya	Logoangwa	Dzaipi
T3 - Borehole	E377345, N365287	Gonyila	Melijo	Pakele

T4 - Borehole	E380645, N379590	Ringa	Ajugopi	Dzaipi
Logoangwa ESR	E389218, N370151	Pagirinya	Logoangwa	Dzaipi
Melijo ESR	E376557, N362839	Melijo Central	Melijo	Pakele
Ajugopi ESR	E381635, N378329	Meiaciku	Ajugopi	Dzaipi

Table 4: Summary of component for surface water infrastructure

S/ N	Component	Area 1	Area 2	Area 3
		Logoangwa Groundwater Supply	Melijo Groundwater Supply	Ajugopi Groundwater Supply
1	Borehole	T1	T3	T4
2	Pump Discharge and Head	86.40 m ³ /hr with 117 m head	64.8 m ³ /hr with 111 m head	28.8 m ³ /hr with 93 m head
4	Pumping Main	DI Pipe, DN-150 Class C40, L-3.96 km	DI Pipe, DN-150 Class C40, L-4.4 km	DI Pipe, DN-100 Class C40, L-3.36 km
5	ESR	Height 10 m, Capacity 110 m ³	Height 10 m, Capacity 200 m ³	Height 10 m, Capacity 60 m ³
6	Distribution Network	HDPE, uPVC pipes 63 to 200 mm O.D L-10 km	HDPE, uPVC pipes DN- 40 to 200 mm O.D, L-07 km	HDPE, uPVC pipes DN-40 to 250 mm O.D, L-10 km
7	Beneficiary Areas	Part of Logoangwa Parish and Pagirinya refugee settlement Camp	Part of Melijo, and Olua (1 and 2), Boroli (1 and 2) refugee settlement Camps	Part of Ajugopi and Nyumanzi refugee settlement Camp

Access Roads

The project area can be accessed from Gulu and Amuru District through the Gulu – Atiak – Adjumani Highway to the Moyo via Laropi Ferry crossing point. Accessibility of project components or sites will be through existing public access roads, given their suitable location in closed proximity to the existing road network. These include the MBR, Ciforo ESR and Dzaipi ESR for the SW infrastructure. Under the GW infrastructure, accessible sites include the Ajugopi ESR and Melijo ESR. However, some project components are not in close proximity to the existing road network. These shall require opening or expansion of the access road as captured by the RAP.

Table 5: Summary of requirements for the proposed access roads

Surface Water Infrastructure	
Access road to Water Intake Site	6m wide road extension to Intake site 0.49km
Access road to WTP	6m wide road extension to WTP
Access road to Pakele ESR	6m wide road extension to ESR and 0.062 km
Groundwater Infrastructure	
Access road to Ajugopi Borehole (T4)	6m wide road extension to borehole site and 0.77km
Access road to Ajugopi ESR	6m wide road extension to ESR and 0.22km
Access road to Melijo Borehole (T3)	6m wide road extension to borehole site and 0.041km

Power Supply

Power source will be hydropower and solar. The intake and raw water pumping station will utilise a 33-kV electricity powerline extension located only about 1.0 km from Ara Intake (along Adjumani – Laropi Road). Borehole Pump Stations will utilise solar of 50 kW (T1), 40 kW (T3) and 15 kW (T4). Diesel generators will be the backup power supply source for each infrastructure except for solar.

Auxiliary Facilities

These are project components that are not deemed part of the TL and DL, boreholes, ESR, Intake, and WTP infrastructure but are key in supporting the operations and functions of project. For this project, auxiliary facilities include; campsites, materials sources, materials yards, offices, stores among others.

3 PROJECT ALTERNATIVES

This ESIA considered analysis of the various feasible alternatives of the project under different scenarios to identify and describe the potential feasible alternatives that would allow the project to reach its objectives. Scenarios considered included a) Project or No Project Alternative; b) Site Location and Design Alternatives; c) Routing Alternatives; d) Technology Selection Alternatives and e) Operation and Maintenance (O&M) procedures for the proposed systems.

The “No Project” Alternative was not considered since adopting this alternative means that the status quo remains and the proposed Adjumani Water Supply System is not developed. It eliminates improved access to safe and affordable water, and generation of employment to both skilled and unskilled labour hence impossible to achieve Uganda’s Vision 2040 of having a piped water supply across the country and poverty eradication would be futile.

Location of Intake: Six (6) alternative locations were assessed for siting the water intake as follows: Intake 1 at Liri on R. Nile, Intake 2 at Ologonjo on R. Nile, Intake 3 at Ogujebe on R. Nile, Intake 4 at Laropi on R. Nile, Intake 4 at Arra West near Laropi on R. Nile and Intake 6 at Logoangwa on R. Ayugi. The criteria for selection of the most feasible intake considered factors like; flooding, energy, access roads, water quality, environmental impacts (on other users and activities like fishermen and livestock farmers), ground water infiltration, treatment process complexity,

distance to MBR (Adjumani), static head, sedimentation (sediment transport), stability of riverbed and foundation condition and water depth. Based on this criterion, siting the intake at Arra West Village on R. Nile was chosen as the most feasible option.

Location of Water Treatment Plant (WTP): Two (2) sites were considered: 1) locating the WTP near the intake in Obo Village, and 2) locating the WTP away from the intake ie between the intake in Arra West Village and the MBR. The factors considered in the assessment were energy requirements, cost (operation & maintenance), ease of disposal of the backwash water. The WTP away from the intake was adopted hence a site was identified in Mijale village.

Routing Alternatives for the Main Water Transmission Mains: The most feasible water transmission mains (RWPM and TWPM), from Arra West intake to the WTP, MBR and ESRs at Adjumani, Ciforo, Pakele and Dzaipi. The evaluation involved an assessment of the environmental and social (E&S) impacts. It was evaluated that a pipeline route that mainly moves along the existing road reserves would be less costly and with minimal impact on the E&S setting of the project area hence the pipeline was mainly routed along the existing road reserves.

Intake Technology: Four (4) intake technologies were assessed: bank infiltration, counter flow constructed channel abstraction, intake well inside river, and floating pipe intake. After evaluation of the operational requirements of the intake technologies and based on the conditions of the selected intake location, the counter flow constructed channel abstraction was selected as the most feasible intake technology.

Water Treatment Technology: Five (5) alternative water treatment technologies were assessed: conventional treatment process, treatment process with pressure filter, treatment process without sludge treatment, treatment process with clariflocculator and treatment process with plate settler. The assessment criteria considered the area requirement, energy input, efficiency, initial investment and maintenance cost and bulkiness. Based on these criteria, the treatment process with plate settler was chosen as the most feasible alternative.

Water Storage Tank Technology: The alternative technology for the storage tanks considered galvanized steel tanks (Steel) and reinforced concrete tanks (RCC). The evaluation of these two storage tank technologies considered the cost, availability and ease of installation. As a result, the steel tank technology was been proposed in the revised design and selected as the most feasible option for the proposed project.

4 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

According to the World Bank's environmental categorisation, the proposed project is classified as EA Category B undertaking which requires detailed ESIA studies. Similarly, according to Schedule 3 of the NEA, Cap. 153 (Section 4a: "storage dams, barrages and weirs", and Section 12c: "sewage disposal works"), Ugandan environmental laws and regulations, require to undertake a full EIA for projects falling under this category.

The legal requirements considered include the policy Framework and Plans mainly the Vision Uganda (2040), NDP III (2020/2021-2024/2025), National Policy for Conservation and Management of Wetlands (1995); National Water Policy (1999); Uganda National Land Policy (2013) and the National Climate Change Policy, 2015.

Under the Legal Framework, the Constitution of the Republic of Uganda, 1995 (as amended); NEA No.5 of 2019 (amended); Land Acquisition Act, Cap 226; Water Act, Cap 152, Public Health Act, Cap 281; OHS Act, 2006; NWSC Statute, 1995 and the Rivers Act, Cap 357 were mainly considered.

Several Regulations, Standards or Guidelines were look at and iclude: the Water Resources Regulations, No. 33/1998, National Environment (Environmental and Social Assessment) Regulations, S.I No.143 of 2020; Wetlands, River Banks and Lakeshores Management Regulations S.I No. 2/2000; Noise Standards and Control Regulations, 2003; UNRA (General) Regulations, 2017; Water Source Protection Guidelines; Standards for consultation; WB Safeguard Policies and IWMDP ESMF.

Additionally, the International Conventions and/or Agreements to Which Uganda is a Party and several institutional frameworks eg NEMA, NWSC, MWE, UNRA, MGLSD; among others, were also considered.

5 PUBLIC CONSULTATIONS AND DISCLOSURE

Stakeholder engagement constituted an important part of the ESIA process, in light of the Project's commitment to adhering to national requirements, as well as a best practice approach to public consultation, that is, an approach that encourages open and transparent dialogue, with as broad a range of stakeholder groups as possible.

Public consultation and disclosure was done during the compilation of the ESIA report through pre-arranged meetings with different stakeholders. A number of stakeholders were consulted including National Stakeholders (Government Institutions/Departments officials) eg MWE, MLHUD, MGLSD, UNRA, OPM, NWSC and Adjumani Local Government (Subcounties of Pacara, Ciforo, Dzaipi, Pakele Town Council and Adjumani Town Council). Furthermore, the local communities within the project area, NGOs (UNHCR, MTI and LWF) were also cunsulted by the ESIA Team. Consultations were also held with the women and other vulnerable groups in the project area.

Some of the related major issues raised during Public Consultation during meetings held with the different stakeholders included mainly covered employment, compensation issues and corporate social responsibilities.

Adjumani DLG team recommended continuous consultations and engagement of the political leaders by the project proponent to ensure that there is stakeholder buy in by the community leaders, need to compensate the affected PAPs, NWSC should draw lessons learnt from other projects for sustainable management in Uganda and should employ the local people. There is also a need to put in place an HIV/AIDS and carry out continuous consultations between NWSC and UNRA to know more about the upcoming projects (Laropi bridge) and what are the provisions in the already ongoing projects e.g. the Atiak – Adjumani – Laropi Road. NWSC should put in place the Source Protection Plan (SPP) for the Intake in Arra West and consideres concerns of raised and incorporate in project design e.g incase excavators are used to dig trenches, where possible local people should be given a chance to do backfilling so that they get jobs. After the final design, NWSC should organize to present the project to the both the district technical and political teams through a workshop since it very key and influential. Water should be taken back to where it is

abstracted for the local communities to gain e.g. at the ferry crossing in Laropi and Arra and engage and actively involve the district in monitoring of social safeguards.

OPM clarified that where water pipes traverse settlements, the NWSC will not have any issues of compensation and NWSC should only work with the settlement commandants to ensure work goes on smoothly.

MGLSD advised on occupational, health and safety measures to be undertaken during the project and Gender sensitivity aspects with regard to the project.

UNRA stipulated that if there is need to be in UNRA's right of way, considerations should be established for issues to be discussed before implementation as described in UNRA's new regulations and at swamp crossings, hankers should not block the incoming flow on roads to avoid flooding of debris and water.

MWE team wanted to know the possible solutions to flooding around the surface water abstraction Intake at Arra West and whether the water source protection component considered under this project, if not NWSC should develop WSPPs and ensure that they are implemented.

6 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

To endure the water supply in Adjumani, NWSC will abstract water from the R. Nile (White Nile) near upstream the Laropi Ferry Crossing. The currently planned water system will supply about 4 towns along the routes of transmission main, namely; Adjumani TC, Pakele, Dzaipi and Ciforo and other several communities and refugee settlements in Adjumani district. Although water supply exists in most of these towns, the additional supply from NWSC will further boost the service level and provide reliable supply. This will translate in improvements in health, economic and social welfare of the community.

Nevertheless, adverse impacts may arise from these water supply improvement activities. . Therefore, this section provides an evaluation of the impacts (both positive and negative) and the corresponding mitigation and/or enhancement strategies identified at all phases of the project i.e., pre-construction, construction, operation and maintenance and decommissioning phases. A summary of the positive and negative impacts of the project is presented in Table 6.

Table 6: Positive and negative impacts of the proposed project

Impact	Project Phase	Impact Significance
Positive Impacts		
Social Acceptability, Community Involvement and Ownership for the Project	Pre-Construction	Major (+16)
Employment Opportunities	Construction	Major (+16)
Human Capacity Building in Form of Skills Training and Technology Transfer	Construction	Moderate (+9)

Improved / Increased Access to Safe and Clean Water by Communities	Operation	Major (+12)
Improved Public Health Conditions and Health Security	Operation	Major (+12)
Gender Empowerment and Equality	Operation	Moderate (+9)
Improved Education Outcomes due to Access to Safe Water	Operation	Major (+12)
Abridged Water Vulnerabilities Among Rural & Urban Host and Refugee Communities	Operation	Major (+12)
Rural Transformation Through Improved Living Conditions (Reliable and affordable Piped Water Supply)	Operation	Major (+12)
Improved Local Governance and Social Accountability	Operation	Moderate (+8)
Benefits to the Economy Through Increased Investment in the Area	Operation	Major (+12)
Negative Impacts and Risks		
Loss of Land and Displacement of Economic Activities	Pre-construction	Moderate (6)
Loss of Vegetation	Construction	Minor (4)
Loss of Habitat for Fauna	Construction	Minor (4)
Impacts on Land Use/cover	Construction	Minor (4)
Decline of Pristine Landscape and Emerging of Vector Breeding Grounds	Construction	Minor (4)
Susceptibility to Soil Erosion and Pollution Risks	Construction	Moderate (6)
Generation and Improper Management of Waste	Construction	Moderate (8)
Noise and Vibration Impact	Construction	Moderate (6)
Air quality and Dust Management	Construction	Minor (4)
Impact on Intake and Pumping Station (Flooding of River Nile)	Construction	Moderate (9)
Impacts on Water Quality	Construction	Moderate (6)
Loss and Relocation of Structures and Utilities	Construction	Minor (4)
Introduction of Invasive Species	Construction	Minor (4)

Health Impact – Contracting and Spreading COVID-19	Construction	Major (12)
Social Conflicts due to Influx of Immigrant Labour	Construction	Moderate (6)
Risk of Child Labour and Violence Against Children	Construction	Moderate (6)
Risk of Gender Based Violence, Sexual Exploitation and Sexual Abuse	Construction	Moderate (6)
Loss of Physical Cultural Resources	Construction	Minor (4)
Impact on Landing Site at Arra	Construction	Minor (4)
Occupational Health and Safety Risks	Construction	Moderate (8)
Community Health and Safety Risks	Construction	Minor (4)
Risk of Seismic Activity	Construction	Moderate (9)
Decrease in Water Resources	Operation and Maintenance	Minor (4)
Air Pollution	Operation and Maintenance	Moderate (8)
Failure of the Water Supply Equipment/Components	Operation and Maintenance	Moderate (8)
Solid Waste Generation	Operation and Maintenance	Moderate (6)
Water and Soil Pollution	Operation and Maintenance	Moderate (6)
Impacts from Damage of the Pipe Network	Operation and Maintenance	Moderate (9)
Transboundary Issues	Operation and Maintenance	Minor (3)
Climate Change Risks and Impacts	Operation and Maintenance	Minor (3)
Reduced Affordability (Inability to Access Water)	Operation and Maintenance	Moderate (6)
Loss of Jobs for Water Vendors	Operation and Maintenance	Moderate (6)
Occupational Health and Safety Aspects	Operation and Maintenance	Minor (4)

Community Health and Safety	Operation and Maintenance	Minor (4)
Cumulative Impacts		
Disruption to Traffic Flow and Communication Routes	Construction Phase	Moderate (9)
Water and Land Pollution	Operation and Maintenance	Minor (4)
Excessive Abstraction of Water	Operation and Maintenance	Minor (4)

7ENVIRONMENT AND SOCIAL AND MONITORING MANAGEMENT PLAN (ESMMP)

This ESMMP for proposed construction works and operation of the proposed Adjumani WSSP, identifies the potential environmental and social impacts that should be managed and monitored. It categorises parties responsible for monitoring actions, associated costs, indicators and training or capacity building needs and reporting.

Institutional Structure and Responsibilities

During the construction phase, the parties to be involved in the implementation of the ESMP include: NWSC with the ultimate responsibility for environmental and social performance on the project; the Supervising Consultant (Supervising Engineer with an Environment and Social Specialist on their team) responsible for monitoring and supervising the implementation of the ESMP and contract requirements by the contractor(s); and the Contractor (Environmental Specialist, Social Development Specialist and Health & Safety Specialist) who has responsibility for implementing the ESMP. NWSC will ensure that both the Supervising Engineer and Contractor effectively implement the ESMP (environmental and social protection measures).

Sub-contractors will be required by a condition of their sub-contract with the main contractor to actively manage E&S issues associated with their subcontract works and comply fully with all the applicable statutory regulations and the main C-ESMP and shall not develop their own ESMP. The Resident Engineer in consultation with NWSC shall review the main C-ESMP and approve it prior to commencement and implementation of the works.

The District Environmental Officer (DEO) of Adjumani districts is responsible for overseeing environmental protection on behalf of NEMA. Due to inadequate facilitation, the project will need to provide auxiliary financial assistance for him/her to effectively participate in this project.

Table 7 and Table 8 below present the ESMMP for the Adjumani WSSP.

Table 7: Environmental and Social Mitigation Plan

Project Phase	Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
Positive Impacts				
Pre-construction	Social Acceptability, Community Involvement and Ownership for the Project	Ensure meaningful public disclosure of design and other information before and during project implementation to avoid misinformation among communities especially in areas where the project is not covering (non-beneficiary areas)	NWSC/ District Local Governments of Project Area	5,000,000
		Increase respectful engagement among those from diverse cultures and decrease intolerant practices by community members.	NWSC District Local Governments of Project Area Contractor	
		Encourage respectful engagement by workers and other members	NWSC/Contractor	
		Maintain a strict level of sensitivity to cultural concerns and differences between workers and members of the community.	NWSC/ District Local Governments of Project Area	
Construction	Employment Opportunities	To manage social conflicts and negative politics that could arise, the Client should coordinate with the appointed contractor to ensure that priority for employment is given to the local qualified people within the project zones depending on their skills and training.	NWSC/Contractor	
		Adequate occupational health and safety standards should be provided to ensure the work environment is conducive.	Contractor	Within contractor's bid budget
		Conduct Labour Inspections on contractor's workplaces by District Labour Officer (DLO).		4,000,000
		Contractor should adhere to national labour laws, policies and regulations more so on remuneration and worker grievance management.	Contractor	
		The provision of jobs to local people should be properly handled in terms of transparency and openness. Involve LC1 village leaders in identifying casual and semi-skilled workers (Offer Identification / registration forms). The same should apply to refugee settlement with the help of the camp commandant. However, the contractor has jurisdictions over recruitment process and eligibility requirements.	NWSC/ District Local Governments of Project Area/ Contractor	
		Where possible, the Adjumani WSSP should integrate social protection mechanisms such as offering casual jobs to vulnerable and marginalized people. These include the PAPs e.g., displaced households, women, youth, disabled persons, lactating mothers, widows, and older persons. In case of employment of vulnerable members from child headed households, the person employed should be at least 18 years of age in line with the Employment Act.	NWSCContractor	

Operation and Maintenance		Women should be given preferential opportunities and employees should be issued appointment letters and contracts with clearly spelt out and understandable terms of employment. The GBV , HIV/AIDs risk mitigation measures must be put in place.	NWSC/Contractor	
		The contractor must also ensure that workers are paid on time. Vulnerable groups like the youth and disabled should be given priority.	Contractor	
		Contractors will be encouraged to pay a “living wage” to all workers	Contractor	
	Human Capacity Building in Form of Skills Training and Technology Transfer	Foreign companies should be required to have a joint venture with local companies to build their capacity.	NWSC/Contractor	
		In addition, terms of agreement as per the Contracts terms for construction works Contractor for the project’s construction and O&M phase should emphasize knowledge transfer and the project developer (NWSC) should monitor and ensure that the objectives are met.	NWSC/Contractor	8,000,000
		O&M manual and standard operating procedures must be handed over to the operators (NWSC).	Contractor	
	Improved / Increased Access to Safe and Clean Water by Communities	Conduct customer education and sensitize water users and communities about operations of new water system, especially on how to access new connections to minimise on the possible misconception and negative attitudes.	NWSC/ District Governments of Project Area	Within NWSC jurisdiction
		Scale-up the intensification of lines, especially in areas where the trunk mains are too far away for the customers to be able to connect at reasonable cost.	NWSC	Within NWSC jurisdiction
		Ensure effective customer relations and customer care	NWSC	Within NWSC jurisdiction
		Ensuring that water is affordable and available all the time	NWSC	Within NWSC jurisdiction
		Need for continuous customer satisfaction surveys in order to obtain customer feedback and improve performance within new and old service areas. Additionally, NWSC Commercial Services Unit (CSU) should revise its customer education action plan to include aspects of catchment protection, mainstreamed with climate change adaptation and mitigations.	NWSC	15,0000,000
		Provide several communal water points will be provided for the community water needs, the locations of these water kiosks will be identified in consultation with the local residents and will be chosen bearing in mind the close proximity to the people they intend to serve.	NWSC	
		The amount of water dispensed by the kiosks should vary depending on the number of residents in that area.	NWSC	
	Improved Public Health Conditions and Health Security	Provide piped water connections to most health facilities (institutional connection) in Adjumani district i.e., Ciforo, Dzaipi, Pakele, Adjumani Towns, among others as part of the intensification lines.	NWSC	Within NWSC jurisdiction
		Ensuring that most of the communities in the project foot print are connected or have access to the piped water i.e., extend water to as many households as possible	NWSC/ District Governments of Project Area	Within NWSC jurisdiction
		Ensuring that operations and maintenance are properly done to avoid issues of water contamination and shortage.	NWSC	20,000,000

		Ensuring that water is affordable and available all the time	NWSC/ District Governments of Project Area	Within NWSC jurisdiction
		Sensitize the communities about the dangers of using unsafe water	Within NWSC jurisdiction	6,000,000
	Gender Empowerment and Equality	Ensuring that women and girls are also given priority while recruiting personnel for the project.	NWSC/Contractor	
		Ensuring the all the households within the project footprint are either connected or have access to clean and safe water.	NWSC	
		Mainstreaming gender into government policy and programming, together with Gender Focal Persons	NWSC	
		Create water programs that reflect the integral roles of women and girls as providers, users and managers of water supply services	NWSC	10,000,000
		Increase capacity of the district and service providers to address gender and water.	NWSC/ District Governments of Project Area	5,000,000
	Improved Education Outcomes due to Access to Safe Water	Provide intensified lines / piped water connections to all 9 ECD centres, 12 primary schools and 1 seed secondary schools.	NWSC	
		Extend the distribution network to cover as many communities as possible	NWSC	
	Abridged Water Vulnerabilities Among Rural & Urban Host and Refugee Communities	Integrate gender mainstreaming in water operations.	NWSC	
		Promote climate resilience and other feasible adaptive pathways among host, IDP/refugee communities such as water storage.	NWSC/ District Governments of Project Area	25,000,000
		Intensify water network to as many areas as possible including taking water back to where it comes from (Arra West)	NWSC	
	Rural Transformation Through Improved Living Conditions (Reliable and affordable Piped Water Supply)	NWSC needs to align its proposed developments in line with the physical plans of Adjumani TC and Pakele, Dzaipi and Ciforo RGCs and other mushrooming centres in Adjumani.	NWSC	Within NWSC jurisdiction
		Subsidise water prices to those who want to be water venders in the respective areas of distribution.	NWSC	
		Make sure that all health centres along the pipelines access water e.g. Arra HCII, Dzaipi HCII, Ciforo HCIII, Pakele HCIII, Pagirinya HCIII, Pachara HCII. This is because even those who have water, there is shortage given the patient numbers received per day.	NWSC	
		Endeavour to engage physical planning committees for proper planning at all stages		
	Improved Local Governance and Social Accountability	The operations and maintenance of new water system should be safeguarded from political undertones arising from the discrepancies between those who are connected and not.		
	Benefits to the Economy Through Increased Investment in the Area	During the construction phase, conditions should be put in place to ensure contractors prioritize use locally produced materials.	NWSC/Contractor	
		The water distribution network connections should target Small and Medium Enterprises (SMEs).	NWSC	

		During the construction phase, all contractors and sub-contractors should be registered tax payers with the Uganda Revenue Authority (URA) and should pay applicable taxes and remittances in a timely manner.	NWSC	
		The project developer should ensure that engineering designs, architectural drawings and site layout plans for the various project facilities be submitted to the Physical Planning Committee of Adjumani District Local Government for review and approval.	NWSC/Contractor	
		The Central Government through URA should ensure that project facilities operator makes timely submissions and routinely update their tax bases.	Government of Uganda	
Negative Impacts				
Pre-Construction	Loss of Land and Displacement of Economic Activities	Ensure timely and appropriate compensation before construction begins as per the recommendations of the RAP report.	NWSC	RAP Report
		The RAP should take into consideration local community and household preferences when proposing compensation and/or relocation to the PAP. For instance, a land owner who is partially affected by the project may be willing to relocate part of his property rather than complete relocation from the affected land.	NWSC	585,770,084 as determined in the RAP Valuation Report.
		PAPs should be given training on financial literacy entailing how to use their compensation packages.	NWSC	RAP Report
		Feasible in-kind compensation can be considered especially for institutional land owners, for instance, provision of individual taps and/or connection of public infrastructure to the piped water system rather than cash payments.	NWSC	
		LGs should be involved in mobilization and sensitizing PAPs, for instance, the client could assign Community Development Officers (CDOs) tasks to register and follow up project affected persons.	DLG	5,000,000
		Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses to secure settings. Prior to the construction phase, farmers shall be sensitised on the pending project at least 6 months in advance such that cultivation within the project sites/ components' footprint is stopped or reduced.	NWSC	Already covered
		In cases where the landlords object using their land for the water pipelines without any compensation, NWSC shall in line with Section 76 9(a) of the Water Act, Cap 152 enter upon any land, take its levels and set it out as the authority thinks necessary, dig, trench and break up the soil, and use or remove any material dug from the land;	NWSC DLG Contractor	
		All land acquired for establishment of the water treatment plant, transmission pipes, reservoir tanks and any other activity either by the Client or contractor shall be compensated for in accordance with land Act. 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.	NWSC DLG	
		Institute and maintain an active GRM on site during the construction phase to ensure that any arising issues are promptly and amicably addressed such as property affected but not previously envisaged in the RAP is timely compensated for as applicable.	Contractor	Within Contractor's bid budget
Construction	Loss of Vegetation	Vegetation clearance should be limited to only localities required for development.	Contractor	Within contractor's bid budget

		The design (during routing/network analysis) tried as much as possible to restrict the project sites and the water transmission and distribution line routes within the road reserves at the pre-construction stage.	Contractor	
		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	Contractor	Within contractor's bid budget
	Loss of Habitat for Fauna	Clearance of fauna habitat (vegetation and soils) should be limited only to localities required for development.	Contractor	
		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.	Contractor	Within contractor's bid budget
		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.	Contractor	10,000,000
		All project workers should be sensitized to minimize damage to vegetation and fauna.	Contractor	Responsibility of EHS under the contractor
		If any wild or aquatic animals (e.g., crocodiles, hippos, pythons among others) are encountered, the Contractor shall notify UWA so that it is picked and taken to a secure place.	UWA	5,000,000
		Trenching, pipework laying as well as well as backfilling will be done concurrently. The contractor shall ensure that every evening, the pits are covered with timber while being secured with a warning tape in case they are not backfilled.	Contractor	
		Close monitoring and supervision of the construction operations to ensure compliance and avoid causing further damage to undesignated project areas.	NWSC/Supervising Consultant	
		Wetlands/swamps and floodplains along the project alignment should be given due attention during the construction phase to avoid negative impacts by: <ul style="list-style-type: none"> Avoiding intentional spilling of petroleum products; Implementation of the water act and wetlands policy, specifically articles that prohibits pollution and dumping of waste. Undertaking a confirmatory survey to set out the actual pipeline route based on the Engineers route and alignment. Two (2) pipe supports (pedestals) are normally adopted for a 6m length of a pipe because the risk of bending is at the ends of the pipe; Once this has been approved by the Engineer, the Contractor pinpoints (identifies) the exact locations for the pedestals; Excavation and filling these locations with hardcore until settlement ceases; Formwork (in the shape of a square or rectangle) is placed above the hardcore; Once approved by the Engineer – reinforcement works for the pedestal base and column are undertaken until the pedestal is ready to receive the pipe. 	Contractor	
	Impacts on Land Use/cover	The water transmission line routes should be as much as possible restricted within the road reserves.	NWSC/Contractor	

		Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the water sources, 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.	NWSC	585,770,084 as determined in the RAP Valuation Report.
		Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses to secure settings. Prior to the construction phase, farmers shall be sensitised on the pending project at least 6 months in advance such that cultivation within the project sites/ components' footprint is stopped or reduced.	NWSC	30,000,000
		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 and crops.	Contractor	
		The contractor should always consult and plan with communities on convenient stock piling areas and accesses during construction.	Contractor	10,000,000
		The contractor should always provide temporary accesses to all affected premises.	Contractor	Within Contractor's bid budget
		Existing accesses should be restored after works, or convenient alternatives provided.	Contractor	Within Contractor's bid budget
		NWSC shall acquire a riverbank user permit from NEMA to carry out a regulated activity in along the riverbank of River Nile in Arra West	NWSC/Contractor	Within NWSC jurisdiction
	Decline of Pristine Landscape and Emerging of Vector Breeding Grounds	Construction materials (stone-based products, murram and related fill materials) subsoil will be sourced preferably from relevant licensed and existing (active) sources i.e., extraction and processing of such materials (as applicable) be in accordance with the provisions in such licences. It is suggested that, the contractor(s)/suppliers be asked to provide copies of proof for such licenses before effecting the supply process;	Contractor	Contractor's bid budget
		The sites be fully revegetated with plants species approved by the Supervising Engineer and District Environmental Officer (DEO)	Supervising Engineer/DLG	
		Excavated soil shall be stock-piled with its edges protected from erosion and such materials can be used during site restoration with the approval of the Supervising Engineer and Adjumani DEO;	Supervising Engineer/DLG	
		Restoration of materials source sites be approved by both the Supervising Engineer and the DEO before issuance of certificate of works completion; and	Supervising Engineer/DLG	
		There should be close and routine monitoring of restoration activities in the site by environmentalist from the Contractor and the Engineer.	Contractor/Supervising Consultant	
		If no suitable licensed source of murram/subsoil is available in the area and the contractor plans to obtain the material from a private landowner, then the contractor will: <ul style="list-style-type: none"> Provide NWSC with a copy of the written agreement between the contractor and the owner of the murram/subsoil source in advance of the beginning of works at the location. The identity of the landowner will be certified by a 	Contractor	

		<p>certificate of ownership or a paper signed by the LC1 Chairperson and/ or Head of Clan. However, depending on volumes that may be required, an ESIA/PB may be mandatory as per the NEA 2019 by NWSC/Contractor.</p> <ul style="list-style-type: none"> Engage and consult any households and/or communities in close proximity to the identified murram/topsoil source and provide evidence of these consultations to NWSC; Ensure adequate compensation on mutually agreed terms is made to people who are either physically or economically displaced by the activities of the contractor. The contractor will provide documentation of the compensation terms (minutes of consultation meetings, signed agreements with affected persons, compensation receipts etc.) to NWSC; Assess health and safety risks linked to murram/subsoil extraction and transport, and implement appropriate mitigation measures. The risk assessment will be provided to NWSC ahead of the beginning of works; and Provide a restoration plan for review, and ensure that the actions of the restoration plan are implemented to the satisfaction of concerned authorities. Sign-off from the relevant authorities will be required and copies of the sign-off will be provided to NWSC. 		
		Surface water run-off will be controlled during earthworks. Surface water features down-slope of the earthworks will be identified, and the necessary berms and drainage channels will be installed to ensure that run-off does not collect or pond in excavated areas or quarries.	Contractor	
	Susceptibility to Soil Erosion and Pollution Risks	A waste management plan will be developed prior to start of construction activities.	Contractor	
		Vegetation clearance should be limited to localities required for development.	Contractor	
		Construction sites should be hoarded off before excavations and soil barriers put in place 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.	Contractor	
		Topsoil should be removed prior to carrying out excavations and 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.	Contractor	
		A spill kit will be maintained onsite to clean-up any accidental spills.	Contractor	
		The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation.	Contractor	Within Contractor's bid budget
		Excess excavated soil material which will not be used for construction works shall be removed from the site in a timely manner and deposited at an approved site	Contractor	Within Contractor's bid budget
		Areas adjacent to the construction site should not be disturbed and care taken to minimize the area of impairment caused by on-site storage of construction materials and equipment.	Contractor	
		NWSC 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-vegetation of excavated sites.	NWSC	5,000,0000
		Contractor will avoid use of old equipment and damaged equipment that is most likely to have oil leakages thus contaminate the soils and the Contractor will ensure that equipment is properly maintained and fully functional to avoid leakages that may contaminate soils. A joint inspection of works and equipment should be done by the consultant, contractors, and the client.	Contractor	
		Throughout reinstatement, the trench back-fill material will be compacted to a level similar to the original surrounding soils to avoid subsidence as a consequence of rain water channelling.	Contractor	

		Upon completion of subsoil and topsoil restoration, disturbed areas will be inspected together by the construction contractor and NWSC personnel for stability, relief, topographic diversity, acceptable surface water drainage capabilities, and compaction.	NWSC/Contractor	Already covered
		All chemicals will be stored in designated, locked storage areas, taking care to ensure segregation of potentially reactive substance (e.g., flammables should not be stored with toxic substances). These areas will have an enclosed drainage system/bund to avoid contamination. Material Safety Data Sheets (MSDS) will be provided for all substances and used in project health and safety assessments. Efforts will be made to avoid and minimise the use of hazardous chemicals during construction where possible;	Contractor	
		The construction sites – Intake, Water Treatment Plant and Reservoir sites will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water.	Contractor	
	Generation and Improper Management of Waste	The Contractor shall develop and implement a Waste Management Plan	Contractor	Within Contractor's bid budget
		All sorts of waste generated during construction such as Ductile, HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and delivered to recycling facilities. Other forms of waste which are inert must be collected by NEMA gazetted waste handlers and taken to a NEMA gazetted waste disposal facilities for disposal.	Contractor	
		All organic waste generated at eating places during construction such as food stuffs shall be collected and transported by the contractor to designated district landfills for disposal.	Contractor	
		All plastic waste generated during construction, such as mineral water bottles, polyethene bags, jerrycans and cups shall be collected and taken for recycling in plastic collectors in for onward transmission to plastic recyclers.	Contractor	
		Human excreta shall be managed using a mobile toilet and then disposed at the existing Faecal Sludge Treatment Plant in Dzaipi.	Contractor	
		The contractor will work with Adjumani district Local government to facilitate sound waste handling and disposal. All wastes must be taken to the approved waste disposal facilities. Proof of delivery and safe disposal of waste will be provided and records maintained at all times.	Contractor	
	Noise and Vibration Impact	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.	Contractor	Within Contractor's bid budget
		Workers should be provided with the necessary personal protective equipment (PPE) such as ear muffs.	Contractor	
		Periodic medical hearing checks should be performed on workers exposed to high noise levels.	Contractor	
		Sites must be hoarded to curb noise impacts to neighbouring communities especially at the intake, WTP, MBR and ESRs.	Contractor	
		Works should be undertaken during day time i.e., from 8 am to 6 pm.	Contractor	
		Works near schools or health centres should be done in periods like weekends in order for noise and vibrations not to interfere with learning environment.	Contractor	
		Weekly monitoring of noise levels at active sites should be carried out by the contractor.	Contractor	
		Insulation/enclosing of any generators and heavy-duty equipment to minimize disrupting ambient noise levels.	Contractor	

		Switching off of equipment when not in use	Contractor	
		Prior notification of residents in the vicinity of construction activities of the contractor's proposed working schedule and the times and duration of any abnormally noisy activity likely to cause concern.	Contractor	
		Restricting speed limits of project vehicles through settlements and trading centres to minimize noise.	Contractor	
	Air quality and Dust Management	Travel speeds of construction vehicles along the road especially at trading/ business centres will be controlled and should not exceed 50 km/h on the highway and 40 km/h off the highway to minimise the chances of higher PM in the project areas.	Contractor	
		Trucks will be covered during haulage of construction materials to reduce on spillage of materials and wherever dust suppression is necessary, water will be sprayed over dusty areas.	Contractor	
		Workers will be provided with PPE and the use of PPE shall be enforced.	Contractor	Within Contractor's bid budget
		All surfaced roads shall be subject to road cleaning and un-surfaced roads to dust suppression, the methodology and frequency of which shall be included in the Contractor's Traffic Management Plan.	Contractor	
		Stockpiles of friable material will be grassed in order to prevent wind erosion.	Contractor	
		A maintenance programme for equipment and vehicles will be implemented, to ensure air emissions like particulates, SO ₂ and NO ₂ are minimised.	Contractor	Within Contractor's bid budget
		Sprinkling water where there is a lot of dust during working hours	Contractor	Within Contractor's bid budget
		Construction work will be undertaken by an experienced and duly registered contractor with a verifiable sense of environmental awareness and responsibility	NWSC	
	Impact on Intake and Pumping Station (Flooding of River Nile)	Planning of construction of intake works during dry season	Contractor	
		Utilisation of the already installed early warning systems and periodic monitoring flows at different locations of the Nile and when need arises to sustainably manage high variability in river flow rates	NWSC/DWRM	
		Sharing of regional climate information among organizations such as ICPAC, EAC, and National Meteorological Departments of the Nile Basin states;	DWRM	
		In open waters, especially during construction of the intake, plastic curtains will be used to contain and confine resuspension of bottom silt to minimize turbidity in surrounding and downstream areas, using longer support spans and restricting construction to dry weather where possible;	Contractor	
		Approach land and road should be raised to allow for storm water drainage from the upstream areas and intake plot into R. Nile above the High Flood Level (HFL);	Contractor	Within Contractor's bid budget
		Construct a strong storm water open channel around the intake fence to take care of the storm water that would reach the intake and diverted to the R. Nile;	Contractor	Within Contractor's bid budget

		Maintain the proposed e-flow of 473 m ³ /s in the river (throughout the year) to support aquatic life and social economic activities down stream	Contractor	
		The intake house (surface infrastructure) should be raised at least 2 to 4 m above the existing ground level (EGL) or the HFL for safety in case of floods in the R. Nile.	Contractor	Within Contractor's bid budget
	Impacts on Water Quality	The Contractor shall construct a drainage system with silt traps to reduce impacts of storm water from the construction site.	Contractor	Within Contractor's bid budget
		The contractor shall implement waste management according to good practice to ensure waste does not pollute the surface water resources	Contractor	
		Surface water runoff will be controlled during earthworks. Surface water features downslope of the earthworks will be identified, and the necessary berms and drainage channels will be installed to ensure that runoff does not collect or pond in excavated areas or quarries.	Contractor	
		Stockpile areas for materials such as sand, gravel, stone, and topsoil, as well as overburden dumps will be located away from any water courses and will be surrounded by perimeter or cut-off drains with sediment and other pollutant traps located at drain exits. Cut-off drains will be maintained throughout the subsequent operation phase;	Contractor	
		Replacement of oil / hydraulic fluids in vehicles shall not be undertaken in sensitive areas, and used fluids such as old car engine oil shall be sent back to the service providers for recycling. Where sites for such activities are located within the facility, a separate drainage should be constructed leading into an oil interceptor before release into the environment	Contractor	
		All construction equipment will be kept in good operating condition to avoid oil or fuel leakages that might contaminate water resources. Poorly maintained machinery will not be allowed to operate on site. All major vehicle repairs shall be conducted by qualified and experienced personnel at gazetted service centres (garages) away from the water transmission and distribution corridor.	Contractor	Within Contractor's bid budget
		All hazardous wastes including material soiled with hazardous wastes and empty containers of hazardous materials shall be stored in a designated area on site for regular removal and disposal by a registered contractor in accordance with the National Environment (Waste Management) Regulations, 2020. All other wastes generated during site preparation and construction will be transported by the contractor or a company that has been specifically contracted to an authorized disposal area.	Contractor	Within Contractor's bid budget
		A spill kit will be maintained onsite to clean-up any accidental spills.	Contractor	Within Contractor's bid budget
		In open waters, especially during construction of the intake, plastic curtains will be used to contain and confine resuspension of bottom silt to minimize turbidity in surrounding and downstream areas, using longer support spans and restricting construction to dry weather where possible; and	Contractor	Within Contractor's bid budget
		Construction activities will largely be carried out during the dry season to avoid sediment transport to the nearby land, water courses and roads	Contractor	
		Workers' camp and associated facilities where applicable will be connected to septic tank or other wastewater systems which are appropriate and of sufficient capacity for the number of workers and local conditions. These facilities will be inspected regularly to ensure proper functioning. Camp site selection shall involve several factors, including; the size and conditions of	Contractor	

		the site and availability of resources; the safety, security and protection it offers and cultural and social considerations. The Contractor shall conduct the necessary environmental and social assessments according to national and World Bank Environment and Social Safeguards Policies and acquire approvals from NEMA and the supervising engineer prior to establishment of new camp sites.		
		Water from cleaning and hydrotest activities which could cause contamination of surface (or ground) waters shall be tested and treated as necessary prior to discharge, including debris and sediment removal.	Contractor	
		Water quality testing and monitoring at the intake should be done at least every week by the contractor under the supervision of the Supervising Consultant to ensure compliance with its environmental management policies, ESIA recommendations and national regulations; and	Contractor	
		Fuel handling and oil spill measures will be implemented to prevent, control and address spill or leaks. Fuel storage and dispensing on site shall not be allowed near the intake area. Fuel and oil handling will be assigned to trained personnel and procedures for fuel storage, operation of mobile fuel tankers and refueling areas will be well defined. Impermeable sheets, spill mats, and drip trays will also be provided in the appropriate areas to curb fuel and oil leakage to the ground. This will be done at designated places at the contractor's camp and in accordance with relevant standards set by the Energy Regulation Board and Uganda Bureau of Standards (UBOS).	NWSC Contractor	
	Loss and Relocation of Structures and Utilities	Ensure timely compensation before construction begins.	NWSC DLG	
		Timely planning of relocation following and approved utilities relocation plan.	NWSC Contractor	RAP Report
		Timely communication and notification of affected communities (under the SEP) regarding planned relocation works.	NWSC	
		Establish visible and transparent Grievance Redress Mechanisms (GRM) (committees and appropriate protocols) so that complaints and dissatisfactions about the resettlement/ compensation process do not unduly delay contractors progressing works.	NWSC DLG Contractor	10,000,000
		Engage all stakeholders especially local leaders in mobilizing / sensitizing communities	NWSC Contractor	7,000,000
		Identify and avoid / relocate existing underground infrastructures that are directly affected by proposed facilities / lines before construction begins.	Supervising Consultant Contractor	Within Contractor's bid budget
		Provide adequate vacation notice (according to regulatory requirements, this is three (3) or six (6) months) to affected people before construction commences. This will also allow affected property owners to plan appropriately or take any salvageable material from their demolished structures without delaying contractor's work.	NWSC	
	Introduction of Invasive Species	Vehicles and equipment entering and leaving the project area will be inspected and cleaned to remove invasive species.	Contractor	
		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.	Contractor	

		NWSC should ensure that the appointed Contractor put in place and effectively implement an Alien Invasive Species Eradication Plan, as part of implementing the ESMP.	NWSC	
Health Impact – Contracting and Spreading COVID-19		Sensitize all project employees about the signs and symptoms of COVID-19 as well as the ways to control its spread and report in cases of signs and symptoms;	Contractor	Within Contractor's bid budget
		Screen local employees/contractors for COVID-19 during recruitment;	Contractor	10,000,000 but based on the situation by then
		Screen all visitors to construction sites using a temperature gun and enforce washing of hands before entry and wearing of approved masks;	Contractor	Within Contractor's bid budget
		Management of potential COVID-19 cases – in case, any workers develop the above symptoms, isolate them and immediately contact the respective District Health Officer (DHO) to pick and transport the patients for treatment;	Contractor	Already covered
		Reduce site traffic – prohibit entry for any non-essential visitors. In addition, utilize staggered start and finish times for workers to limit site congestion and physical contact. Further, restrict the number of people in attendance at any site inductions, and consider holding them outdoors whenever feasible.	Contractor	
		Practice social distancing – Consistently monitor points of worker interactions such as dining areas to ensure social distancing guidelines (2-4 meters apart) are being met.	Contractor	
		Prioritize sanitation – Enforce workers to wash their hands with soap and water for at least 20 seconds or to use sanitizers before entering and after leaving the worksite, as well as before and after handling all goods, materials and equipment. Routinely clean any common contact surfaces on-site (e.g., scanners, turnstiles, screens, telephones and desks). Lastly, be sure to temporarily remove or disable any site entry systems that require skin contact (e.g., fingerprint scanners).	Contractor	5,000,000
		Limit physical contact – Make sure that the contractor stagger break times to reduce congestion and physical contact in eating areas. Require workers to keep at least 2-3 meters of distance between one another while eating.	Contractor	
		Enhance whole-of-society coordination mechanisms to support preparedness and response, including the health, transport, travel, trade, finance, security and other sectors. Involve public health Emergency Operations Centres and other emergency response systems early.	Contractor DLG	1,000,000
		Continuously sensitize the workers and pass on any new guidelines by Government and the WHO.	Contractor	Already covered
Social Conflicts due to Influx of Immigrant Labour		The contractor will be required to develop a Labour Influx Management Plan and/or a Workers' Camp Management Plan. These will include sanctions for workers involved in criminal activities.	Contractor	Within Contractor's bid budget

		As a contractual obligation, contractors shall be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc. to implement during project execution.	Contractor	Within Contractor's bid budget
		All construction workers shall be orientated and sensitized about responsible sexual behaviour in project communities.	Contractor	Within Contractor's bid budget
		The contractors will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).	Contractor DLG	10,000,000
		The contractor will reduce labour influx by tapping into the local workforce. Depending on the size and the skill level of the local workforce, a share of the workers required for the project may be recruited locally. The local labour if trained could be employed afterwards for the operation and maintenance of the new infrastructure. The recruitment criteria should be transparent and fair to local communities to avoid conflicts.	Contractor	
		Prepare a sexual harassment policy in the event of 20 or more workers	Contractor	
		The contractor will conduct cultural sensitization training for workers regarding engagement with local community.	Contractor	5,000,000
		Workers will be encouraged to get vaccinated against common and locally prevalent diseases.	Contractor	10,000,000
		The contractor, where need arises, will engage an HIV service provider to be available on-site who should conduct campaigns on STDs among the workers and local community; educate workers and the community about the transmission of diseases; and implement HIV/AIDS education program and provision of condoms.		
	Risk of Child Labour and Violence Against Children	The contractor will develop and implement a Children Protection Strategy that will ensure minors are protected against negative impacts associated by the Project including SEA based on NSWC ESMPs;	Contractor	Within Contractor's bid budget
		Children under the age of 18 years should not be hired on site as provided by Child Act (2016);	Contractor	
		Not invite unaccompanied children to workers' homes, unless they are at immediate risk of injury or in physical danger;	Contractor	
		The contractor should put up notices on work sites (NO CHILD LABOUR) in order to silence agitations;	Contractor	
		The Developer should engage District Education Officer, District Community Development Office (DCDO), Gender Officers, Parish Chiefs among others in monitoring school attendance in the project's area of implementation;	NWSC DLG	5,000,000
		Reporting mechanisms should be put in place such as a whistleblowing system;	NWSC DLG Supervising Consultant	6,000,000
		At the induction of employees, the employer should emphasise that molestation of children especially the girl child is punishable by taking the culprit to court;	Contractor	Within Contractor's bid budget
		An employer who tries to shield or cover up for the employee caught in the act will equally be prosecuted, according to the penal code;	NWSC	5,000,000

			DLG Supervising Consultant	
		Sensitization should be done and continuous throughout the project implementation in schools in the project area, by the DLG together with the Contractor about risk of child labour and VAC; and	DLG	4,000,000
		Comply with all relevant local legislation, including labour laws in relation to child labour specifically provisions of Uganda's Employment Act 2006 on protection of children against exploitation.	Contractor	
Risk of Gender Based Violence, Sexual Exploitation and Sexual Abuse	Develop and implement a SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA 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).	Contractor		Within Contractor's bid budget
	The Contractor shall require his employees, sub-contractors, sub-consultants, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse, including sanctions for noncompliance (for example, termination).	Contractor		
	The contractor will conduct mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable Code of Conduct toward local community members, specifically women.	Contractor		
	NWSC should ensure that social safeguards personnel are recruited as part of the project implementation personnel to supervise contractors and carry out effective and continuously community engagements and consultation, particularly with women and girls;	NWSC		8,000,000
	Review of specific project components that are known to heighten GBV risk at the community level, e.g. compensation schemes; employment schemes for women; etc.;	NWSC Contractor		9,000,000
	Contractor shall ensure adequate referral mechanisms are in place i.e. GBV reporting mechanisms should be put in place by the Client; and	NWSC DLG		
	The contractor, where a case arises, will cooperate with law enforcement agencies in investigating complaints about gender-based violence.	Contractor		
Loss of Physical Cultural Resources	At the local level, additional consultations will be carried out prior to commencement of works by the contractor at the project sites.	NWSC Contractor		5,000,000
	Re-alignment of the distribution line in Rassia West Village where it crosses the graves by moving the line to the opposite side of the road	NWSC Contractor - Design Team		Within Contractor's budget
	A 'chance find' procedure will guide actions to be taken in the event that suspected archaeological artefacts or paleontological items are encountered and they should be handed over to Ministry of trade and industry- Department of Museums and Monuments.	Contractor		
	Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with the Department of Museums and Monuments (DMM)	Contractor		Within Contractor's bid budget

		Construction works will be designed to ensure no damage to any cultural sites or medicinal plants that may be encountered including older-trees that are culturally significant. Where such sites cannot be avoided, culturally appropriate measures will be agreed and implemented prior to the construction activities.	Contractor	
		Compensation of the affected sites will be undertaken before construction activities commence in accordance with World Bank requirements.	NWSC	Already covered under RAP
	Impact on Landing Site at Arra	Maintain the currently proposed intake and open/create a crossing point about 180 m downstream of the intake	NWSC	
		Fence off the project intake and pipework to ensure minimal contact between the community near the abstraction point and the project	Contractor	Within Contractor's bid budget
		Notify the public about the construction program and of any construction activities such as transport of large equipment can trigger traffic impacts and congestion.	Contractor	Within Contractor's bid budget
		Offer a transitional allowance to both fishermen (150,000 each) and fishmongers (200,00 each) to enable them relocate to the newly proposed site.	NWSC	30,600,000 as established by the RAP
	Occupational Health and Safety Risks	The primary measure to mitigate OHS impacts is prevention which entails identification of risks and instituting pro-active measures to avoid them. In part this can be achieved by following GIIP or national guidelines. For unavoidable risks, personal protective equipment (PPE) should be provided to workers.	Contractor	Within Contractor's bid budget
		Orient all staff on safe work practices and guidelines and ensure that they adhere to them.	Contractor	Within Contractor's bid budget
		Training staff on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences.	Contractor	Within Contractor's bid budget
		Regular safety drills to constantly follow on various possible incidences.	Contractor	
		Develop evacuation procedures to handle emergency situations.	Contractor	
		All working vehicles should have a functioning reverse warning sound.	Contractor	
		While working at R. Nile, workers should be in life jackets.	Contractor	
		There should be water rescue apparel in place at all times of work	Contractor	
		Use of water proof cardboard elements during construction	Contractor	
		Those working at heights should put on body harness.	Contractor	
		All excavations should have permit, and excavations exceeding 2 m should be protected with shoring.	Contractor	
		Shoring should be used on all excavations exceeding 2 m, and excavations should be covered before closure of the site each day.	Contractor	
		Workers should undergo toolbox meetings daily.	Contractor	

		A qualified Health and Safety Officer will be recruited by the Contractor to oversee OHS matters on a daily basis.	Contractor	
		Personnel will only undertake tasks for which they are trained/ qualified. A formal 'permit to work' system will be in place and strict instructions will be given for operators of equipment.	Contractor	
		Maintenance of accident logs on site to register all injuries and to investigate their causes to prevent reoccurrence.	Contractor	
		Emergency resources (e.g., fire extinguishers, stocked First Aid kits, Emergency Contacts, Doctor on Call, etc.) will be maintained at all active construction sites.	Contractor	
		Workers should get acquainted with the material safety data sheets (MSDS) for equipment and should use and operate equipment according to manufacturer's instructions.	Contractor	
	Community Health and Safety Risks	Instituting speed limits on project vehicles,	Contractor	
		Use of signs and barriers to show the dangerous areas;	Contractor	
		Identify and clearly mark all areas with restricted accessibility to the public;	Contractor	
		Enforce restrictions on unnecessary entry into the project site or any protected zone	Contractor	
		Follow the mitigation measures prescribed to reduce any dust or noise impacts.	Contractor	
	Operation and Maintenance	Decrease in Water Resources	NWSC MWE/DWRM	
			MWE/DWRM	Mandate of DWRM
			MWE/DWRM	Mandate of DWRM
			NWSC	As prescribed by DWRM
		Air Pollution	NWSC	
			NWSC	
		Failure of the Water Supply Equipment or Components	NWSC	
			NWSC	
		Solid Waste Generation	NWSC	Operation costs
			NWSC	
		Water and Soil Pollution	NWSC	
			NWSC	

	Impacts from Damage of the Pipe Network	The contractor should clearly mark the transmission line with visible landmarks. The local authorities should encourage its people to respect road reserves and avoid building on water transmission lines;	Contractor	
		Design and implementing a leak detection and repair program;	NWSC	40,000,000
		Prevent introduction of contamination from the distribution system itself through; Minimizing microbial growth and biofilm development, choosing residual disinfectant, using construction materials that do not contribute to release undesirable metals and other substance or interact with residual disinfectants and Constant monitoring of water quality	NWSC	
	Transboundary Issues	Involvement of stakeholders from the onset of project identification till implementation helps in creating interest, sense of ownership and sustainability of the entire process;	NWSC	
		Disclose the detailed design report and the ESIA to countries downstream of the proposed project area and other regional bodies such as the Nile Basin Initiative (NBI), NELSAP, L. Victoria Basin Commission and the secretariat of the East African Community (EAC) for review and input;	MWE/DWRM NBI/NELSAP	Mandate
		Create a forum for regional participation during construction works by inviting representatives of the partner states to be part of project supervision teams;	MWE/DWRM NWSC	10,000,000
		The ministry should notify all the Nile partner states on the proposed development and subsequent acknowledgement of receipt of that notification. Everything done must be in conformity to the cooperative framework agreement for the Nile. Sharing progress reports to partner states and regional bodies should be considered;	MWE/DWRM	
		In case grievances arise, the states shall follow guidance on conflict mediation as detailed in the UN Convention on the Law of the Non-Navigational Uses of International Watercourses. The MWE/NWSC has an International Transboundary Water Affairs Department which can work closely with the Ministry of Foreign Affairs to address any conflicts that may arise in future;	NWSC	
		Utilize the cooperative framework to facilitate basin cooperation in water resources developed under the Nile Basin Initiative;	MWE/DWRM NWSC	
		Utilize regional programs such as the World Bank supported Cooperation in International Waters in Africa (CIWA) program assists riparian governments in Sub-Saharan Africa in unlocking the potential for sustainable, climate-resilient growth by addressing constraints to cooperative water resources management and development.	MWE/DWRM NWSC	
	Climate Change Risks and Impacts	Implementation of the National Adaptation Programme of Action (NAPAs) for the EAC countries	NWSC All countries under NELSAP/NBI/EAC DLG NGOs	
		MWE/DWRM and NWSC should consistently monitor levels and quality of R. Nile.	MWE/NWSC	7,000,000
		Sharing of climate information by regional climate organizations such as ICPAC, EAC, and National Meteorological Departments of the Nile Basin to know the annual, monthly, and seasonal climate projections of the R. Nile to enable evidence-based decision-making.	ICPAC EAC National Meteorological	

			Departments of the Nile Basin	
Reduced Affordability (Inability to Access Water)	UNHCR should provide subsidies for internally displaced people (IDP) / Refugee communities.	UNHCR NGOs		
	NWSC should consider population’s willingness to pay of UGX100 per 20 ltrs of safe water (based on the project area’s economic profile and vulnerability) in Adjumani.	NWSC		
	NWSC should subsidise water connection charges for low-income communities.	NWSC		
	Public standard pipes, which have subsidized water charges should be provided in low-income communities where people cannot afford private connections.	NWSC		
Loss of Jobs for Water Vendors	NWSC 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 based on the SEP.	NWSC DLG	3,000,000	
	The community Development officer (CDO) should mobilise the local people (including water vendors) and sensitise 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.	DLG	5,000,000	
	Vendors would be encouraged to become scheme or kiosk operators; vendors would be encouraged to tender for public water points a livelihood restoration initiative following stakeholder consultations.	NWSC DLG		
Occupational Health and Safety Aspects	Workers need to be protected from work related hazards by providing them with PPEs e.g. gloves, gum boots, overalls, helmets, hard hats and reflector jackets.	NWSC	30,000,000	
	Training on LOTO (Lock-out-tag-out procedures when working with electrical gadgets).			
	All working vehicles should have a functioning reverse warning sound.			
	Working at R. Nile, workers should be in life jackets. Those working at heights should put on body harness.			
	Continuous occupational risks management plan, registration and inspection of workplace, equipment and vehicle inspection and servicing, among others			
	Use signage and posters to warn staff and/ or visitors about restricted areas e.g., the laboratories, among others in order to keep people out of danger			
	Continuous occupational risks management plan, registration and inspection of workplace, equipment and vehicle inspection and servicing, among others			
	Machinery should continuously and regularly be well serviced and should be in good working condition. Servicing of equipment’s should be done at camps far off the project area.		NWSC operational costs	
	Where applicable, equipment should be fitted with silencers to reduce noise e.g. backup generators			
Community Health and Safety	Sensitization of the community on the risks/dangers of swimming in the R. Nile especially for the children since it’s a very deep river;	NWSC		

		Provide watering points for livestock (about 180m) downstream of the intake where a new crossing point was proposed by the community;		
		NWSC together with Local community should form a Project Management Committee which should address issues of operations of the intake at Arra West village.		
		Impacts on community safety and downstream activities will be mitigated by i) community announcements and advertisements in case of change in water levels, as well as in the Emergency Preparedness Plan (EPP) which should periodically be updated.		
Cumulative Impacts				
Construction and Operation	Disruption to Traffic Flow and Communication Routes	The Contractor shall develop and implement a traffic management plan	Contractor	
		Disruptions to public access shall be identified in the Contractor’s Traffic Management Plan, under which suitable notice of intending delays and closures are given to all concerned parties and approved prior to commencing work. All road closures shall be separately notified and agreed with the subcounty administration.	Contractor DLG	
		Where access to or from an individual property is closed for a period of 2 hours or more, the owner shall be informed at least 7 days in advance.	Contractor	
		Vehicular access to and from hospitals, police stations, and other public institutions shall be maintained through the use of steel road plates over open trenches. Pedestrian access to schools, health facilities, and other premises frequently accessed by the public will be maintained with the use of walking boards.	Contractor	
		To minimize interference with traffic, half of the road shall be closed to enable vehicles use one half as the other half is being excavated and installed with pipe work. The excavated soil shall be temporarily consolidated on the sides of the road and re-used for backfilling immediately the laying of pipework is completed.	Contractor	
		Road safety and site safety training should be done involving construction workers, police and local community.	Contractor DLG	
		Conspicuous signage shall be well placed on roads and the Contractor’s Traffic guides on ground shall direct traffic in case of diversions or open trenches.	Contractor	
		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 before usage.	Contractor	
		All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits.	Contractor	
		The vehicle speed shall be limited to a maximum of 30km/hr areas near sensitive facilities.	Contractor	
		Works near sensitive facilities like schools and health centres shall only be limited to day time (7am to 6pm).	Contractor DLG	
		MOU between UNRA and NWSC to designate this responsibility regarding any claims to ownership of land within the road reserves especially in Adjumani, or any proposed UNRA road (if any) should be done.	NWSC UNRA	
		Adopt the crossing sections provided by the contractor on Atiak - Adjumani - Laropi road.	UNRA	

			Contractor	
		The Design Team will continue to discuss with UNRA to assess the designs and any other feasible options (tunnelling Vs trenching across the tarmac road) and to secure UNRA permission secured for road crossings.	NWSC UNRA Contractor	
Operation and Maintenance	Water and Land Pollution	Adjumani District Local Government should ensure that all projects are regulated and licensed, and monitor their activities.	DLG	5,000,000
		Make sure that new developments are approved by the Adjumani Town Council technical team	NWSC DLG	
		In case of any development that will discharge waste on land or in water, effluent exiting the should be treated to meet the National Environment (Standards for the discharge of effluent into water or land), Regulations (2020).	NWSC DLG	NWSC Operation costs
	Excessive Abstraction of Water	Adjumani DLG should ensure that all projects are regulated and licensed, and monitor their activities.	DLG	
		All proposed establishments with aim of abstracting higher amounts of water should acquire permits from DWRM/MWE	DWRM/MWE	
ESTIMATED GRAND TOTAL COST			UGX 498,000,000 (equivalent to 138,333.33 USD) excluding the RAP costs	

Table 8: Environmental and Social Monitoring Plan

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
Positive Impacts – Construction Phase								
Employment Opportunity	<ul style="list-style-type: none"> Percentage of local construction labourers 	<ul style="list-style-type: none"> Quarterly 	<ul style="list-style-type: none"> Project site 	<ul style="list-style-type: none"> Percentage of local people employed in the project 	<ul style="list-style-type: none"> Employment Records, inquiries and observation 	<ul style="list-style-type: none"> At least 50% of Casual workers At least 30% Women 	<ul style="list-style-type: none"> NWSC LCs Contractor 	<ul style="list-style-type: none"> Contract
Negative Impacts - Construction Phase								
Loss of Vegetation	<ul style="list-style-type: none"> Area (extent) cleared; Species type 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> Project sites and source of materials 	<ul style="list-style-type: none"> Ha No. species 	<ul style="list-style-type: none"> Progress Reports Site inspection and consultations with stakeholders RAP report approved by CGV 	<ul style="list-style-type: none"> Restricted to TL & DL Restored area that had been disturbed. 	<ul style="list-style-type: none"> NWSC Contractor 	<ul style="list-style-type: none"> 6,000,000 Contract
Loss of Habitat for Fauna	<ul style="list-style-type: none"> No. of species Species type 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> Project sites and source of materials 	<ul style="list-style-type: none"> Type No. species 	<ul style="list-style-type: none"> Progress Reports Site inspection and consultations with stakeholders 	<ul style="list-style-type: none"> Project Area 	<ul style="list-style-type: none"> NWSC Contractor DLG 	<ul style="list-style-type: none"> 5,000,000 Contract
Decline of Pristine Landscape and	<ul style="list-style-type: none"> Copy of license(s) Copy of Agreement 	<ul style="list-style-type: none"> After extraction of materials or 	<ul style="list-style-type: none"> Affected Person and 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Check for agreement 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> NEMA NWSC DLG 	<ul style="list-style-type: none">

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
Emerging of Vector Breeding Grounds	<ul style="list-style-type: none"> Evidence of compensation and Reinstatement Plan Signs of ponding of water Borrow pits restored to pre-project condition with native vegetation and vegetation growing well 	construction activities	<ul style="list-style-type: none"> Contractor's office Project sites and Sources of materials 		<ul style="list-style-type: none"> Consult with landowner Inspection of sites and source 			
Susceptibility to Soil Erosion and Pollution Risks (Wetland Pollution)	<ul style="list-style-type: none"> Siltation Turbidity Number of complaints from communities and authorities Extent of site clearance Sites area hoarded off Covered stockpiles of loose soils Any gullies of soil erosion Signs of siltation in nearby water bodies Extent of landscaping 	Monthly throughout construction	<ul style="list-style-type: none"> Wetland Project sites 	TSS	<ul style="list-style-type: none"> Sample & lab test During Construction whenever it rains Review of records or reports Direct observations Site and project office inspection 	<ul style="list-style-type: none"> National Standards Baseline 	<ul style="list-style-type: none"> NWSC Supervising Consultant Contractor 	<ul style="list-style-type: none"> 10,000,000 Contract Contract
Generation and Improper Management of Waste	<ul style="list-style-type: none"> Amount of Solid waste Presence of waste bins at all workstations Presence of mobile toilets at workstations 	Weekly	Project site	<ul style="list-style-type: none"> Kg for Solid waste, Litres for Liquid waste No. of mobile toilets 	Observations and Measurements	<ul style="list-style-type: none"> 0 Legal disposal 	<ul style="list-style-type: none"> NWSC DLG Contractor 	<ul style="list-style-type: none"> 8,000,000 5,000,000 Contract

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
	<ul style="list-style-type: none"> Presence of delivery notes for all forms of waste generated and disposed during construction. Waste Management Plan in place Collection and disposal records 							
Noise pollution and Vibration	<ul style="list-style-type: none"> Record of noise levels Site hoarding in place Silencers installed in noise emitting machines Earmuffs used by workers on site Record of complaints from recipients 	<ul style="list-style-type: none"> Weekly 	<ul style="list-style-type: none"> Project sites 	<ul style="list-style-type: none"> dBa mm/s 	<ul style="list-style-type: none"> Noise Level Meter Vibration meter 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC NEMA/DLG Contractor 	<ul style="list-style-type: none"> 5,000,000 3,000,000 Contract
Air Quality and Dust management	<ul style="list-style-type: none"> Dust (PM₁₀ and PM_{2.5}) Complaints from the local community Visible dust emissions Records of frequency of water sprinkling on dusty areas Tarpaulins on tracks carrying loose soils. Records of automobile maintenance 	<ul style="list-style-type: none"> Once per month Daily inspection to be made to detect and remedy excessive dust generation). 	<ul style="list-style-type: none"> Project site Project communities 	<ul style="list-style-type: none"> ppm 	<ul style="list-style-type: none"> Micro-dust Pro Direct Observation 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> Contractor NWSC/Sup. Consultant 	<ul style="list-style-type: none"> Contract 10,000,000

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
	<ul style="list-style-type: none"> Visible gaseous emission from vehicles, equipment & machinery Records of complaints from onsite workers & neighbouring communities Hoarded off sites Evidence of PPE issuance Sign posts in the project area limiting speed 							
Impact on Intake and Pumping Station (Flooding of River Nile)	<ul style="list-style-type: none"> Prevailing Season at the time of construction Water levels 	<ul style="list-style-type: none"> Daily When need arises After every rainfall event 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Records of flow rates Records of climate data Flood frequency analysis records Early warning system/gaging station at the intake 	<ul style="list-style-type: none"> Low flows 	<ul style="list-style-type: none"> NWSC MWE/DWRM Contractor 	<ul style="list-style-type: none"> 5,000,000 10,000,000 Contract
Water Quality	<ul style="list-style-type: none"> All parameters 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> Intake, BHs, Wetland 	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Lab. Analysis 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC Contractor 	<ul style="list-style-type: none"> 30,000,000 Contract
Loss of Land and Displacement of Economic Activities	<ul style="list-style-type: none"> PAPs 	<ul style="list-style-type: none"> Before commencement & continuous throughout implementation 	<ul style="list-style-type: none"> All project sites and their affiliated facility sites 	<ul style="list-style-type: none"> No. of PAPs Compensated Land consent agreements 	<ul style="list-style-type: none"> <i>RAP Implementation Report/ Grievance Log</i> <i>CGV approved RAP report</i> <i>Sensitization and engagement reports</i> <i>Notices to the PAPs</i> 	<ul style="list-style-type: none"> 100% compensation 	<ul style="list-style-type: none"> NWSC/ RAP Consultant 	<ul style="list-style-type: none"> RAP Budget

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
					<ul style="list-style-type: none"> Land agreement forms 			
Loss and Relocation of Structures and Utilities	<ul style="list-style-type: none"> PAPs 	<ul style="list-style-type: none"> Before commencement & continuous throughout implementation 	<ul style="list-style-type: none"> All project sites and their affiliated facility sites 	<ul style="list-style-type: none"> No. of PAPs Compensated Land consent agreements 	<ul style="list-style-type: none"> RAP Implementation Report/ Grievance Log CGV approved RAP report Sensitization and engagement reports Notices to the PAPs Land agreement forms 	<ul style="list-style-type: none"> 100% compensation Agreements 	<ul style="list-style-type: none"> NWSC DLG UMEME Telecommunication Agencies 	<ul style="list-style-type: none"> RAP Budget
Health Impact – Contracting and Spreading COVID-19 and risk of HIV spread	<ul style="list-style-type: none"> Covid 19 patients Signs of COVID-19 Hand washing facilities Deaths New HIV/AIDS Patients 	<ul style="list-style-type: none"> Daily When need arises/On standby Monthly 	<ul style="list-style-type: none"> Campsites Project sites 	<ul style="list-style-type: none"> °C No. of Covid-19 patients No. of HIV/AIDS Patients 	<ul style="list-style-type: none"> Covid 19 tests records Death records HIV test records 	<ul style="list-style-type: none"> No patients Normal human temperature No deaths 	<ul style="list-style-type: none"> MOH Contractor 	<ul style="list-style-type: none"> 8,000,000 Contract
Social Conflicts due to Influx of Immigrant Labour	<ul style="list-style-type: none"> Labour conflicts Immigrants 	<ul style="list-style-type: none"> Throughout the construction phase 	<ul style="list-style-type: none"> Project area 	<ul style="list-style-type: none"> No. of immigrant workers No. of local workers 	<ul style="list-style-type: none"> Employment records No. of grievances received % of grievances resolved Grievance Redress Committees 	<ul style="list-style-type: none"> 100% harmony 	<ul style="list-style-type: none"> NWSC/Supervising Consultant DLG MoGLSD Contractor 	<ul style="list-style-type: none"> 9,000,000 5,000,000 3,000,000 Contract
Risk of Child Labour and Violence Against Children	<ul style="list-style-type: none"> Workers below 18yrs 	<ul style="list-style-type: none"> Quarterly 	<ul style="list-style-type: none"> Project area 	<ul style="list-style-type: none"> No. of young employees No. of VACs 	<ul style="list-style-type: none"> National identification records of workers indicating age Records of requirements for employment Records of trainings on child abuse 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> NWSC/Supervising Consultant DLG MoGLSD Contractor 	<ul style="list-style-type: none"> As per budget on awareness raising campaigns Contract

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
					<ul style="list-style-type: none"> Complaints from local leaders Site Visits 			
Risk of Gender Based Violence, Sexual Exploitation and Sexual Abuse Risks of inadequate stakeholder engagement	<ul style="list-style-type: none"> Nature of GBV Case Types of grievances received, 	<ul style="list-style-type: none"> Daily by contractor Weekly by Consultant Quarterly by NWSC. 	<ul style="list-style-type: none"> Project site 	<ul style="list-style-type: none"> No. Reported Cases Frequency of stakeholder engagements and feedback received 	<ul style="list-style-type: none"> Grievance Log Police Case Files Engagements 	<ul style="list-style-type: none"> 0 As many as planned 	<ul style="list-style-type: none"> NWSC Consultant Contractor 	<ul style="list-style-type: none"> 26,000,000 Contract Contract
Loss of Physical Cultural Resources	<ul style="list-style-type: none"> Destroyed PCRs Chance finds 	<ul style="list-style-type: none"> At stage of project excavation 	<ul style="list-style-type: none"> Project sites 	<ul style="list-style-type: none"> No. of PCRs/Chance finds 	<ul style="list-style-type: none"> RAP Report Chance Finds Reports 	<ul style="list-style-type: none"> 0 destroyed 100% report of CFs 100% compensation 	<ul style="list-style-type: none"> NWSC Local Leadership Contractor Department of Museums and Monuments (DMM) 	<ul style="list-style-type: none"> 10,000,000 2,000,000 Contract 5,000,000
Impact on Landing Site at Arra	<ul style="list-style-type: none"> New site downstream of the intake Fence at the intake 	<ul style="list-style-type: none"> Once 	<ul style="list-style-type: none"> Intake 	<ul style="list-style-type: none"> No. of fishermen No. of fisher mongers 	<ul style="list-style-type: none"> <i>CGV approved RAP report</i> <i>Notices to the PAPs</i> Newly established site downstream 	<ul style="list-style-type: none"> 100% compensation 	<ul style="list-style-type: none"> NWSC Local Leadership Contractor 	<ul style="list-style-type: none"> RAP Budget
Occupational Health and Safety Risks	<ul style="list-style-type: none"> Number and type of PPE. Health and sanitation facilities in site. 	<ul style="list-style-type: none"> Daily by contractor Weekly by Consultant Quarterly by NWSC. 	<ul style="list-style-type: none"> Project site 	<ul style="list-style-type: none"> Number of safety measures provided 	<ul style="list-style-type: none"> Incidents/Acc. Log, injuries and inspection 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> NWSC Consultant Contractor 	<ul style="list-style-type: none"> 12,000,000 Contract Contract
Negative Impacts - Operation stage								
Decrease in Water Resources (Quantity)	<ul style="list-style-type: none"> Abstraction permits (rates) Water levels 	<ul style="list-style-type: none"> Daily by NWSC Monthly by DWRM 	<ul style="list-style-type: none"> Intake and BHs 	<ul style="list-style-type: none"> Ltrs/day 	<ul style="list-style-type: none"> Groundwater abstraction permit Groundwater abstraction logs Complaints from communities 	<ul style="list-style-type: none"> Test pumping recommended rates Surface flow recommendation abstraction rate 	<ul style="list-style-type: none"> NWSC MWE/DWRM DLG 	<ul style="list-style-type: none"> Operational Cost 20,000,000 10,000,000

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
Air Pollution	<ul style="list-style-type: none"> Complaints from the local community Odour neutralizing chemicals Waste on site 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> WTP 	<ul style="list-style-type: none"> Odour/Smell 	<ul style="list-style-type: none"> <i>Neutralizing Chemicals at the WTP</i> <i>Measurements</i> 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC/Sup. Consultant 	<ul style="list-style-type: none"> Operational Costs
Solid Waste Generation	<ul style="list-style-type: none"> Amount of Solid waste Presence of vermin free bins and/ or skips at the water treatment plant 	<ul style="list-style-type: none"> Once a week 	<ul style="list-style-type: none"> Project site NWSC Area Office WTP 	<ul style="list-style-type: none"> Kg for Solid waste, Litres for Liquid waste 	<ul style="list-style-type: none"> Observations and Measurements 	<ul style="list-style-type: none"> 0 Legal disposal 	<ul style="list-style-type: none"> NWSC DLG 	<ul style="list-style-type: none"> 10,000,000 3,000,000
Water and Soil Pollution	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> BHs, WTP 	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Lab. Analysis Hydrogeological analysis 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> 40,000,000
Impacts from Damage of the Pipe Network	<ul style="list-style-type: none"> Leakages due busted pipes Water quality at distribution points Complaints from public 	<ul style="list-style-type: none"> Daily 	<ul style="list-style-type: none"> Entire systems 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Records of leakages due busted pipes Water quality records at distribution points Complaints from public Presence of the leakage and repair program 	<ul style="list-style-type: none"> No leakage 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> Operational costs
Transboundary Issues	<ul style="list-style-type: none"> Involvement of stakeholders Disclose the detailed design report and the ESIA Forum for regional participation 	<ul style="list-style-type: none"> Before construction, during construction and operation phase 	<ul style="list-style-type: none"> Intake 	<ul style="list-style-type: none"> Abstraction rates 	<ul style="list-style-type: none"> Records of involvement of stakeholders Involvement in the entire project Feedback from other states about the impact of the project Level of cooperation 	<ul style="list-style-type: none"> Full cooperation 	<ul style="list-style-type: none"> NWSC MWE/DWRM All countries under NELSAP/NBI/EAC e.t.c 	<ul style="list-style-type: none"> 25,000,000

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
Climate Change Risks and Impacts	<ul style="list-style-type: none"> Implemented National Adaptation Programme of Action (NAPAs) Level of monitoring of levels and quality of R. Nile. Climate information 	<ul style="list-style-type: none"> Throughout 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Climate patterns 	<ul style="list-style-type: none"> Active or ongoing or already established NAPAs projects Reports on reduced levels of climate in the Nile Basin specifically the EAC 	<ul style="list-style-type: none"> No Climate variability and change 	<ul style="list-style-type: none"> NWSC All countries under NELSAP/NBI/EAC e.t.c DLG NGOs 	<ul style="list-style-type: none"> 30,000,000
Reduced Affordability (Inability to Access Water)	<ul style="list-style-type: none"> Connections in the project area Cost of unit of water (bill) Alternative water sources PSPs Complaints from customers Incentives and subsidies 	<ul style="list-style-type: none"> Quarterly 	<ul style="list-style-type: none"> Project area 	<ul style="list-style-type: none"> No. of alternative sources No. of customers getting connected or disconnected No. of taps and PSP No. of complaints from customers No. Of HHs given incentives, subsidies 	<ul style="list-style-type: none"> <i>Connections and disconnection reports</i> <i>Other water sources and their performance reports</i> Records of complaints from customers 	<ul style="list-style-type: none"> Fully affordable 0 complaints 	<ul style="list-style-type: none"> NWSC DLG 	<ul style="list-style-type: none"> Operational and meantime costs 5,000,000
Loss of Jobs for Water Vendors	<ul style="list-style-type: none"> Water vendors 	<ul style="list-style-type: none"> Before and during operation phase 	<ul style="list-style-type: none"> Project area 	<ul style="list-style-type: none"> No. of water vendors 	<ul style="list-style-type: none"> Records of former water vendors Records of current water vendors Complaints from the public 	<ul style="list-style-type: none"> As many as possible 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> Operational and meantime costs
Occupational Health and Safety Aspects	<ul style="list-style-type: none"> Accidents Complaints PPE 	<ul style="list-style-type: none"> Daily 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> No. of accidents No. of minors, near misses, fatalities No. of safety equipment No. of trainings and meetings 	<ul style="list-style-type: none"> Approved occupational safety and health plan at sites Records of health & safety cases at work place Firefighting equipment in place 	<ul style="list-style-type: none"> 0 accidents, minors, near misses and fatalities 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> 30,000,000

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
					<ul style="list-style-type: none"> First aid kits and eye washing stations. Records of Health and safety training and site drills. Material safety and data sheets 			
Cumulative Impacts – Construction Phase								
Disruption to Traffic Flow and Communication Routes	<ul style="list-style-type: none"> Accidents Traffic along the road 	<ul style="list-style-type: none"> Daily When 	<ul style="list-style-type: none"> Roads in the project area mainly road crossing points by the pipes 	<ul style="list-style-type: none"> No. of accidents 	<ul style="list-style-type: none"> Traffic management plan and Records of accidents Signage along the roads Records of vehicle maintenance Complaints from the public Restored portions of the road affected Notices to traffic police 	<ul style="list-style-type: none"> No accidents No traffic 	<ul style="list-style-type: none"> Uganda Traffic Police Contractor NWSC/Supervising Consultant 	<ul style="list-style-type: none"> Mandate of police Contract 2,000,000
Cumulative Impacts – Operation Phase								
Water and Land Pollution	<ul style="list-style-type: none"> All soil and water parameters 	<ul style="list-style-type: none"> Quarterly 	<ul style="list-style-type: none"> BHs, WTP 	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Lab. Analysis Hydrogeological analysis 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> 50,000,000
Excessive Abstraction of Water	<ul style="list-style-type: none"> Abstraction rates Reducing water levels 	<ul style="list-style-type: none"> Daily by NWSC Monthly by DWRM 	<ul style="list-style-type: none"> Intake and BHs 	<ul style="list-style-type: none"> Ltrs/day 	<ul style="list-style-type: none"> Groundwater abstraction permit Groundwater abstraction logs Complaints from communities 	<ul style="list-style-type: none"> Test pumping recommended rates Surface flow recommendation abstraction rate 	<ul style="list-style-type: none"> NWSC MWE/DWRM DLG 	<ul style="list-style-type: none"> Operational Cost 10,000,000 5,000,000
Total Estimated Monitoring Costs								UGX 417,000,000 (Equivalent to 115,833.33 USD)

12 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The anticipated benefits of the construction, operation and maintenance of the proposed Adjumani Water Supply Project are immense. The project will provide a reliable supply of affordable portable water to the residents of Adjumani, which comes along with many benefits. For example, the project will result into an improvement of public health conditions, provide employment to local residents and bring the water closer to the residents, including refugees, gender empowerment and improved education outcomes with increased enrolments.

However, just like most developments, the immense benefits of this proposed project do not necessarily insulate this project from negative impacts. In order to evaluate the project so that its impacts on the environment and socio-economic set up are enhanced, avoided, minimized, restored, compensated or offset. An evaluation of the possible project alternatives was also conducted to come up with the most feasible alternative. Further, an evaluation of the positive and negative impacts was performed for all project components, and an Environmental and Social Management and Monitoring Plan (ESMP) was drawn.

The key negative impacts that will arise during the construction phase include susceptibility to soil erosion and pollution risks which may trigger water pollution, disruption to traffic flow and communication routes due to road crossings which may cause accidents, influx of immigrants and labour and land acquisition that will trigger displacement of livelihood activities. Compensation and community health and safety are the key fears raised by the communities. Land acquisition and resettlement impacts and risks are expected to be managed through utilisation and implementation of the prepared RAP. The transmission and distribution lines are expected to mainly utilize the road reserves which will significantly minimize resettlement risks. Road crossings of the transmission line especially within Atiak - Adjumani – Laropi Road are expected to pose traffic safety risks but implementation of a robust Traffic Management Plan and utilisation of the pipe ducts that have been provided by the UNRA Contractor on the road will address such impacts. The ESMP emphasizes the need to immediately restore excavated/ disturbed areas as soon as the pipes have been laid.

In general, all negative impacts can be mitigated following the ESMP proposed in this report. Suggestions were also proposed on the enhancement of the positive impacts. The project should be developed in conformity with all legal requirements. The Developer should ensure that the wastes and chemicals are handled and disposed of in accordance with the ESMP, and following the established regulations and policies. If the proposed project is developed following the suggestions given in the ESMP of this ESIA, we believe that there will be no negative impacts that can deter its implementation.

NWSC with support from the World Bank will require collective action from stakeholders such as the Adjumani Local government and regional actors in the WASH sector for its effective implementation, NGOs, MWE, among others. . The critical aspect is meaningful stakeholder mobilization and engagement as well as recruitment of an experienced team to manage the safeguards risks. NWSC will lead the supervision (directly and through a Supervising Consultant) of the construction Contractor and the operations to ensure negative impacts from the

project are minimised. This should entail among others, undertaking of annual audits following provisions of the ESMP to ensure continuous improvement of the project's processes and products. NWSC should use its vast experience in implementing similar water supply projects to effectively manage these potential risks.

Recommendations

Based on the benefits expected to accrue from the proposed Adjumani Water Supply Project, which have been stated above, and the fact that the identified negative impacts can be mitigated following the proposed ESMP, we strongly recommend to NEMA to review and approve this ESIA to enable further development of the project.

Therefore;

- the design should consider extending the distribution lines back to the areas where water is abstracted e.g village of Arra West and Laropi around the intake. This will promote social equity and sustainability of the project in Adjumani district;
- Construction material for the project should be sourced from legally authorised sites, mainly the existing ones where possible;
- It is mandatory for the Contractor to develop and implement a Contractor ESMP for the project's construction phase, encompassing the auxiliary footprint;
- Tapping and extension of the hydroelectric power lines at the Intake, WTP and borehole sites, should strictly follow the access route alignment to ensure that the set-out land requirements suffice; and
- Ground water sources, during the operation phase, the recommended number of pumping hours and abstraction rates should be maintained in order not to compromise the existing ground water sources.
- A landing site should be open up at about 180m downstream of the proposed intake for the fishermen and community at large to cater for the livelihood displacement anticipated.

1 INTRODUCTION

1.1 Project Background

The Ministry of Water and Environment (MWE) together with National Water and Sewerage Corporation (NWSC) are implementing the Integrated Water Management and Development Project (IWMDP) with funding from the World Bank and Government of Uganda. The project aims at improving access to water supply and sanitation services, capacity for integrated water resources management and the operational performance of service providers.

The project focus on improving water and sanitation services in small towns and rural growth centres (RGCs) with special attention to the vulnerable Northern and Eastern regions and those communities hosting refugees displaced from conflicts and famine. Under component 1.2 of the IWMDP, districts that host about 70% of refugees will be supported with provision of piped water supply and sanitation services. The target areas include Yumbe, Arua, Moyo (including Obongi district newly created from Moyo), Adjumani in West Nile, Lamwo in Northern and Kiryandongo in Central Uganda.

Under component 2 of the IWMDP, NWSC will undertake construction and rehabilitation of Water Supply and Sanitation infrastructure in Mbale Municipality; construction of Gulu-Karuma Water Supply Project; improve water supply and sanitation in Adjumani Urban Area, including support to refugees; and carrying out of environmental and social management activities to protect water sources and sensitize communities. The NWSC was established as a government parastatal organisation in 1972 to develop, operate and maintain water supply and sewerage services in the urban areas of Uganda. It operates under the MWE, and has a coverage of over 250 towns countrywide. NWSC has been operating under three-year renewable performance contracts with the Government of Uganda (GoU) since 2000 and is currently operating under the sixth performance contract, running from 2019-2022.

NWSC has allocated funds for implementation of the Water and Sanitation infrastructure measures in Adjumani Town Council (TC) and nearby areas under the proposed Adjumani Water and Sanitation Project in order to address the water supply and sanitation gap. Adjumani district is found in the Northern Region and West Nile sub-region of Uganda and is bordered by Obongi district in the West and North-West, Madi-Okollo district in the South-West, Amuru district in the South and East, Moyo district in the North and South Sudan in the North-East.

1.2 Project Justification

Uganda is the largest refugee hosting country in Africa and among the top five in the world. According to the United Nations High Commission for Refugees (UNHCR)/ Office of the Prime Minister (OPM) data¹, by 30th April, 2021, Uganda was hosting 1,553,063 refugees, of which 245,289 (about 15.8% of the total refugee population) were living in Adjumani District with about 18 refugee hosting camps.

¹ Office of the Prime Minister, UNHCR, Government of Uganda; <https://data.unhcr.org/en/country/uga>

Most of these refugees fled conflict in South Sudan, which has experienced political instability which has escalated in the over the last three decades. Various humanitarian organisations supporting refugee response programs have headquarters in Adjumani and Pakele Town Councils. This has spurred sustained economic and population growth in the areas. As part of indicators for population and economic growth in the area, Pakele Town Board was gazetted a town council in September 2017. The developments have also led to an increase in land prices, rental rates and other real estate costs in the area as demand for real estate in the town and surrounding areas has increased. Unreliable water supply service currently experienced in the area is one of the stumbling blocks to this expected development and service delivery to the population including refugees and host communities.

In order to address the water supply challenge, a hybrid water supply system based partly on production boreholes and a new surface water treatment system on the River Nile has been proposed for Adjumani TC. The groundwater source alone cannot adequately meet the projected demands over the proposed design horizon of 20 years. The demand is projected to reach 5,500 m³/day by the year 2040, serving a projected population of 110,000 people. The current demand is estimated at 3,000 m³/day for the estimated population of 60,000 people. The vast majority of these people are served by boreholes while there are approximately 300 connections in the town council served by the existing water supply.

The proposed Adjumani WSSS will be implemented in the urban areas of Adjumani and Pakele Town councils (TCs), and Rural Growth Centres (RGCs) of Ciforo and Dzaipi and selected refugee settlement camps (RSCs) and their respective host communities in Adjumani district. RSCs targeted include; Pagirinya, Olua, Boroli, Olijji, Agojo and Nyumanzi. Other areas were included as identified during the NWSC – Adjumani Water Supply and Sanitation Feasibility Study (2021) in coordination with the MWE.

The proposed interventions in Adjumani will involve the identification and development of ground production well fields and surface water source systems, upgrading of the water distribution system to serve the inhabitants of Adjumani – Pakele, the refugee settlements and their respective host communities. The interventions will also focus on the improvement of public sanitation, through construction of public toilet facilities and a faecal sludge treatment facility.

1.3 The Need for Environmental Impact Assessment for the Assignment

1.3.1 Project Categorisation and Rationale of ESIA

The National Environment Act (NEA), 2019, section 113 (1) requires that, any developer who proposes to undertake a new project which falls within Schedule 5 of the Act is required to undertake an Environmental and Social Impact Assessment (ESIA) as prescribed by and reiterated in the National Environment (Environmental Impact Assessment - EIA) Regulations 2020, section 3(a)(ii).

The proposed development of WSSS facilities in Adjumani District are under the categories of “Utilization of Water Resources and Water Supply” as well as “Waste Management Facilities” which are listed under schedule 5 section 4(i) *Construction of water T/Lines of more than 20 km in length or with a capacity of more than 500,000 m³ per day of water*, and schedule 4 Part 2

section 9 (d) and 22 respectively of the Act, that requires mandatory Environmental and Social Impact Assessment (ESIA) before implementation. Therefore, an Environmental and Social Impact Study (ESIS) is required before the proposed project activities are approved by National Environment Management Authority (NEMA) for implementation.

Additionally, the World-Bank guidelines require assessment and management of environmental and social risks and impacts of projects to ensure environmental and social sustainability as well as inform improved decision making. These include Operational Safeguards Policies {Environmental Assessment (OP/BP/GP 4.01), Natural Habitats (OP/BP 4.04), Physical Cultural Resources (OP 4.11), Involuntary Resettlement (OP/BP 4.12), among others} for investment project financing and the World Bank Group Environmental, Health, and Safety (EHS) Guidelines.

The WB 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:

- a) **Category A Project:** which may have potentially significant adverse social or environmental impacts that are diverse, irreversible, or unprecedented;
- b) **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;
- c) **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
- d) **Category FI Project:** Assigned to business activities undertaken by Financial Intermediaries or through delivery mechanisms involving financial intermediation.

The proposed Adjumani WSS project is therefore classified as EA **Category B**. This is due to the following reasons;

- The proposed construction and operation of the water supply facilities will be restricted within the user-communities;
- Water transmission channel will follow existing public or access roads and construction activities will be restricted to the road reserves. Under normal circumstance, fresh access roads will not be created hence reducing further the impact associated with land acquisition. No wetlands or sensitive sites will be affected except at the intake of which the required land is very small (Figure 1-1); and
- Additionally, the acquisition of the water transmission corridor may not result in displacement of any homesteads, church, school or any built up structure except displacement of roadside kiosks mainly in Adjumani Town Council. The project will temporarily displace some movable kiosks which are in the road reserve but these will be returned in their positions after the pipes have been laid into the ground and pipes will be laid mostly in the road reserves of the existing public roads. Additionally, the WB EHSs, with specific reference to the EHSs for water and sanitation projects, applies to the project.



Figure 1-1: Size and extents land take at the Intake Site

Therefore, NWSC contracted JBN Consults and Planners Ltd to undertake the ESIA, in accordance with the NEA, 2019 and the WB OPs. The ESIA was conducted between November and December 2021 which aimed at preparing a framework to ensure that E&S impacts and risks accruing from the proposed infrastructure are identified and mitigation measures put forward.

1.3.2 Objective of the ESIA

To ensure that the proposed investments of Adjumani WSSS comply with the GoU environmental laws, as well as WB's OPs and guidelines – ensuring no adverse impacts on the environment and its components. The overall objective of the assignment was to detail the potential adverse bio-physical and socio-economic impacts of the proposed WSSS and propose mitigation measures.

1.3.3 Specific Objectives

The specific objectives of the ESIA were therefore:

1. Establish the environmental and social baseline conditions at project sites;
2. Provide outline of the project activities to be undertaken; conduct stakeholder meeting with the cross-section of stakeholders;
3. Identify, evaluate and assess project alternatives taking into account environmental, social, technological and financial considerations;

4. Identify, evaluate and assess the potential environmental & social impacts of the project;
5. Propose feasible environment & social mitigation measures; and
6. Prepare an ESMP as well as Environmental and Social Monitoring Plan for the project.

1.4 Scope of Project

The scope of work involved carrying out a detailed ESIA for the proposed Adjumani WSSS which will be implemented specifically in the urban areas of Adjumani and Pakele Town Councils, and RGCs of Ciforo Rural and Dzaipi and selected Refugee Settlement Camps (RSCs) and their respective host communities in Adjumani district. Refugee settlement camps targeted include Pagirinya, Olua, Boroli, Olijji, Agojo and Nyumanzi RSCs. The sanitation component will be implemented specifically in Adjumani and Pakele TCs, and RGCs of Ciforo Rural and Dzaipi (Figure 1-2). Under the Adjumani WSSS, the Consultant is required to prepare detailed ESIA for the water supply and sanitation components, respectively. Therefore, this ESIA is specifically for the Adjumani Water Supply System. The duration of the consultancy services contract is 10 calendar months.

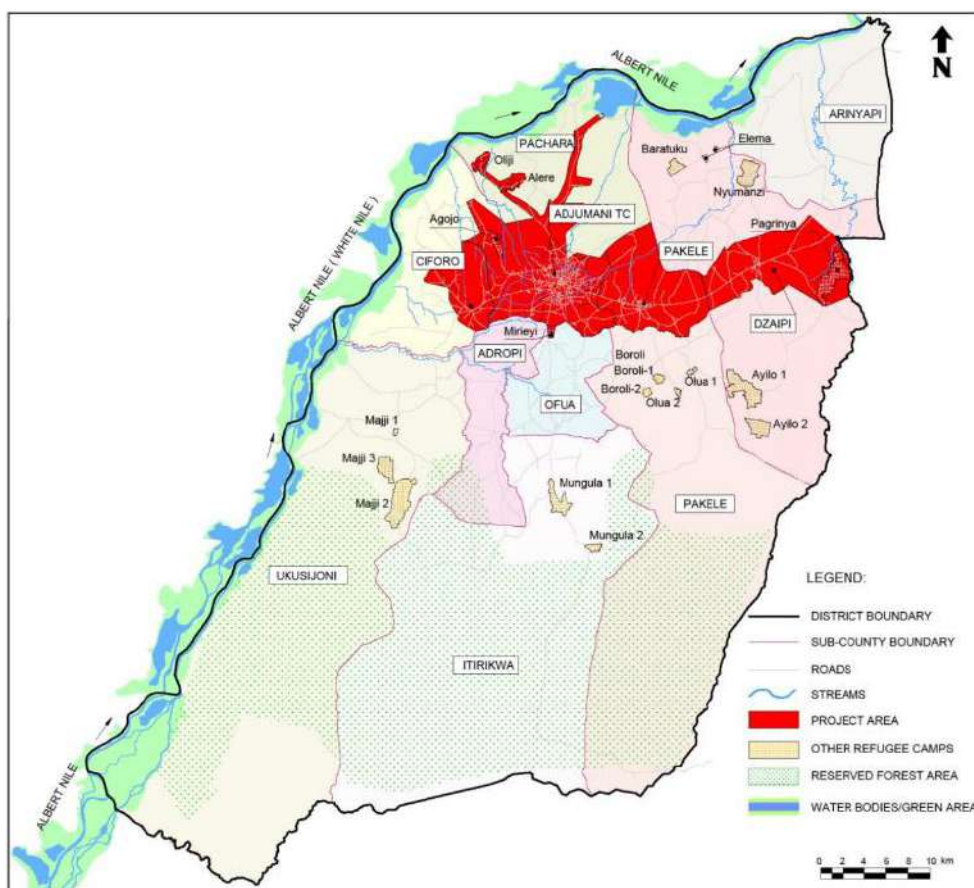


Figure 1-2: Location map of the project area in Adjumani district²

1.5 Proponents' Contact and Project Cost Estimate

² Feasibility Report – Adjumani Water Supply and Sanitation Project (2021), NWSC

Name and physical address:

NATIONAL WATER AND SEWERAGE CORPORATION

The Contract Manager

Plot 3 Nakasero Road,

P.O. Box 7053, Kampala, Uganda

E: info@nwsc.co.ug

The overall project cost estimate for the water supply system is UGX UGX **51,573,215,088** (Fifty One Billion, Five Hundred Seventy Three Millions Two Hundred Fifteen Thousand Eighty Eight Uganda Shillings).

1.6 Report Structure

This ESIA Report has been structured as follows:

Executive Summary: Executive Summary of the project and its activities, ESIA study methods, key findings and impacts as well as proposed mitigation measures and conclusion.

Chapter 1. Introduction: gives a description of the project background, project justification, rationale for ESIA, the scope of work and the report structure.

Chapter 2. ESIA Methodology: gives a detailed methodology on how the project's baseline including the physical, biological and socio-economic baseline data collection was conducted. It further describes disclosure, the project impact and risk identification and analysis including the cumulative impacts assessment.

Chapter 3. Project Description: gives a description of the project proponent and costs, site locations, the geographical zoning of areas to be supplied and technical description of the project components.

Chapter 4. Project Alternative: gives the details of project scenarios including the No project scenario, alternatives considered and the analysis of alternatives.

Chapter 5. Policy, Legal and Institutional Framework: gives background of the policy and plans, legal framework, guidelines, regulations/standards and institutional framework arrangements under which the Adjumani WSSP ESIA has been conducted. It further includes both the World Bank Safeguard requirements, World Bank -EHS guidelines and other international agreements.

Chapter 6. Mainstreaming COVID-19 Measures into the Project: gives highlight about COVID-19 and measures taken by the Consultant and proposed during the implementation of this project.

Chapter 7. Environment and Socio-Economic Baseline: gives a detailed description on the proposed sites, the existing physical environment, bio-physical, socio-economic and landuse activities and cultural heritage and archaeological resources baseline conditions.

Chapter 8. Public Consultations and Disclosure: provides an overview of consultation activities commenced in regard to Adjumani WSSP and concerns raised.

Chapter 9. Potential Environmental and Social Impacts: gives a view of the both positive and negative potential environmental and social impacts during the planning and designing, construction, operation and maintenance phases according to their magnitude and presents the anticipated overall impacts of the project. It as well points out the mitigation and enhancement measures.

Chapter 10: Environmental and Social Management and Monitoring Plan: gives an ESMMP matrix and ESMMP implementation. It provides specific mitigation measures, monitoring actions, 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 and subsequent operations of the project.

Chapter 11. Conclusions: provides concise details of the outcome of the Adjumani WSSP as to policies, strategies, plans, measures and activities needed to ensure that development does not harm the environment.

2 ESIA METHODOLOGY

Various methods were used to collect data for the preparation of the Adjumani Water Supply and Sanitation Project. This chapter describes the different methods employed.

2.1 Overview of the ESIA Process

This ESIA was undertaken following the 1997 EIA guidelines, the ESIA Regulations of 2020, guidance in the National Environment Act (NEA, 2019) and the laws and treaties governing use of international watercourses including the relevant laws of the riparian states (Figure 2-1).

The NEA (2019) defines ESIA as an analytical process that systematically examines the likely environmental and social impacts of a proposed project, evaluates alternatives, and designs appropriate mitigation, management, and monitoring measures, taking into account interrelated socio-economic, cultural, and human health impacts, both beneficial and adverse.

Additionally, the Environmental and Social Management Framework (ESMF) for the IWMDP; and the World Bank's general Environment Health and Safety Guidelines (EHSs), with specific reference to the EHSs for Water and Sanitation Projects guided the ESIA process. The WB's policy requirements, in instances that they were more comprehensive, were addressed over and above the requirements of the regulatory framework of Uganda.

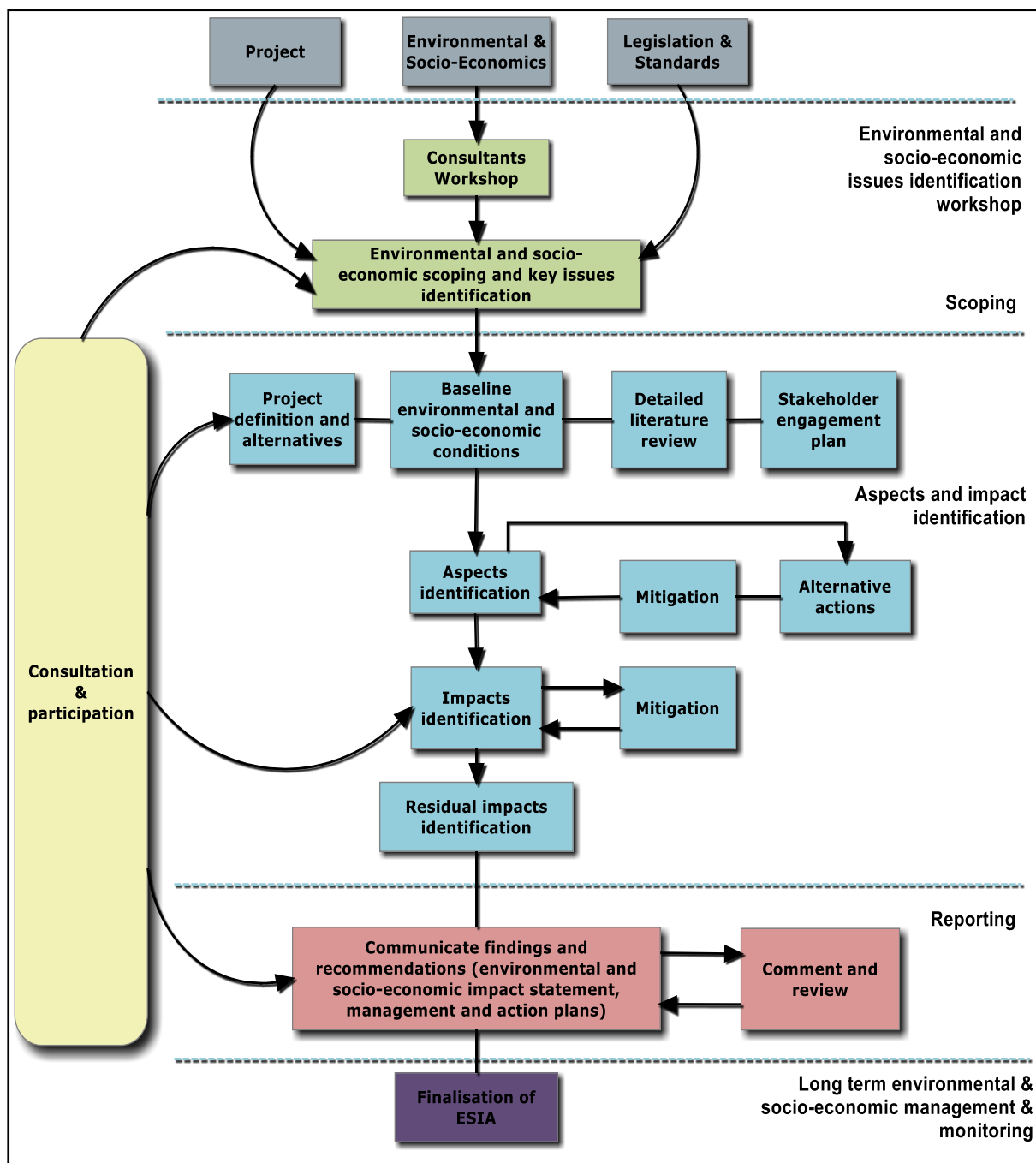


Figure 2-1: Proposed ESIA approach in line with water resources related project cycle

This ESIA only covered the surface water abstraction, treatment and supply i.e., raw water intake and raw water pumping station, water treatment plant (WTP), the raw and treated water transmission lines, the associated elevated storage reservoirs (ESRs) along the way and distribution network. Furthermore, it covered the ground water abstraction and supply i.e., borehole and pumping station, transmission lines, associated ESRs and their distribution networks. The sanitation is covered under a standalone ESIA report.

2.2 The EIA Guidelines for Water Related Projects

The Guidelines for EIA in Uganda 1997 recognize the need for sectoral Guidelines in addressing the specific sectoral environmental concerns. In view of this, the EIA Guidelines for water resources related projects were prepared based on the framework of the Guidelines for EIA in Uganda 1997, which give general procedures to be followed when conducting EIA as well as an outline of the main obligations for the planners, including developers and lead agencies. The EIA Guidelines provide lead agencies, EIA practitioners and others involved in the EIA process with practical guidance and a ready source of information about the process.

The Guidelines state, “taking into account findings from project scoping, the developer shall prepare ToRs and submit to NEMA with a copy to DWRM. NEMA shall review the ToRs in consultation with DWRM and any other relevant Lead Agencies before the EISA is conducted. The reviews ensure that the assessment will be conducted in an agreed-upon and focused manner. Based on the tasks specified in the ToRs, the developer shall then source and hire an experienced and multi-disciplinary team of EIA Practitioners and other relevant experts to undertake the different tasks specified in the ToRs”.

2.3 Scoping

Scoping was one of the initial steps in this Environmental and Social Impact Study (ESIS) process. It included consultation of a range of stakeholders to identify potential impacts or issues that were unique to the project context and this allowed for in-depth analysis in the environmental impact study. The general objective of the scoping exercise was to identify the critical biophysical, socio-economic, and cultural issues which needed to be addressed by the ESIA. In this regard, the developer (NWSC) prepared a scoping report and drafted the ToR for the ESIS.

2.4 Terms Of Reference

The EIA Regulations, 1998 stipulate that an environmental impact study shall be conducted in accordance with the guidelines for ESIA and that ToR shall be prepared by the developer in consultation with the lead agency (Regulation 10). The ToR were developed through the scoping exercise. The scoping report and ToR were submitted to the National Environment Management Authority (NEMA) and subsequently approved.

2.5 Literature Review

To gain a clear insight on baseline parameters and project characterization, various planning, regulatory documents and reports were reviewed. These provided useful information for the baseline conditions of the project area. Under this process, the following documents were accessed and reviewed by the ESIA consultant:

- a) Adjumani WSSP Design/Feasibility Report (2021)
- b) Development Plans (2020/2011-2024/2025) for District, Town Council and Subcounties i.e., Adjumani District, Adjumnani TC, Pachala, Laropi, Pakele, Dzaipi, Ciforo and Adropi.
- c) National Environment Act 2019

- d) Uganda Poverty Assessment Report (2014)
- e) Situation Analysis of Child Poverty and Deprivation in Uganda (2014)
- f) Ministry of Gender, Labour and Social Development Orphans and Other Vulnerable Children Statistical Report (2017-2018)
- g) Ministry of Gender, Labour and Social Development Orphans and Other Vulnerable Children Statistical Report (2017-2018)
- h) UNDP-Uganda Country Gender Assessment October (2015)
- i) National State of the Environment Report - NSOER (2018-2019)³
- j) UBOS National and District Statistical Abstracts (2014, 2016 and 2017); among others.
- k) National Environment (Environmental and Social Assessment) Regulations, S.I No.143 of 2020
- l) National Environment (Waste Management) Regulations S.I. No. 49 of 2020

In addition, relevant guidelines, policies and laws that guide environment Impact Assessment in Uganda were reviewed. The associated World Bank Operational Safeguards were reviewed to ensure that the assessment is in line with the WB Operational Policy and procedures. Relevant international conventions where Uganda is party were also reviewed. Other documents included the World Bank Environmental and Social Framework (2017) and Environmental Impact Statements for previous water and sanitation projects.

2.6 Establishment of Environmental & Socio-Economic Baseline Conditions

2.6.1 Physical Environment

The physical environment baseline includes the air quality, noise levels, vibrations and water quality which were measured, not only to inform construction contractors about pre-construction conditions existing at proposed sites, but also the first annual environmental audit (subsequent baseline conditions).

Information on the physical environment of the site, namely climate, topography, geology and soils and hydrology were obtained mainly from available secondary data, and using Geographic Information Systems (GIS) mapping and Remote Sensing (RS) techniques. Primary data e.g., location coordinates and photographs were captured using a handheld Garmin 64s Global Positioning System (GPS) and cameras, respectively. The coordinates were input into a GIS and RS application (ArcGIS 10.5) to generate and analyse spatial data for the sites e.g., maps.

2.6.1.1 Air Quality, Noise and Vibrations

Baseline measurement of noise, air quality and vibration were undertaken at set out locations in and around the project sites with potential to cause noise and air quality nuisance and vibration effects during the ESIA study. Therefore, this assessment focused on the Criteria Air

³ <https://www.nema.go.ug/sites/default/files/NSOER%202018-2019.pdf>

Contaminants (CAC), Noise pollution contaminants and possible sources of vibrations which reflect the project emissions of concern with respect to environmental health. The baseline measurements sites were selected considering the presence of potential receptor(s) and their sensitivity to noise, air pollution and vibration impact.

2.6.1.1.1 Criteria for Selection of Sampled Sites

During the ESIA studies, the selected receptors for noise, air quality and vibration assessment were purposively sampled based on professional judgement and other factors as provided in **Table 2-1**. As part of the ESIA studies, the consultant undertook site-survey/transect walks or drive through to ascertain the number, distribution and potential of the sensitive receptors and their distance from the proposed project facilities.

The selection of sampling points in the ESIA study was guided by the provisions of the Uganda's Draft Regulatory Air Quality Standards and National Environment (Noise standard and Control) Regulations, 2003 which defines air quality and noise permissible limits for various land uses zones i.e., commercial (urban centres, health units), mixed land use (residential areas, farmlands, schools and administrative units) and industrial zones, respectively. The complexity of project area's land use and land cover (LULC) e.g., urban or rural set ups and existence of tall structures and vegetation constrains air mixing, sound movements and causes variation in their baseline conditions. Additionally, topography, which were mainly characterized by the terrain. The kind of terrain influences horizontal mixing of air over long flat stretches as opposed to mountainous areas/complex terrains with flagpoles that would encourage vertical mixing of air.

The baseline focused on selected sensitive receptors based on their location from the proposed project sites. Therefore, the sampling points were selected to represent the above land uses (**Table 2-1**). Therefore, the selected potential receptors for noise, air quality and vibration assessment were clustered according to Figure 2-2 and then randomly sampled. The sampled sensitive receptors represented the different LULC and activities in and around the project sites; marked potential candidates for air, noise and vibration pollution; and sections within the project sites/areas.

Table 2-1: Potential air quality, noise and vibration sampling points

Site	Village/ Sub county	Date and GPS Coordinates	Key land use and receptor	Current source of air quality, noise and vibration impacts
Etejo Primary School (near the Intake)	Arra West Village	30/11/2021 E381536 N378241	Located near Etejo P/S and the Ara West Village settlement in Arra West Village. Educational/ learning activities and community settlements are sensitive to dust, vibrations and noise. Monitoring at this school will provide valuable information regarding impact on schools and nearby communities.	Sources of air quality nuisance: kitchen smoke and a mini diesel run dry mill, Sources of noise: Birds, conservations and occasional vehicles headed to the ferry crossing point. Source of vibration: non-identified.
Homesteads and church near the WTP	Mijare village	01/12/2021 E366534 N382148	Location represents how households and places of worship are sensitive receptors to air quality and noise nuisance and vibration impacts	Sources of air quality nuisance: smoke from kitchens, local brewing of ethanal and dust from an access road. Sources of noise: vehicles along the access road. Sources of vibration: Vehicles along the access road to the ferry crossing.
Homesteads near MBR	Mukolo Village – Adjumani Town Council	02/12/2021 E364092 N374852	Mixed land use with peri-urban land use characterised by an influx of residential houses, retail businesses and bushland traversed by common access roads	Sources of air quality nuisance: Smoke from kitchens and dust from access roads. Sources of noise: Motorcycles along access roads and conversations; Sources of vibration: non-identified
Cifolo trading center (near Cifloro ESR)	Cifolo Trading centre	04/12/2021 E357700 N370853	Upcoming urban centre with a mix of retail business and households characterised by loud music from barber shops and mini dry mills. Traversed by a busy marram access road to a landing site. Road characterised by construction	Sources of air quality nuisance: traffic along the busy access road to the landing site, smoke from kitchens and fumes from mini diesel run dry mills.

Site	Village/ Sub county	Date and GPS Coordinates	Key land use and receptor	Current source of air quality, noise and vibration impacts
			trucks ferrying materials and public transport and non-government organisation vehicles.	Sources of Noise: Traffic from the busy access road. Sources of Vibration: Non-identified.
Homesteads near the Logoangwa ESR	Pagirinya Village	05/12/2021 E389263 N370142	Rural settlement characterised by residential homesteads, bushland and a common access road.	Sources of air quality nuisance: dust from the access road and smoke from kitchens. Sources of noise: Conversations and motorcycles along the access road. Sources of vibration: non-identified
Settlement near Ajugopi ESR	Maichiku Village	05/12/2021 E381536 N378241	Rural settlement with over 200 housing units intercepted by bushland.	Sources of air quality nuisance: smoke from kitchens, local brewing of ethanal and dust from an access road. Sources of noise: Motorcycles along the access road. Sources of vibration: non-identified.
Pakele Catholic Church near Pakele ESR	Pakele Town Council	06/12/2021 E371252 N371769	Sensitive receptors: Catholic Church, Pakele Girls Primary School, Administrative offices and church and school residences. Represents areas of worship, learning centre and residential areas sensitive to air, noise and vibrations impacts.	Sources of air quality nuisance: dust from the access road and smoke from kitchens. Sources of noise: Children playing, church bells at 16:30pm. Sources of vibration: non-identified
Offices at Dzaipi Subcounty near Dzaipi ESR	Dzaipi Sub county	07/12/2021 E383936 N374958	An open space with many office buildings including the sub county offices, police station, Dzaipi health centre IV and a peri-urban settlement in the neighbourhood traversed by the main Gulu – Adjumani highway under construction during the period of measurement.	Sources of air quality nuisance: traffic along the busy Gulu Adjumani highway and ongoing road construction, and smoke from kitchens. Sources of Noise: Traffic from the busy access road.

Site	Village/ Sub county	Date and GPS Coordinates	Key land use and receptor	Current source of air quality, noise and vibration impacts
			Represents cumulative impacts during construction of the reservoir tank and piping works in addition to road ongoing road construction impacts especially noise and vibrations to offices	Sources of Vibration: Non-identified.
Olua Church School near Melijo ESR	Olua Village	9/12/2021 E376486 N363204	The church neighbours Olua P/S and the Olua refuge settlement camp, small market (mudala) represents mixed land use that includes settlement, places of worship and learning centres along the road sensitive to noise and vibrations.	Sources of air quality nuisance: dust from the access road and smoke from kitchens. Sources of noise: Children playing. Sources of vibration: non-identified

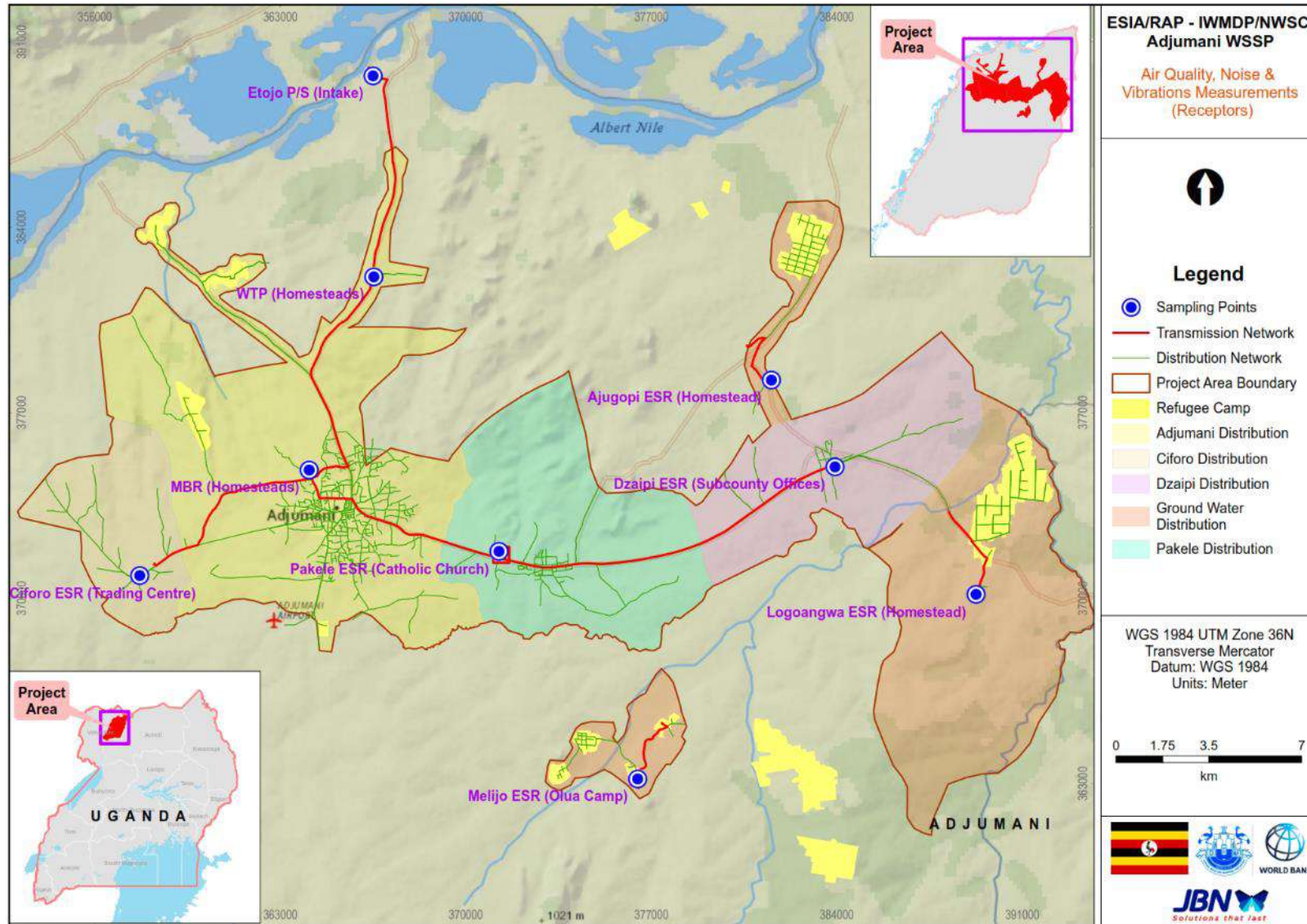


Figure 2-2: Selected air quality, noise and vibrations measurement points in the project area

2.6.1.1.2 Air Quality

Ambient air quality assessments included monitoring of a range of parameters of particulate matter (PM_x) and gases undertaken at locations with potentially sensitive receptors (Table 2-1) where pollution impacts including dust nuisance will likely be a concern. These sites can be selected as suitable for future monitoring during the projects' implementation phases. Major sources of outdoor air emissions in the project area are from vehicular traffic activities. Different air pollutants that were assessed include;

- i) Particulate Matter (PM), including total suspended particulate (TSP). Inhalable particulate matter (PM₁₀ and PM_{2.5});
- ii) Sulphur Dioxide (SO₂)
- iii) Nitrogen Dioxide (NO₂)
- iv) Carbon Monoxide (CO)
- v) Volatile Organic Carbon (VOC)

Air Quality Measurement Procedure

Aeroqual S500 Monitor was used to establish the baseline values for PM_{2.5}, PM₁₀, NO₂, SO₂, VOCs and CO. The principle involves a sensor that uses a laser particle counter which uses a light scattering method to size and count particles and then convert particle numbers to mass concentrations through proprietary algorithms. The sensors come factory calibrated.

The monitor was placed on a tripod stand 1.2m above the ground, switched on, allowed 3 minutes of zeroing and 7 minutes of stabilizing readings. The monitor was then be set to start data logging at a frequency of five (5) minutes for 4-6 hours per site. The results of concentration of particulate matter are displayed on the screen as they are recorded on the monitor's memory. The data was then downloaded using Aeroqual S500 V6.5 Software and analyzed to generate mass concentration graphs and also provides minimum (min), average (ave) and maximum (max) values for each parameter logged.



Air quality measurements at Etejo Primary school in Arra West Village near the intake



Air quality measurements at the WTP in Mijare village



Air quality measurements near a household in Mukolo West village near the MBR



Measurements at Cifolo trading centre near Ciforo ESR



Air quality measurements in Maiciku village near Ajugopi ESR: ongoing brewing of ethnal



Air quality measurements at Pakele Catholic Church near Pakele ESR



Air quality measurements at Dziapi Subcounty near Dzaipi ESR



Air quality measurements at Olua Church school near Melijo ESR



Figure 2-3: Field air quality, noise and vibration monitoring at selected sites

2.6.1.1.3 Noise Measurements

Noise pollution contaminants are generally waving that interfere with naturally occurring waves of a similar type in the same environment. However, noise pollution is defined as unwanted sound or sound that is loud or unpleasant. Sounds are considered noise pollution if they adversely affect wildlife, human activity or are capable of damaging physical structures on a regular basis. The sound levels were measured at different receptors in and around the project sites (schools, hospitals, settlements etc.).

Measurement of ambient noise levels was carried out using a precision integrating Sound Pressure Level (SPL) meter and duly calibrated Casella CEL-633B Environmental & Occupational Noise Meter (Figure 2-4). The Casella CEL-633B device also provides integrated SPL and octave band of noise measurements with an active range of 0-140 decibels (dB). It is compliant with the following IEC and ANSI international standards as follows:

- a) *IEC 61672-1: 2002-5 (Electro-Acoustics–Sound Level Meters) Group “X” instruments. Performance of Class 1 or 2 as relevant to the instrument model.*
- b) *IEC 60651: 1979, IEC 60804: 2000, ANSI S1.4 1983, ANSI S1.43-1997(R2007)*
- c) *1/1 Octave and 1/3 Octave Filters comply with EN61260: 1996, Class 0 and ANSI S1.11 1986, Order-3 Type 0C.*

The instrument has A, C and Z filter weightings satisfying IEC 61672-1: 2002 Class 1 and time weightings of Fast (F), Slow (S) and Impulse (I) according to IEC 61672-1: 2002. It has a memory capacity of 999 individual runs, or 400 separate runs of 24 hours’ duration with 1-minute periods and 1 second profiles. It can measure the Equivalent continuous sound pressure levels (Leq) as follows: LAeq, LCeq, LZeq, LAeq, LC–LA and LAeqT80. It can also measure the Peak sound pressure level i.e., LAPk, LCPk and LZpk. In addition to all the broadband results above, the instrument can also produce the following results for each of the octave or 1/3-octave bands: LZeq, LZFmax, LZSMax, LZF10, LZF50, LZF90, LZF95, LZF variable LCeq, LCFmax, LCSMax, LCF10, LCF50, LCF90, LCF95, LCF variable LAeq, LAFmax, LASMax, LAF10, LAF50, LAF90, LAF95, LAF variable.

- a) LAeq – is the constant noise level that would result in the same total sound energy being produced over a given period of time.
- b) LAFmax – the maximum Sound level with 'A' Frequency weighting and Fast Time weighting
- c) LAImax – the maximum Sound level with 'A' Frequency weighting and Impulse Time weighting
- d) LAFmin – the minimum Sound level with 'A' Frequency weighting and Fast Time weighting constant.
- e) LAImin – the minimum Sound level with 'A' Frequency weighting and Impulse Time weighting.

Set-up and Measurement

The meter was first switched on and calibrated using Acoustic sound level calibrator type CEL-251 for sound level meter at 114.0 dB (A) for every point measured (Figure 2-4).



Figure 2-4: Calibration of equipment before undertaking measurements

The meter was placed on a tripod stand (1.2m high) from the ground and then set to run mode. The initialization process displays and lasts for approximately 10s followed by the measurement screen implying ready for use. It does simultaneously recordings for all noise functions it completes, makes periodic or cumulative data measurements, and stores acquired data on a repeating interval of time. Therefore, the meter was left to log noise readings at an interval of 30 minutes and the results will later be downloaded to a computer for analysis using the Casella Insight software. The noise sources together with the ambient environment at each location noted.



Noise measurements at Etejo P/S in Arra West settlement near the intake



Dzaipi sub county offices – near Dzaipi ESR - representative land use for peri-urban, office, health centre and settlements.



Cifolo trading centre near Ciforo ESR



Homestead in Pagirinya village – near Logoangwa ESR



Settlement in Maichiku Village – near Ajugopi ESR



Olua Church School – near Melijo ESR

Figure 2-5: Typical field set up of noise measurement equipment

2.6.1.1.4 Vibrations

Vibration often presents a threat to people and wildlife in the areas where it is above the recommended threshold. The sources of vibration can be transport and construction equipment among others. To determine the baseline vibration levels in the project area, the Extech SDL800: Vibration Meter/Datalogger vibration meter was used.

The SDL800 measures and logs vibration data using a remote vibration sensor with magnetic adapter on 47.2"(1.2m) cable. It offers a wide frequency range of 10Hz to 1kHz with basic accuracy of $\pm (5\% + 2 \text{ digits})$. The machine continuously logs vibrations data using a SD memory card, which allows user to easily transfer collected data to a PC for further analysis. The machine was connected to a 6-inch nail using the magnetic adapter and the nail mounted into the ground near the facilities where vibrations were measured from, switched on and allowed to run for 1 minute to settle. It was then set to start logging data at a frequency of 5 minutes. The parameters measured were velocities and frequencies in the vertical, longitudinal and lateral axes ('R', 'T', and 'V') whose combination gives the Peak Particle Velocity (PPV) measured in mm/s. PPV is commonly used in monitoring construction vibration. Also, the distance from the point of measuring and the vibration source were measured and recorded for every site.



Set up for vibration measurements at different sites

Figure 2-6:: Vibration measurement at sensitive receptors

2.6.1.2 Water Quality Analysis

2.6.1.2.1 Identification of the sampling points

The Consultant first undertook a reconnaissance survey of the project area to appreciate the existing water resources, their location in view of the proposed project components, and how they may be affected by the project. The reconnaissance survey further involved the identification and delineation of the potential pollution sources that are likely to impact on the water resources. From the findings of the reconnaissance survey, it was identified that the water intake and water treatment plant sites were the potential areas of focus for water quality assessment, and thus, a detailed water quality assessment was carried out on these sites. The selection of sampling points targeted the upstream and downstream of the potential point-source pollution discharge point associated with the project components (Figure 2-7).

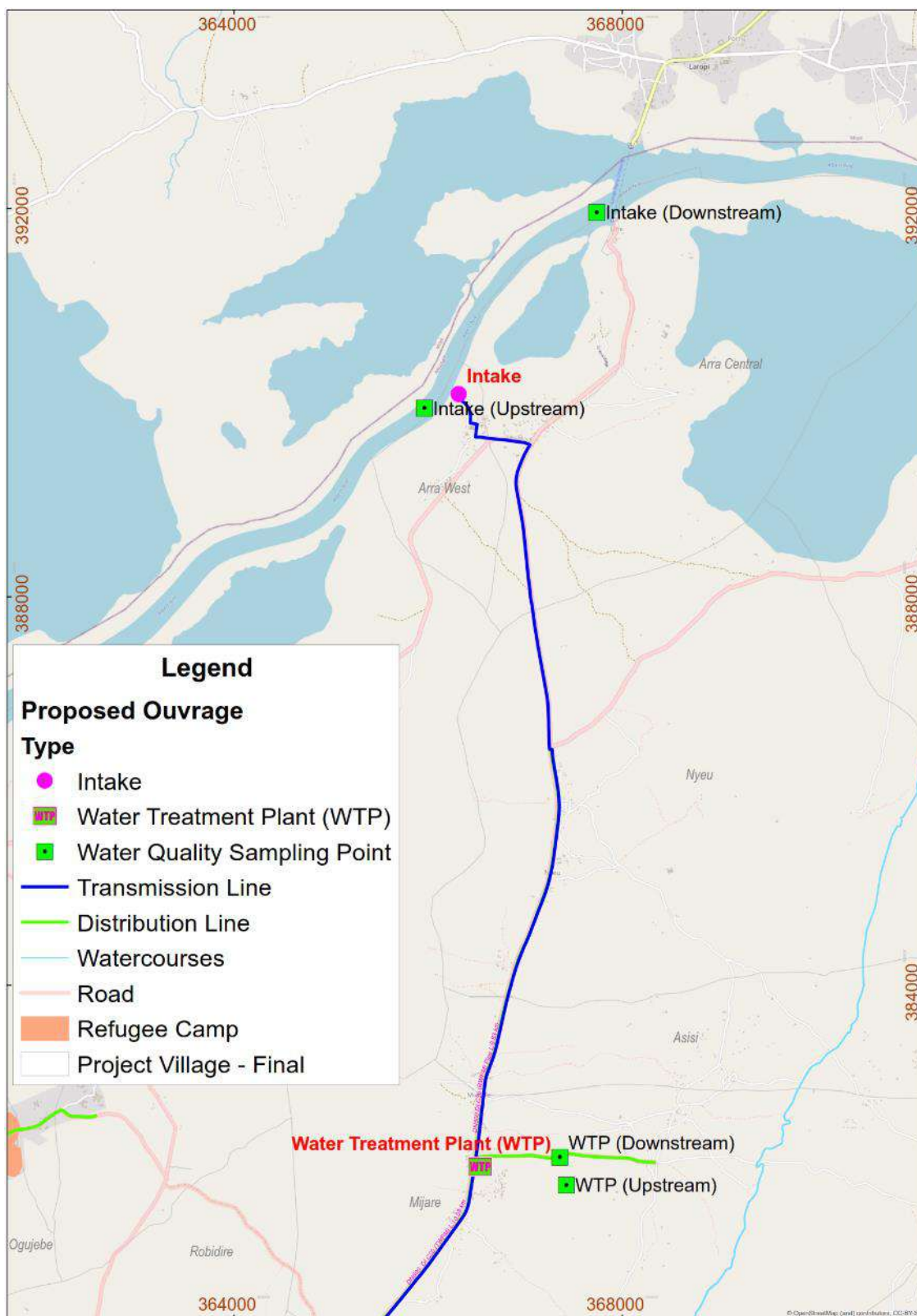


Figure 2-7: Location of the water quality measurement/sampling points

2.6.1.2.2 Field and laboratory water quality measurement/analyses

Water quality assessment was done through in-situ water measurements using a portable multi-parameter meter, while water samples were collected for laboratory analysis of parameters

which could not be measured in-situ (Figure 2-8). Water samples were collected using clean 1 L sampling bottles that were rinsed prior to sampling, and then kept in an ice-cooled box, and transported to the laboratory (National Water and Sewerage Corporation laboratory) for analysis. The samples were delivered to the laboratory within six hours from the time of their withdrawal from the field. Water quality parameters that were measured in-situ included pH, electrical conductivity (EC), turbidity, total dissolved solids (TDS) and salinity. Water quality parameters that were analysed in the laboratory included colour, total suspended solids (TSS), total hardness, total alkalinity, ammonium-nitrogen, nitrate-nitrogen, total nitrogen (TN), total phosphorus (TP), orthophosphate, chloride, sodium, iron, biochemical oxygen demand (BOD) and fluoride. During water quality measurement/sampling and analysis, quality control was followed, according to the standard methods (APHA/AWWA/WCF, 2020). The results of water quality analysis will be used to provide a baseline for monitoring future impact of the project on the water quality in the water resources assessed.



Figure 2-8: Taking in-situ water quality measurements and a water sample from River Nile and stream located downstream of the proposed WTP

2.6.2 Biological Environment

2.6.2.1 Aquatics (Fisheries)

The study on aquatic ecosystem involved survey of historical and current status of aquatic fauna and flora in Madi area of the Upper Nile River (around the intake), including the socioeconomic importance of aquatic environment. Fish species was identified and used as key indicator species among the aquatic fauna. The assessment was then carried out on the established ecological and socioeconomic functioning of the area as to how the project will impact the following aspects; water quality parameters, aquatic vegetation occurrence and distribution, fish habitats, fish species occurrence, fisheries ecological processes (breeding, nursing, feeding and migration), fishing as a livelihoods activity, and access to any existing landing sites for fisheries and other settlement activities.

The potential impacts of all stages of the project from pre-construction, through construction and installation to operation as per design of the water supply development project in Adjumani WSSS were considered and evaluated against applicable environmental standards, regulations and guidelines, existing environmental conditions, and issues and concerns raised by all project stakeholders. Evaluation of the implementation and effectiveness, of existing and planned environmental controls and monitoring and mitigation are considered and proposed.

The data collection and assessment process for effect of the project on the aquatic ecosystem was carried out in 3 stages; stakeholders' consultations, technical field surveys and assessment, and socio-ecological survey and measurements. Technical field assessment was done using a professional water quality probe, field observation and interviews, experimental fishing, and a rapid fishermen catch survey assessment. The stakeholders consultations involved discussions with district officials responsible for water, fisheries and conservation, as well as community leaders. Socio-ecological survey involved meeting and discussions with fisherfolk and residents within the project area. Therefore, interviews with onsite fishermen (arra west intake), market surveys (Laropi ferry crossing point) were the techniques used to collect the data.

2.6.2.2 Vegetation, Habitat and Flora Survey

To study the vegetation structure and composition of the Intake, water treatment plant, all reservoirs, transmission and distribution lines, and borehole areas (T1, 3 & 4) for the proposed water supply in Adjumani district, a combined methodology was applied. This included both literature review and field observations.

2.6.2.2.1 Literature review

Literature relevant to the site and proposed activities was reviewed prior to field surveys to get a picture about the vegetation and flora that is found in the project area from previous studies. This information was sought from available published reports and other resources.

2.6.2.2.2 Filed Surveys

To collect site specific data, a field visit was conducted in the month of November/December 2021. At proposed site or route, the vegetation of the general area was described from the

dominant and more common species of plant. Observations were made of land use practices and any activities that could cause disturbance to the ecological integrity of the ecosystem and the flora. Photographic representation of the vegetation and condition of the sites was made and coordinates taken for such pictures. Photographs of species encountered were taken. For illustration of different plant cover types and valued ecosystem components (VECs), pictures were taken and coordinates of location marked with GPS “Garmin 64s” in World Geodetic System 1984 (WGS 84). The coordinates for pictorial illustrations were displayed in Universal Transverse Mercator (UTM). A diameter tape was used to record tree diameters at 1.3 m or breast height, a pair of tape measures and stick poles were used to demarcate the quadrats along transmission lines, reservoirs, borehole areas and tank sites. Measuring tree heights was made possible by using yardstick and estimates. A number of regional flora keys were used in the field for better species identification.

2.6.2.2.2.1 Quantitative Sampling

Inventories of demarcated plots have been widely used in floristic sampling and ecological studies in the recent years (Poulsen 1997). However, the results of species richness depend on the size, shape and number of the plots being used and the choice of the shape depends on the scope of the study (Grieg Smith, 1983). Circular plots are easier to measure and have fewer edge errors because edge length is minimized (Grieg Smith, 1983). Circular nested quadrants of 10m radius were used during the field survey to make estimates comparable with previous surveys of researchers in the region.

Systematic sampling was used along the transmission and distribution routes. Random sampling technique was used for vegetation sampling at the reservoirs, intake, water treatment, and boreholes. The first points (quadrant) were randomly generated using the Distance Software and overlaid in the proposed water project sites for vegetation sampling. Alternating quadrants method was laid along the transmission and distribution lines. To located and lay nested quadrants spaced out at intervals of 500 m along the transmission and distribution routes and a range of 50 – 110 m at the borehole and tank sites, a GPS was used.

Herbs were sampled in a 2 m radius quadrant, while shrubs were sampled in a 5m and trees in 10 m radius. All plants encountered rooted within the quadrant were recorded in their respective lifeforms. Tree diameters at breast height (Dbh) were measured and recorded in diameter classes of 2.5 - 9.9 cm, 10 - 29.9 cm, 30 - 49.9 cm and ≥ 50 cm. The ≥ 50 cm classes were grouped under one class because their numbers are usually low.

Lianas were recorded by the presences or absence mechanism in the same quadrant as the trees. The data have been used to show the relative distribution and diversity of the species within the case study areas. Daubenmire method of canopy cover ranking, and frequency was employed for herbaceous cover estimates.

2.6.2.2.2.2 Opportunistic Records

Although quadrants registered reasonable data on the distribution, diversity, and abundance of the various plant strata according to the land use types of the area, a cumulative list was

compiled from both the plots and opportunistic encounter that were recorded as they were encountered in the case study areas.

2.6.2.2.2.3 Voucher Specimens

Plant species that could not be instantly identified were collected and photographed for further confirmation at Makerere University herbarium (MHU) where final identification was done.

2.6.2.2.2.4 Data Analysis

Species were compiled on a site-by-site basis and the total richness obtained. A plant species lists (species richness) were compiled from the plot data and additional opportunistic observations and presented in tables and graphs. Their percentage cover was also analysed from their distribution through the growth habits.

2.6.2.3 Fauna Survey

Several methods available for studying fauna were applied, and they vary from animal to animal as well as the type of habitat. Similarly, the time available for conducting the study dictate the type of method to use. The survey covered butterflies, dragonflies, herpetofauna, avi-fauna and mammals. The following methods were used to study the fauna for both the proposed surface and groundwater infrastructure for Adjumani WSSP. The

2.6.2.3.1 Butterflies

Sampling Method: Pallard's sweep net method for sampling butterflies (De Vries 1997) was employed at established (transects) points in the different habitats encountered along the distribution lines and locations for the Sump and Tanks. The method involved moving randomly at a slow and even pace of (~1km/h) (Pellet 2007) through the study area. The method was applied by sweeping the net back and forth to capture the butterfly. The net is flipped over when capture is anticipated. Trapped butterflies were gently removed from the net, identified and released.

Individuals whose identity is unknown were photographed and individual placed in collection envelopes, with details of GPS coordinates, time and the photograph number written on the labels and taken to Makerere University Museum for identity determination. All trapped butterflies were identified to species level.

Data Analysis: This was through compiling a checklist for all butterflies encountered and identified in the study area. Standard guide by Larsen (1991) was used to identify specimens to species level, and also by matching with Makerere University Museum collections. The species were arranged into families *Hesperiidae*, *Lycaenidae*, *Nymphalidae*, *Paeridae* and *Papilionidae* and *genera*.

2.6.2.3.2 Dragonflies

Sampling Method: Dragon flies were also sampled using a sweep net along a 200 m line transect. Dragonflies encountered were caught by swinging the net rapidly up and from behind the insect. The sweep net was then flipped so that the bag closes over the opening to stop the insect from

escaping. The dragonflies were extracted from the net by grasping the wings at the base and gently closing them between finger and thumb, and identified. Where possible, photographs were also taken for those dragonflies that were caught.

Data Analysis: Data collected was analyzed by compiling a species checklist for the surface water and ground water infrastructure.

2.6.2.3.3 Herpetofauna (Amphibians and Reptiles)

Sampling Method: A combination of scientifically tested methods was used to collect information on herpetofauna as described by Heyer et al. (1994); Fellers and Freel (1995); Halliday (1996); and Olson et al. (1997). The methods include the following:

- a) **Visual Encounter Surveys (VES):** The method involves moving through a habitat watching out for, and recording surface-active herpetofauna species. VES was complimented by visual searches, by examining under logs, leaf litter, in vegetation, and crevices. Species encountered were recorded and where possible photographed.
- b) **Audio Encounter Surveys (AES):** This method uses the species-specific calls/sounds/ advertising calls made by breeding males. The identity of the amphibian species heard calling and their numbers were counted and recorded.
- c) **Dip Netting:** Using a dip net, ponds, pools, and streams and other water collection points were dip netted. Adult amphibians and tadpoles encountered were also recorded.
- d) **Opportunistic Encounters:** Herpeto-fauna species encountered opportunistically while moving in the project area were also recorded.

Data Analysis: Species checklist was compiled which list gives a measure of herpetofauna species richness all sampled sites and routes. Standard identification guides by Spawls et al. (2008) and Branch B (2005) was used. Unidentified specimens were taken to Makerere University Museum for identification. Bar graphs were used to compare the results. Relative abundance was computed from the total number of individuals recorded per species within the herpetofauna population for the sampling sites.

2.6.2.3.4 Avi-fauna (Birds)

Sampling Method: Timed Species Count (TSC) method (Bibby *et al* 2000) was used at the surface water and ground water infrastructure sites as well as along the distribution and supply pipelines. At each of the sites, bird species seen and their numbers were recorded. Each TSC lasted one hour, during which time all bird species seen or heard were listed in order of detection. Additional records were made of species found near and around the project sites outside the time of the count. The observer's eyes were aided by a 10 x 40 binocular. Efforts were made to sample the different habitats represented in the study areas. Sampling was conducted in the early morning and towards the evening. All identifications were made to species level.

Data Analysis: Species checklist was compiled which gave a measure of the bird species richness at each sampling site and along the routes. Standard identification guide by Stevenson and Fanshawe (2002), supported by the Uganda Bird checklist (Nature Uganda, 2016) was used.

Relative abundance was computed from the total number of individuals recorded per species within the population within the sampling sites.

2.6.2.3.5 Mammals

Sampling Method: The mammals were surveyed using three (3) methods:

- a) **Direct Observation/Opportunistic Encounters:** All mammals seen or opportunistically sighted or heard calling while moving in the project area were identified, counted and recorded;
- b) **Use of Signs e.g., footprints and/or dung or calls:** Mammal species whose footprints and or dung that could be recognized were recorded for their presence;
- c) **Local consultations:** The fauna specialists held discussions with local residents/community in and around sampling points about the availability of mammal species in the area.

Data Analysis: The number of species caught at each site were used as a measure of species richness (Hellmann and Fowler 1999). The simplest measure of species richness is the number of species present in a sample (Hellmann and Fowler 1999). For relative abundance, the number of individuals caught was used as an index of abundance of small mammal species at each survey site (Slade and Blair 2000).

2.6.2.3.6 Fauna Species Conservation Status

The conservation status of each fauna species encountered was ascertained using the 2020 version of the published IUCN red data list and the National red list of Uganda's threatened species (Wildlife Conservation Society 2016). Through examining published distribution records and literature, assessment of distribution range limits of the different species, new records, lack of records of expected species, and determining how typical/representative/distinctive the species/communities are in the area was conducted. Mammal identifications were based on Field guides by Kingdon (1974), Delany (1975) and Kingdon et al. (2013).

2.6.3 Social Environment

This section explains the methodology that was used to study the socio-economic baseline conditions of the project area. A summary of the study methods employed are given as follows:

2.6.3.1 Kick-Off Meeting

At the onset of the ESIA study, a kick-off meeting was held with the ESIA Consultant team at JBN offices to mainly confirm the scope of the study/work, timelines for the delivery of the assignment, and confirm communication lines and secure available information for the ESIA. The meeting also agreed on the dates of field visits as well as availability of all teams to carry out the studies.

2.6.3.2 Detailed Field Baseline Investigations

The socio-economic assessment employed both qualitative and quantitative methods and several techniques were used in data collection, including questionnaire surveys also known as household surveys (questionnaire tool attached as Annex 11), key informant interviews (Stakeholder consultations), focus group discussions and case study reviews. These were important in establishing the socio-economic baseline information and subsequent assessment of potential social impacts. Socio-economic surveys were also done to obtain data on demographic parameters, access to infrastructure and services, land ownership aspects of gender and vulnerability, livelihoods among other parameters.

2.6.3.2.1 Socio-Economic Survey

The socio-economic survey involved identification of socioeconomic baseline conditions within the project area (both general and site specific). Identification of socioeconomic baseline conditions helps to identify and analyse impacts from the project, propose mitigation or enhancement measures and to form a basis for future monitoring of project impacts on the human environment. The socio-cultural environment was determined based on secondary data, consultations, observations and a socioeconomic household survey of households in selected villages where the water and sanitation infrastructure will be located specifically in Sub-Counties/Town councils of Pachara, Adropi, Pakele, Adjumanu Town Council, Dzaipi and Ciforo.

2.6.3.2.2 Fieldwork

As a procedure normally executed by JBN assignments, before the field work began, the field work team (socio-economic enumerators) were trained about both the contents of the questionnaire and the specifics of the survey area sample, as well as, the overall logic of the ESIA. The survey process was administered under close supervision of the Social Development specialist and field supervisors. A total of 11 enumerators were trained.



Figure 2-9: Training enumerators at JBN offices before field socio-economic survey

2.6.3.2.3 Selection of Respondents

A total of 1181 questionnaires were administered for randomly selected households along the transmission lines, as shown in below. Of these there were 1000 nationals and 210 refugees. Simple random sampling method lends itself to the quantitative design and is rooted in the concept of probabilistic sampling. Sample selection through simple random sampling method is premised on principle that findings based on the larger samples have more certainty than those based on smaller samples. “As a rule,” Kumar (2005) argues, “the larger the sample size, the more accurate will be the findings” and the sample should be representative of the true population (Diamond and Jefferies, 2001). To attain a reliable and scientifically defensible sample, this study applied Yamane (1967:886) simplified formula to calculate the sample size, at 95% Confidence Interval and 0.05 level of significance as shown below;

Where;

N = Total population size,

n = Sample size,

e = Degree of precision (significance).

Given the homogeneity of rural households it was very unlikely that the survey could get any outliers (different survey results if we subjected the same population to this tool. Participation of local interpreters and/or local leaders in the sample selection was used to streamline transparency and eliminate suspicion by the locals, of biased selection throughout the entire process.

Therefore, the number of questionnaires for district, sub-counties, Town councils and villages along the transmission lines was mainly determined based on the settlements along the transmission lines and availability and willingness of respondents to respond to the questions. Specifically, the sub-counties and town councils where the field enumeration took place included Adjumani TC, Adropi, Ciforo, Dzaipi, Pachara and Pakele. Being rural and peri-urban project, some challenges were faced especially in areas where agriculture was the predominant socio-economic activity and most potential respondents were mainly attending to their farm land and in town council, trading centers where most potential respondents were concentrated, majority were concerned about attending to their businesses/retail shops and farmland than responding to questions from the field enumerators. The next willing respondent was therefore chosen to respond to the socio-economic tool survey questions.

Table 2-2: Showing the number of respondents by Sub- County

District	Sub-County/Town Council	Number of respondents
Adjumani	ADJUMANI TOWN COUNCIL	233
Adjumani	ADROPI	67
Adjumani	CIFORO	145
Adjumani	DZAIFI	266

Adjumani	PACHARA	203
Adjumani	PAKELE	267
TOTAL		1181

2.6.3.2.4 Direct Observation & Photography

Transect walks were concentrated around the project area collecting specific information regarding general housing condition, basic facilities and amenities such as electricity, education, health, etc.

Photographs were used to carefully to obtain visual impressions of key observed facts such as current status, images, scenes, faces and other factual data as additional evidence for analysis and reporting.

2.6.3.2.5 Ethical Considerations

Before an interview was conducted, a potential respondent was briefed about the purpose of the interview and affirmations about their anonymity and confidentiality of the information they would provide was given. This way the interviewee was able to give informed consent⁴ to the interviewer to proceed with the interview.

2.6.3.2.6 Data Input and Processing

In order to ensure that the quality of data input is maintained at highest levels, the database was designed with several quality assurance mechanisms: Database processing was done once all data were input in the database. The field enumerators processed/cleaned the database for errors and ran basic screening of responses obtained in the field before uploading it on the server. The system developed for this quality check is that of assigning unique numbers to each questionnaire, hence making every answer traceable, if need be. Database processing/cleaning focused on two dimensions, namely, identifying data input errors, as well as logical errors in the questionnaires. Each problematic/improbable response was eliminated from the final socio-economic survey results and report, hence, providing for an overview of valid and reliable ESIA data. The data was then downloaded as syntax file of (.sps) for export into SPSS format for analysis. The database has variable names and value labels in English and was also accompanied by a code-book for tabulation of results.

2.6.3.2.7 Data Analysis

The analysis of the data was done by the data analyst both in terms of reliability and in terms of possible technical errors. The populated and cleaned database was analyzed carefully by an experienced data analyst proposed for this exercise. The analysis aside from the general overview of results was also done through cross-tabulation of variables to provide a more in-depth overview of results and give meaning to the data collected. In order to generate detailed analysis

⁴ *Informed consent means that a person knowingly, voluntarily and intelligently, and in a clear and manifest way, gives his consent"*

of results both at household level and individual members within households, the SPSS database was transposed to allow for such analysis. The transposed database was used to generate the results presented in this report.

2.6.3.2.8 Gender Analysis

Gender mainstreaming requires undertaking gender analyses in all aspects of the water sub-sector; to ensure that the water and sanitation services are provided by the sub-sector respond to gender needs. Consequently, before any decisions are made, the potential impact on women as well as on men will be explored and measures will be put in place to ensure the achievement of potential favourable outcomes and mitigation of potential negative effects. The consultant used both Harvard Gender Analysis Framework and Gender Analysis Matrix to analyse the gender dimensions of the water and sanitation aspects. The Harvard framework was adequate because it looked at the individual vendor and his/her household. It fits well to agricultural-related and other rural production systems (USAID, 2008).

Data on gender aspects was captured through a number of methods such as Focus Group Discussions (FGDs), Key Informant Interviews (KIIs) with Office of the Prime Minister, Community Development Officer, District Community Development Officer, Local leaders and community meetings within the project area. Analysis of gender relations provided the study with information relating to conditions that women and men face, and the different effects that projects and programs may have on them because of their situations. Such information informs and improves project implementation and is essential in ensuring that the different needs of both women and men are met especially in terms of their roles and responsibilities in the communities.

2.7 Cultural Heritage

The study involved a desktop study of the history of the area as well as a study of the customs and history of the Adjumani people who inhabit in the project area. Lastly fieldwork in the project area from the water intake location at Arra West village on the bank of R. Nile, then along transmission route following the road up to the WTP, MBR and 3 ESR sites of Ciforo, Pakele and Dzaipi. The fieldwork investigated the presence of cultural resources like historic buildings, cultural sites, sacred traditional religion sites and the presence of archaeological resources.

2.8 Consultation and Project Disclosure

Stakeholder refers to individuals or groups who are affected or likely to be affected by the project (project-affected parties) and may have an interest or influence in the and its impacts, either positive or negative. The World Bank Ops (OP 4.01 and OP 4.12) recognizes the importance of open and transparent engagement between NWSC and project stakeholders as an essential element of good international Practice.

Effective and meaningful stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to success of the project design and implementation. Stakeholder engagement is most effective when introduced at an early stage of the project development process through the project cycle, and is an integral part of early project decisions and the assessment, management and monitoring

of the project's environmental and social risks and impacts. Stakeholder consultations have been undertaken right from the inception, detailed ESIA and disclosure of the preliminary impacts in Adjumani district and all sub-counties and town councils as well as villages traversed by the water supply and sanitation infrastructure. This shall continue during and throughout project implementation phase commencing engagements as early as possible in the project development process and in a timeframe that enables meaningful consultations with all stakeholders. The process of stakeholder engagement involved the following:

- a) Stakeholder identification and analysis;
- b) Planning the stakeholder engagement method and process;
- c) Disclosure of information;
- d) Consultation with stakeholders;
- e) Addressing and responding to concerns and issues; and
- f) Reporting to stakeholders.

Stakeholder consultations and engagements were conducted throughout the process; that is during the reconnaissance visits, inception exercise, and detailed ESIA study and will continue throughout the project life. All stakeholders were given timely, relevant, understandable and accessible information, and were consulted in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination and intimidation as stipulated in ESS **10: Stakeholder Engagement and Information Disclosure**.

Various stakeholder consultative meetings were held with Adjumani district administration and the local communities consisting of their local council representatives (LC Is) and project affected persons between 29th November 2021 to 11th December 2021. Further engagements with Ministries, Departments and Agencies (MDAs) were held between 15th February and 13th April 2022 and are still going on.

Due to the current situation of the Covid-19 Pandemic, innovative methods of conducting stakeholder and community consultations such as Online meetings (i.e., Zoom, Microsoft teams, Telephone interviews, Email consultation correspondences) were mainly employed during the detailed ESIA in line with World Bank March 2020 Guidance notes on stakeholder consultation during COVID-19. Similarly, MOH guidelines and presidential directives on gatherings were followed. Where stakeholder engagements require physical meetings, the consultant followed MOH guidelines of social distancing, washing hands and wearing of masks.

2.8.1 Stakeholder Identification

To ensure a successful stakeholder engagement, the project team identified the different stakeholders, both project-affected parties and other interested parties⁵ and engaged all of them in

⁵ The stakeholders of a project will vary depending on the details of the project. They may include local communities, national and local authorities, neighbouring projects, and nongovernmental organizations.

order to determine their requirements and expectation, and manage their influence in relation to their requirements.

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. The provisional list of stakeholders to be consulted was developed and updated as required throughout the ESIA study, to reflect changing developments and possibility of identifying new stakeholders.

This exercise resulted in the identification of all the stakeholders that fed into the actual consultative processes in this study. Through gender sensitive public consultation, the ESIA team understood the local conditions. This was critical in guiding social baseline survey that followed and subsequently, impact, risk, and mitigation measure identification. Therefore, stakeholder consultations were significant in highlighting the potential socio-economic and environmental concerns and impacts that could be associated with the implementation of the proposed project. It was also important in helping to determine appropriate mitigation measures. For this project, a list of key stakeholders was identified and assessed through stakeholder mapping.

No	Stakeholder	Roles on the project	Mode of engagement
1	NWSC	NWSC is the project proponent. NWSC has the mandate to operate and provide water and sewerage services in areas entrusted to it on a sound commercial and viable basis.	Physical meeting
2	Adjumani District Local Government (CAO, Senior Environmental Officer)	Mandated agency to oversee all activities of Lower Local Government including civil works, Environment, Social, Health and Safety in the District. Adjumani District Local Government structures are important for mobilising support for the project as well as monitoring its social-environmental impacts both during construction and operation phases.	Physical meeting
3	OPM	It coordinates and provides guidance on all refugee related response activities in all refugee settlements	Physical meeting
4	Lutheran World Federation	LWF is one of the refugee implementing partners for WASH in refugee hosting districts specifically in Adjumani district	Physical meeting
5	Medical Teams International	MTI is an agency is humanitarian aid agency that provides health care services for refugees, disaster survivors, mothers and children	Physical meeting
6	Ministry of Gender Labour and Social Development (MGLSD)	In this Ministry is found the Occupational Health & Safety (OHS) Department responsible for supervision and monitoring of worker's safety in Uganda's industrial	Physical meeting

No	Stakeholder	Roles on the project	Mode of engagement
		<p>facilities to ensure safe and health work environment.</p> <p>OHS Department will undertake routine inspection of proposed project's construction and operation activities.</p>	
7	Uganda National Roads Authority	One of UNRA's responsibilities is the establishment and maintenance road reserves. Given that the water pipelines are in some places located in the road reserve especially on the transmission line along the Atiak – Laropi road, UNRA has to be informed so that any plans with respect to the project area takes into consideration the pipeline.	Physical meeting
8	Affected Communities	Being direct beneficiaries and project affected persons, these provide ownership of the project, share views and concerns that may come as a result of the project, report safeguard issues, provide information for grievances management	Physical meeting

2.8.2 Stakeholder Consultation and Engagement Processes

Stakeholder engagement comprised consultations with District Local government officials of Adjumani (technical and political wing), Subcounty, Parish officials and Local Council leaders, OPM officials (UNHCR), NGOs (LWF) and community members in the project area and other relevant stakeholders. Notifications for the meetings at district level were made through the CAO while the lower-level meetings were through Subcounty chiefs.



Meeting with NWSC Area Manager, Adjumani District



Meeting with Assistant CAO of Adjumani District Headquarters



Meeting with OPM Settlement Commandant



Meeting with the LWF, SGBV official



Meeting the community in Pagirinya



Meeting the community in Pakele



Meeting with NWSC – Adjumani TC

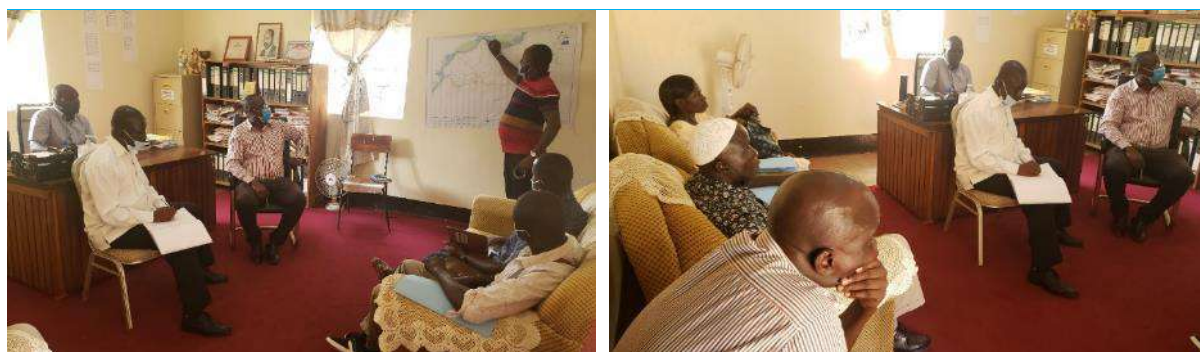


Consultative meeting between NWSC, ESIA and Design teams and the District Water Officer – Adjumani DLG on 9th December 2021



Consultative meeting between NWSC, ESIA and Design teams and the District Engineer – Adjumani DLG on 9th December 2021





Consultative and disclosure meeting between NWSC, ESIA and Design teams and the Adjumani (Political and Technical teams) – Adjumani DLG on 9th December 2021

Figure 2-10: Some of the stakeholder meetings that were held during the detailed ESIA study

Table 2-3: Meetings with District Technical teams

Stakeholder Group	Designation	Date	Venue of meetings	Number	
				Male	Female
Meeting with NWSC	Area Manager	29 th November 2021	NWSC Offices, Adjumani	06	02
Meeting with Adjumani District Officials	Deputy CAO, CDO and Labour Officer	30 th November 2021	Adjumani District HQ	03	00
Meeting with OPM	Camp Commandant	30 th November 2021	OPM Offices	01	00
Meeting with Lutheran World Federation	Project Officer SGBV official Social protection Field officer	30 th November 2021	LWF Offices	03	01
Pachara Sub-County	SAS, Parish Chiefs, LC1s of Arra West, Central, Mijale, Unna, Ajujo, Marindi, Tanganyika, Jiwa, Adropi	30 th November 2021	Pachara Sub-County HQs	15	04
Medical Teams International	Medical Coordinator	1 st December 2021	MTI Offices	01	00

Stakeholder Group	Designation	Date	Venue of meetings	Number	
Pakele Town Council	Town Clerk, Chairman LC III, CDO	1st December 2021	Pakele T/C Offices	02	01
Adjumani Town Council	Vice LC III Chairperson, Health Inspector, Ass. Water Engineer	5 th December 2021		03	01
Adjumani	Deputy RDC	6 th December 2021	RDC's Offices	02	00
Adjumani Town Council Leaders	Town Clerk, Mayor, Deputy Town Clerk	8 th December 2021	Adjumani Town Council Headquarters	04	01
Meeting with Adjumani District Officials	Water Engineer	9 th December 2021	Adjumani District Headquarters	05	00
	NWSC, ESIA and Design teams and the District Water Officer – Adjumani DLG on	9 th December 2021	Adjumani District Headquarters	06	00
	District Engineer – Adjumani DLG	December 2021	Engineer's Office, Adjumani District Headquarters	09	01
Ministry of Gender Labour and Social Development (MGLSD)	OHS Department	17 th May 2022	MoGLSD offices	05	00

Table 2-4: Community Stakeholder Engagement

Meetings held	Date and time	Venue of meetings	Number	
PACHARA SUB-COUNTY			Male	Female
Arra central, Omi, Arra West & Tanganyika	1 st December 2021 10:00am	Alere Community Centre	43	10
Jiwa, Mukono, Nyeu, Mijale, Asisi	1 st December 2021	Jiwa Parish Centre	15	04

	10:00am			
Marindi Central, Rassia East	1 st December 2021 2:00pm	Marindi Parish Centre	15	12
Unna Central	1 st December 2021 2:00pm	Unna Central Village	46	28
Lajopi, Mokolo	2 nd December 2021 10:00am	Parish Centre	18	17
Alere	2 nd December 2021 12:00pm	Alere Parish	15	06
PAKELE TOWN COUNCIL				
Manyala, Maringo, Pocile	2 nd December 2021 2:00pm	Pereci Primary School	25	08
Atabo Central A, Central B, Atabo West, Yayikoto	2 nd December 2021 10:00am	Pakele Town Council Offices	23	12
Agalejo, Wanziri, Kelukwsibonjo	2 nd December 2021 2:00pm	Town Council Extension	11	13
Ojigo, Tiolio Mejiaderi	2 nd December 2021 4:00pm	Nyivura Ward Centre	07	06
DZAIPi SUB-COUNTY				
Pagirinya	4 th December 2021 10:00am	Pagirinya Primary School	23	13
Dzaipi Central, Aboki, Silili, Laye, Obu	4 th December 2021 12:00pm	Dzaipi Central	23	17
Marindi	4 th December 2021 2:00pm	Village Centre	16	06
ADJUMANI TOWN COUNCIL				
Koroko	5 th December 2021	Biyaya Parish	15	11
Abirichaku	5 th December 2021	Abirichaku	12	13
Lajoje, Cesia, Lajoje Ginnery, Adjumani TC	6 th December 2021		25	05

Biyaya	7 th December 2021		21	31
CIFORO SUB-COUNTY				
Mocope, Ciforo Central, Loa, Kabaoli, Marila	6 th December 2021		30	13
Central I, Central II	8 th December 2021		04	11
Onigo	10 th December 2021		19	02
SETTLEMENT CAMPS				
Pagirinya Base Camp	8 th December 2021	Camp	02	00
Nyamanzi Base Camp	8 th December 2021	Camp	01	00
Olua I & II Base Camp	9 th December 2021	Camp	05	02

2.9 Review of Policy, Regulations, Institutional Framework & International Guidelines

This was done to determine if the proposed project was in line with national policies and met environmental laws and regulations. Therefore, to accomplish this, there was review of national environmental laws, policies and institutional framework; and review of World Bank guidelines on environment.

2.10 Impact Identification and Analysis

2.10.1 Introduction

This chapter identifies, describes and evaluates significant environmental and social consequences (both positive and negative) of the pre-construction, construction, operation and decommissioning phases of the Adjumani WSSP following desk studies, site investigations, views obtained through public consultations and our professional experience in similar assignments. The key infrastructural facilities to be setup comprise: intake and pumping station works; water treatment plant facility; transmission and distribution mains and reservoirs. Whereas, positive impacts should be enhanced, the proposed mitigation measures should be implemented as suggested to minimise or eliminate the predicted negative environmental and social impacts.

2.10.2 Impact Intensity (Magnitude)

Impact severity (Magnitude) describes the actual change that is predicted to occur to the receptor. The magnitude of an impact takes into account all the various impact characteristics in order to determine whether an impact is negligible or significant. The assessment of magnitude was undertaken through: firstly, the key issues associated with the project i.e. categorized as beneficial or adverse and secondly, the magnitude of potential impacts, categorized as major, moderate, minor, or negligible based on consideration of the parameters such as:

- Type of impact (i.e., direct, indirect, induced);
- Size, scale, or intensity of impact;
- Nature of the change compared to baseline conditions (i.e., what is affected and how);
- Reversibility (ranging from no change to permanent requiring significant intervention to return to baseline);
- Likelihood (ranging from unlikely to occur to occurring regularly under typical conditions);
- Geographical/Spatial extent and distribution (e.g., local/within the site, regional, national and international); and
- Persistence/Duration and/or frequency (e.g., temporary, short-term, long-term, permanent).
- Compliance with legal standards and established professional criteria - ranging from meets or exceeds minimum standards or international guidance to substantially exceed national standards and limits / international guidance.
- Cumulative (such an impact results from the aggregated effect of more than one project occurring at the same time, or the aggregated effect of sequential projects. A cumulative impact is *“the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions”*).

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

Table 2-5: Criteria for rating impact intensity

Criteria	Intensity Description (considering duration of the impact, spatial extent, reversibility, ability of comply with legislation, etc)	Rating scales
Intensity (the expected magnitude or size of the impact)	Very Low - where the impact affects the environment in such a way that natural, and /or cultural and social functions and processes are negligibly affected and valued, important, sensitive or vulnerable systems or communities are negligibly affected.	1
	Low - where the impact affects the environment in such a way that natural, and/or cultural and social functions and processes are minimally affected and valued, important, sensitive or vulnerable systems or communities are minimally affected. No obvious changes prevail on the natural, and / or cultural/ social functions/ process as a result of project implementation.	2
	Medium - where the affected environment is altered but natural, and/or cultural and social functions and processes continue albeit in a modified	3

Criteria	Intensity Description (considering duration of the impact, spatial extent, reversibility, ability of comply with legislation, etc)	Rating scales
	way, and valued, important, sensitive or vulnerable systems or communities are moderately affected.	
	High - where natural and/or cultural or social functions and processes are altered to the extent that they will temporarily or permanently cease, and valued, important, sensitive or vulnerable systems or communities are substantially affected. The changes to the natural and/or cultural / social-economic processes and functions are drastic and commonly irreversible.	4

2.10.3 Impact Sensitivity

Sensitivity is generally site specific and criteria the was developed from baseline information gathered. The sensitivity of a receptor was determined based on review of the population (including proximity, numbers, vulnerability, among others) and presence of features (sensitive ecosystems), such as rare and endangered species, unusual and vulnerable environments, architecture, social or cultural setting, major potential for stakeholder conflicts on the site or the surrounding area. Generic criteria for determining sensitivity of receptors are outlined in Table 2-6.

Table 2-6: Criteria for rating impact sensitivity

Criteria	Sensitivity Description	Rating scales
Very Low	Vulnerable receptor (human or ecological) with good capacity to absorb proposed changes or and good opportunities for mitigation	1
Low	Vulnerable receptor (human or ecological) with some capacity to absorb proposed changes or moderate opportunities for mitigation	2
Medium	Vulnerable receptor (human or ecological) with limited capacity to absorb proposed changes or limited opportunities for mitigation.	3
High	Vulnerable receptor (human or ecological) with little or no capacity to absorb proposed changes or minimal opportunities for mitigation.	4

2.10.4 Impact Evaluation and Determination of Significance or Severity

The impact severity was determined by evaluating the intensity of the impact and the sensitivity of the environmental and social receptors, which is largely subjective, but based on the professional judgement of the specialist team taking into account several impact characteristics

Impacts will be identified and significance will be attributed considering the interaction between magnitude criteria and sensitivity criteria as in the significance matrix (**Table 2-7**). The impact severity is then calculated as the product of the two numerical descriptors;

$$\text{Impact Severity/Significance} = \text{Impact Intensity/Magnitude (I)} \times \text{Impact Sensitivity (S)}$$

The results are equivalent to **negligible, minor, moderate or major**. This is a semi-qualitative method designed to provide a broad ranking of the different potential impacts of a project.

Table 2-7: Determination of impact severity

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

- **Major:** These denote that the impact is unacceptable and further mitigation measures must be implemented to reduce the significance. More details are provided in **Table 2-8**.
- **Moderate:** 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. Shaded orange in the impact significance matrix.
- **Minor:** Impacts in this region are considered acceptable. Shaded blue.
- **Negligible:** Impacts in this region are almost not felt. Shaded green.

Table 2-8: Impact Severity

Impact Rating	Impact Description	Rating scales
---------------	--------------------	---------------

Major	<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 expedience of water/air quality and noise guidelines representing threat to human health in long and short term Causing widespread nuisance both on and off site 	> or = 12
Moderate	<ul style="list-style-type: none"> Noticeable effects on the environment, reversible over the long-term Localised degradation of resources restricting potential for further usage Sub-lethal effects upon a globally or regionally endangered species with no effect on reproductive fitness and/or resulting in disruption/disturbance to normal behaviour returning to normal in the medium term Elevated contribution to global air pollution problem partly due to preventable releases Frequent breaches of water/air quality and noise guidelines Causing localised nuisance both on and off site 	> or = 6 but < or = 9
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 jeopardising further usage Disruption/disturbance to normal behaviour of a globally or regionally endangered species returning to normal in the short term Small contribution to global air problem through unavoidable releases Elevation in ambient water/air pollutant levels greater than 50% of guidelines Infrequent localised nuisance 	> or = 2 but < or = 4

Negligible	<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 	= 1
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2.10.5 Cumulative Impacts Assessment

Cumulative impacts are impacts on key biodiversity features (valued ecosystem components related to biodiversity) generated by the combined effects of all past, present, and reasonably foreseeable projects⁶. The combined, incremental effects of human activity, referred to as cumulative impacts, pose a serious threat to the environment. While they may be insignificant by themselves, cumulative impacts accumulate over time, from one or more sources, and can result in the degradation of important resources. This was undertaken as follows:

Step 1: Scoping Phase I – VECs, Spatial and Temporal Boundaries

This involved identification and establishment VECs, spatial and temporal boundaries of assessment. It further involved identification and agreement on VECs in consultation with stakeholders, determining the time frame and establishing the geographic scope. This guided on knowing whose involvement is key; which VEC resources, ecosystems, or human values are to be affected by the development (based on prior sectoral assessments or the project's ESIA); known or anticipated cumulative impact issues within the region; concerns for cumulative impacts identified in consultation with stakeholders, including potentially affected communities (these may exist at distance from the planned development); regional assessments prepared by governments, multilateral development banks (MDBs), and other stakeholders (if any); CIAs prepared by sponsors of other developments in the region and any other Information from NGOs.

Step 2: Scoping Phase I - Other Activities and Environmental Drivers

This involved identification of other past, existing, or planned activities within the analytical boundaries. Assessment of their potential presence of natural and social external influences and stressors (e.g., wildfires, droughts, floods, predator interactions, human migration, and new

⁶

<http://documents.worldbank.org/curated/en/946301468309844309/pdf/769980WPOP1292440Box374382B00PUBLIC0.pdf>

settlements). This guided on knowing if there are any other existing or planned activities affecting the same VEC and if there are any natural forces and/or phenomena affecting the same VEC

Step 3: Establish Information on Baseline Status of VECs

This involved definition of the existing condition of VEC; understanding VEC's potential reaction to stress, its resilience, and its recovery time through assessment of trends. This is because determination of the trend of change in the baseline condition of a given VEC over time may indicate the level of concern for cumulative impacts. Therefore, it was helpful; to know what is the existing condition of the VEC; establish the indicators to be used to assess such conditions; identify any other additional data are needed and know those who may already have this information required. Data that are needed focus on the most important VECs though the collection of baseline data tends on these VECs was limited and targeted to indicators that would allow determination of any changes in VEC conditions as it provides a baseline condition that integrates the collective effects of all existing developments and exogenous pressures.

Step 4: Assess Cumulative Impacts on VECs

This involved estimating the future state of the VECs that may result from the impacts they experience from various past, present, and predictable future developments through identification of potential environmental and social impacts and risks; assessment expected impacts as the potential change in condition of the VEC (i.e., viability, sustainability) and identification of any potential additive, countervailing, masking, and/or synergistic effects. This guided on answering the questions on key potential impacts and risks that could affect the long-term sustainability and/or viability of the VEC; the known or predictable cause-effect relationships and interaction of these impacts and risks to each other.

Step 5: Assess Significance of Predicted Cumulative Impacts

Determination of impact significance and overall agreement among affected communities and other relevant stakeholders strengthens mitigation measures and monitoring programs, focusing on expected probable cumulative impacts. The significance of all CIs was evaluated not in terms of the amount of change, but in terms of the potential resulting impact to the vulnerability and/or risk to the sustainability of the VECs assessed implying evaluation of CIs in the context of ecological thresholds. Therefore, appropriate thresholds and indicators were defined to determine impact and risk magnitude and significance in the context of past, present, and future actions including identification of identify trade-offs hence establishment of how these impacts will affect the sustainability and/or viability of the resource and/or VEC and the consequences and/or trade-offs of taking the action versus no action.

Step 6: Management of Cumulative Impacts – Design and Implementation

Depending on the context in which the development impacts occur (i.e., the impacts from other projects and natural drivers that affect the VECs) and the characteristics of the development's impacts, mitigation measures were proposed as a result of views and actions of multiple stakeholders. This involved utilisation of the mitigation hierarchy to design management strategies to address significant cumulative impacts on selected VECs; engage other parties needed for effective collaboration or coordination; propose mitigation and monitoring programs

on how to manage uncertainties with informed adaptive management. This included aspects of how cumulative impacts can be avoided, minimized, and/or mitigated; how can the effectiveness of proposed management measures be assessed and what are the triggers for specific adaptive management decisions, among others.

2.11 Development of Enhancement and Mitigation Measures

The consultant has proposed enhancement measures for each identified positive impact. The enhancement actions are described in the ESMP showing details about preferred period of implementation, responsible parties, estimate cost, etc. Like above, the consultant proposed mitigation measures for each identified negative impact or risk. The mitigation actions are described in the Environment and Social Management Plan showing the details about preferred period of implementation, responsible parties, estimate cost, etc.

2.12 Formulation of Environmental and Social Management Plan

The ESMP includes the project activities and their impacts, the proposed mitigation measures for negatives and mitigations for the positive impacts/benefits, the institutional arrangements required for effective implementation, as well as for effective monitoring of the implementation of the mitigation measures, including time horizons and cost estimates for these activities.

2.13 Development of an Environmental and Social Monitoring Plan

The Plan includes details of monitoring measures for the Environmental and Social Monitoring Plan including the parameters to be measured and frequency of measurements. The monitoring program enables verification of the adequacy of the management plans and other mitigation measures identified in the ESMP and will provide a basis for determination of any remedial measures or adjustments to management aspects if required.

3 PROJECT DESCRIPTION

3.1 Location of Project Sites

Adjumani district is found in the Northern Region and West Nile sub-region of Uganda and is bordered by Obongi district in the West and North-West, Madi-Okollo district in the South-West, Amuru district in the South and East, Moyo district in the North and South Sudan in the North-East. It lies between eastings of E322245, N329433 and E395307, N377025 to the west and East, respectively while to towards the north and south, it lies between E393941, N397100 and E337829, N318180. The proposed surface water (Table 3-1) and groundwater supply components (Table 3-2) are located in different areas across the project area in the district. The intake is located approximately 2.5km upstream of the Laropi – Omi ferry crossing point along the R. Nile and about 16 km from Adjumani Town in Arra West. Other infrastructure will include WTP, MBR, ESRs, transmission and distributions lines and Boreholes.

Table 3-1: Location of the proposed project components for surface water system

Hydraulic (Surface water) Component	UTM 36 M – GPS Coordinates	Village/Zone	Parish/Ward	Subcounty/Town Council
Raw water intake and pumping station	E366339, N390075	Arra West	Omi	Pachara
WTP	E366578, N382069	Mijare	Jihwa	Pachara
MBR	E364089, N374784	Mokolo West	Lajopi	Adropi
Ciforo ESR	E358228, N371292	Mocope	Mugi	Ciforo
Pakele ESR	E371318, N371666	Karelu	Pakele Town Board	Pakele
Dzaipi ESR	E383913, N374946	Dzaipi Central	Mgbere	Dzaipi

Table 3-2: Location of the proposed project components for groundwater system

Hydraulic (Groundwater) Component	UTM 36 M – GPS Coordinates	Village/Zone	Parish/Ward	Subcounty/Town Council
T1 - Borehole	E388260, N373312	Pagirinya	Logoangwa	Dzaipi
T3 - Borehole	E377345, N365287	Gonyila	Melijo	Pakele
T4 - Borehole	E380645, N379590	Ringa	Ajugopi	Dzaipi

Logoangwa ESR	E389218, N370151	Pagirinya	Logoangwa	Dzaipi
Melijo ESR	E376557, N362839	Melijo Central	Melijo	Pakele
Ajugopi ESR	E381635, N378329	Meiaciku	Ajugopi	Dzaipi

3.2 Geographical Zoning of the Area Supplied

This delimitation or geographical zoning of the supply has been proceeded according to:

- Existing network, including facilities not operating by the NWSC;
- Future facilities designed in previous studies;
- Exchanges with local administrations to determine which area should be supplied in priority;
- Topographic constraints: the highest and most distant zones are not considered to be supplied by the future Nile system.

Both surface and groundwater source options were adopted to cater for the above constraints. Therefore, Adjumani WSS (total project area) was divided in to four (4) water distribution zones of Ciforo, Adjumani, Pakele and Dzaipi for surface water system and Area 1 (Part of Logoangwa Parish and Pagirinya refugee settlement Camp), Area 2 (Part of Melijo, and Olua (1 and 2), Boroli (1 and 2) refugee settlement Camps) and Area 3 (Part of Ajugopi and Nyumanzi refugee settlement Camp) for groundwater system. Table 3-3 shows the details of the area to be supplied by each distribution zone. Figure 3-1 and Figure 3-2 show the distribution geographical zones for both surface and groundwater systems.

Table 3-3: Details of Distribution Zones

Distribution Zone	Ciforo	Adjumani	Pakele	Dzaipi	Total
Area Covered (km ²)	28.43	118.98	72.69	70.34	290.44
Parishes Covered	Loa, Mugi	Agojo, Lalopi, Palemo, Biyaya, Central Esia, Pereci (West), Marindi, Alere, Olij, Jihwa	Pereci (East), Pakele Town Council, Nyivura, Meliaderi, Boroli, Ibibiaworo	Mgebere, Adidi (part), Logoangwa	21 Parishes
Refugee Settlements Covered		Agojo, Alere, Olij, Mirieyi		Pagirinya	5 Refuge Settlements

The following map proposes the future served area (parishes to be served by the future water system in 2040).

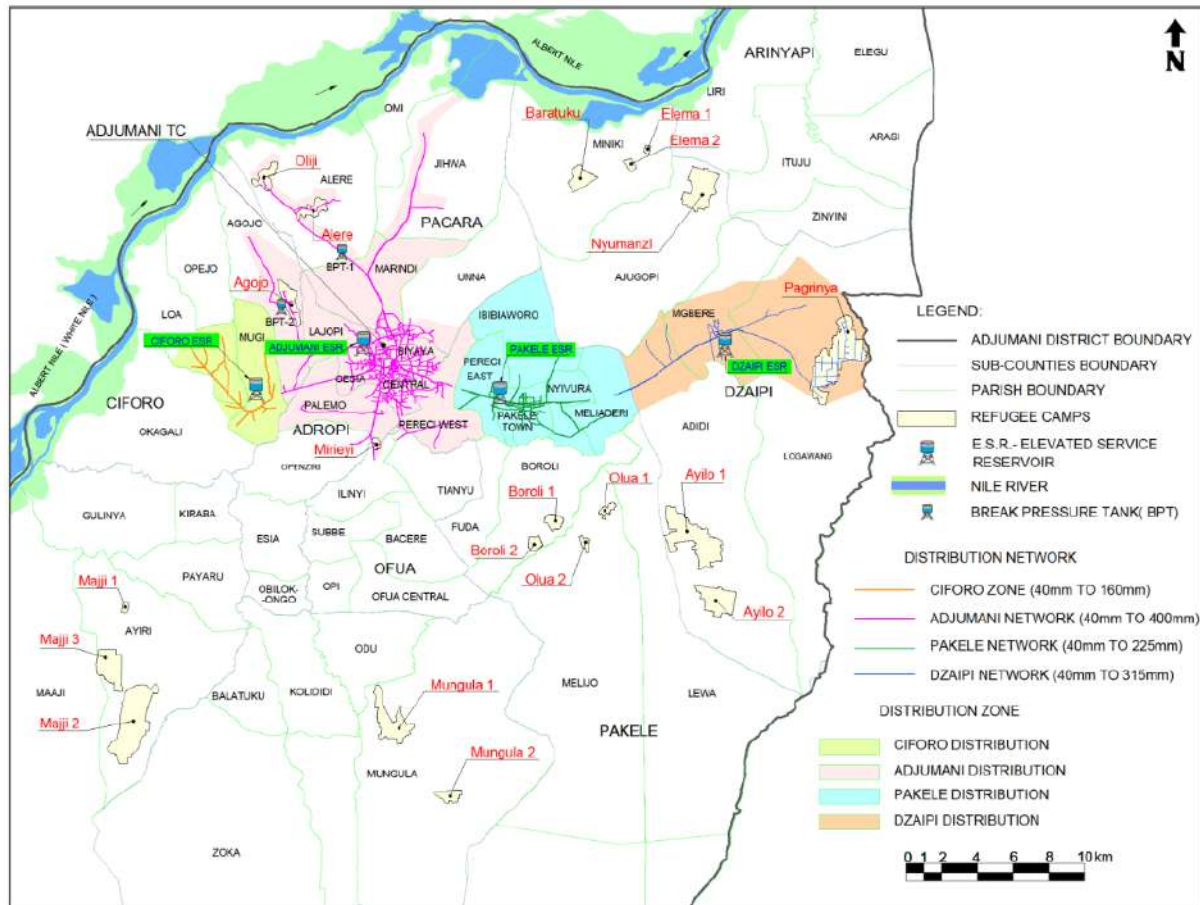


Figure 3-1: Geographical zoning of the surface supply systems (Areas 1 to 3)⁷

⁷ NWSC Feasibility Report (Main Design Report) – Adjumani Water Supply and Sanitation Project (2021)

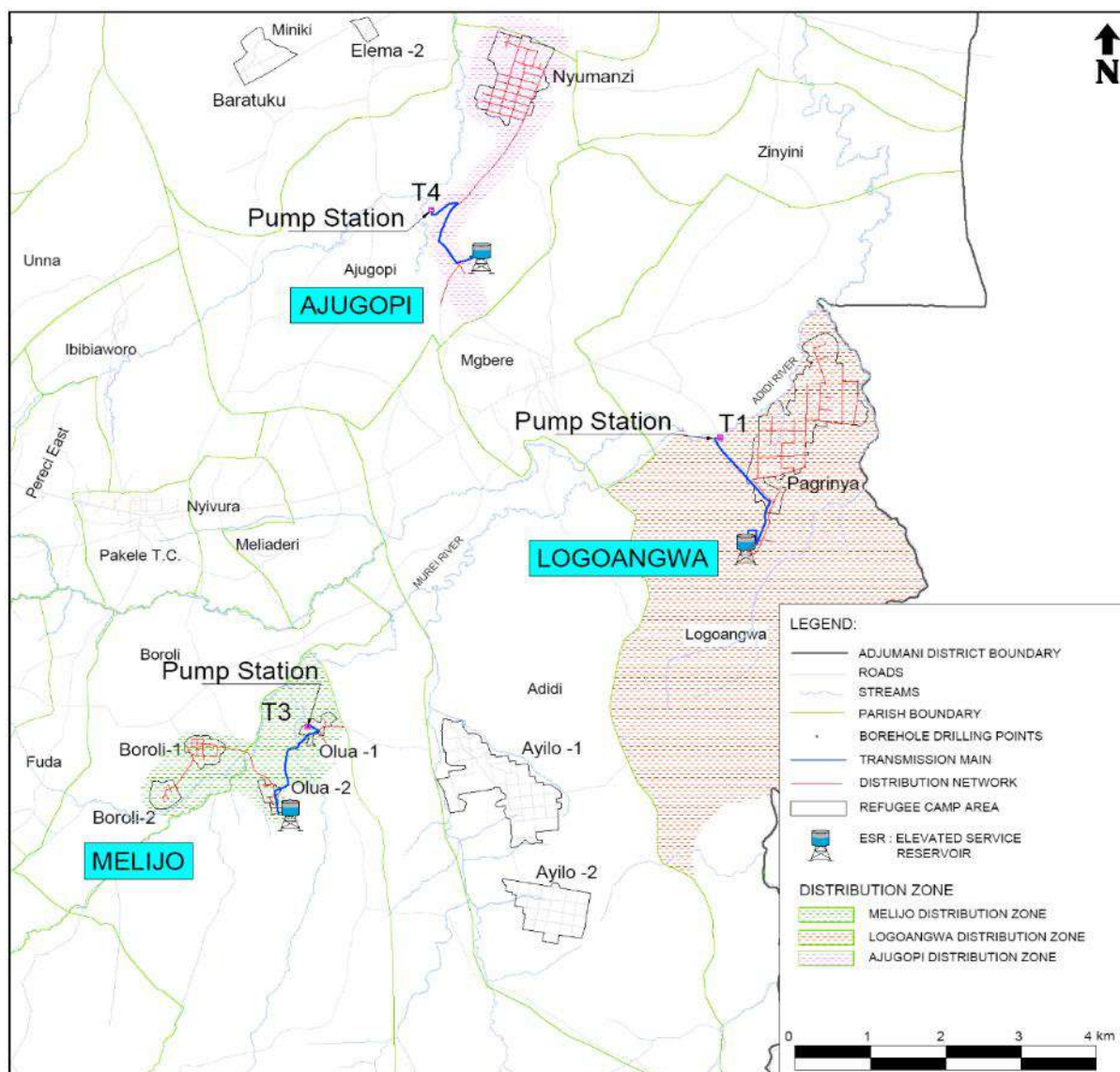


Figure 3-2: Geographical zoning of the groundwater supply systems (Areas 1 to 3)

The population growth evolution in Adjumani project area is presented in Table 3-4 below. It takes into consideration only the project area population and water demand at both subcounty and parish levels in the project area.

Table 3-4: Projected population and water demand in the project area

Subcounty	Parish	Population (2040 yr) connected to piped water supply	Total water demand including 10% distribution system losses in MLD
Adjumani TC	Cesia	14911	1.809
	Biyaya	13138	1.594
	Central	14333	1.739
	Sub Total	42,382	5.142
Adropi	Lajopi	1082	0.074
	Pelemo	1690	0.117

	Sub Total	2772	0.191
Pachara	Jihwa	1135	0.078
	Marindi	2666	0.182
	Omi	1025	0.070
	Unna	1348	0.092
	Alere	876	0.060
	Sub Total	7,050	0.482
Ciforo	Loa	2000	0.137
	Mugi	1407	0.096
	Agojo	1099	0.076
	Sub total	4,506	0.308
Dzaipi	Adidi	1820	0.124
	Ajugopi	1159	0.079
	Logoangwa	1920	0.131
	Mgbere	4157	0.504
	Sub total	9,056	0.906
Pakele	Pareci	2808	0.192
	Pakele TC	6650	0.807
	Meliaderi	1163	0.079
	Boroli	480	0.033
	Melijo	1095	0.076
	Ibibaworo	535	0.037
	Nyivura	893	0.061
	Sub total	13,624	1.284
	Total	79,390	8.313

(Source: Volume 1 - Main Report, February 2022)

3.3 Technical Description of Project Components

The Adjumani Water Supply System will comprise the both surface water and groundwater supply systems.

3.3.1 Surface Water Infrastructure

The surface water supply system (SWSS) comprises of the water sources, transmission, treatment, storage and distribution. The system will have an Intake and pumping station of 12MLD at Arra West Village, Raw and Treated Water Transmission mains of 18.83 km long, Water Treatment Plant (WTP) of 8.0 MLD capacity in Mijale, Master Balancing Reservoir (MBR) in Mukolo West, Feeder mains of 29.73 km, and Distribution network of about 331.24 km. The transmission mains shall be raw water transmission and treated water transmission mains from intake to water treatment plant (WTP) and WTP to Master Balancing Reservoir (MBR) respectively. The Feeder mains shall convey water from MBR to all the Elevated Service Reservoirs (ESR) by gravity. The distribution network would convey water from ESR to beneficiaries (houses) within the town. For the transmission mains, the DI pipes are proposed and for the distribution network uPVC and PE

pipes are proposed. Table 3-5 gives the summary of the proposed surface water components under the Adjumani WSSP.

Table 3-5: Summary of components for surface water infrastructure

S/N	Component	Surface Water Supply System on River Nile
1	Water Source	River Nile (about 16 km from Adjumani TC)
2	Intake Capacity	12 million Litres Per Day (MLD)
3	Water Storage Reservoir	None
4	Raw Water Pumping Main (RWPM)	From the Intake to the WTP DI Pipe Class 40 DN-300mm, L- 8.83km for immediate stage
5	Raw Water Pump Station	Vertical Turbine Pumps 1 Duty and 1 Standby (Discharge 70.66 lps against 136 m head), Motor Rating - 140 kW for immediate stage
	Power sources for the intake and raw water pumping station	A 33-kV electricity line located only about 1.0 km from Ara Intake (along Adjumani – Laropi Road)
6	Water Treatment Plant	Total 8.0 MLD capacity. Module 1 - 4.0 MLD for immediate stage with the following units; Pre-Chlorination, Aeration Fountain, Parshall Flume, Distribution Chamber, Flash Mixer, Flocculator, Plate Settler, Rapid Sand Filter, Chlorine Contact Tank
7	Treated Water Pump Station	Vertical Turbine Pumps 1 Duty and 1 Standby (Discharge 66.49 l/s against 176m head), Motor Rating - 170 kW for immediate stage
8	Treated Water Pumping Main (TWPM)	From WTP to MBR cum Adjumani ESR DI Pipe Class 40 DN-300 mm, L-10.08 km for immediate stage
9	Gravity Feeder Mains	uPVC Pipe (Class PN10) 110 to 250 mm O.D, L- 29.93 km shall convey water from MBR to all the Elevated Service Reservoirs (ESR) by gravity <ul style="list-style-type: none"> • MBR to Ciforo ESR through DN150mm DI (Class C40) about 1.27 km and DN100mm DI (Class C40) about 6.19km • MBR to Pakele ESR through DN300mm DI (Class C40) about 8.46km long

S/N	Component	Surface Water Supply System on River Nile
		<ul style="list-style-type: none"> Pakele to Dzaipi through DN 300mm DI (Class C40) about 2.32km and DN200mm DI (Class C40) about 13.73km
10	Master Balancing Cum Adjumani ESR	Capacity – 2No each 655 m ³ (1 Reservoir for construction in the immediate phase)
11	Elevated Storage Reservoir	Ciforo ESR (Existing 50 m ³ , staging height of 10m); Pakele (Existing 150 m ³ staging height of 12m) and Dzaipi 130 m ³ (for construction in immediate phase - staging height of 10m)
12	Distribution Network	Pipes will convey water from ESR to beneficiaries (houses) It will be a total of 48km (110mm to 315mm) uPVC pipe
13	Beneficiaries (Towns)	<p>Ciforo (Loa and Mugi);</p> <p>Adjumani (Agojo, Lajopi, Palemo, Biyaya, Central, Cesia, Pereci (west), Marindi, Alere, Olijji, Jihwa);</p> <p>Pakele (Pereci (East), Pakele Town Council, Nyivura, Meliaderi, Boroli, Ibibiaworo); and</p> <p>Dzaipi (Mgebere), Adidi (Part), Logoangwa(part)</p>
14	Beneficiaries Refugee Settlements	Adjumani (Agojo, Mirieyi, Olijji, Alere)

3.3.1.1 Raw Water Intake

The intake structure will be constructed on the bank of the River Nile. A part of the approach land and road will be raised to allow for storm water drainage from the upstream areas and intake plot into R. Nile above the High Flood Level (HFL). To take care of the storm water that would reach towards the intake, a storm water open channel is proposed outside the compound wall of the intake so that the storm water can be captured outside the plot and diverted to the R. Nile. All the structures within the intake plot are planned above the HFL of the River. The Raw Water Pumping Station (RWPS) at intake will pump the raw water (12 MLD an equivalent of 0.14 m³/s) to the water treatment plant through vertical turbine pump through DN 500 mm pumping main.

The flow regime of River Nile at the intake shows that from the year 2000 to 2015, the lowest and maximum flow rates were 607 m³/s in 2002 and 1716 m³/s in 2004. The mean flow (Albert Nile) was 1201 m³/s whereas the flow exceeded at 90% of the time was 810 m³/s. Throughout the year, the 40% of Monthly Average Flow (MAF) is 473.5 m³/s and the recommended e-flow is 473.48 m³/s. This implies an abstraction of only 0.03% of the MAF by NWSC at the proposed intake (Details in Section 7.3.9). Therefore, there is sufficient water from the proposed source to supply

the proposed demand of 12 MLD in comparison with the e-flow of 473 m³/s and the lowest recorded flow of about 607 m³/s.

For abstraction of water into the intake structure, trenchless technology with Tunnel Boring Machine (TBM) is proposed. To take care of functional requirement of cleaning/desilting, two pipes of DN 1000 mm pipes are proposed. The micro tunnel boring machine (MTBM) will be deployed for the jacking of pipe into the river.

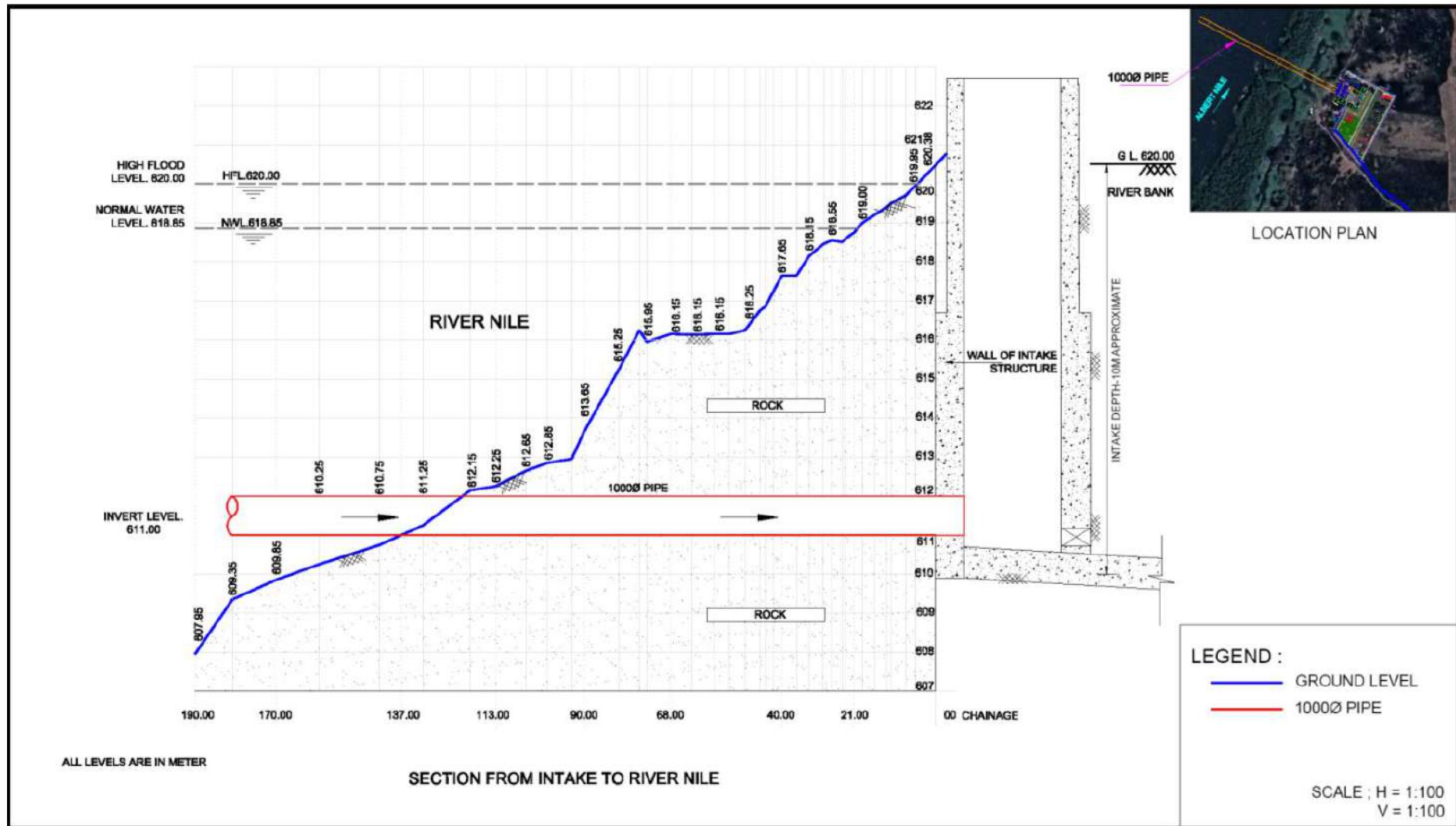


Figure 3-3: Section at Intake and River Nile



3.3.1.2 Raw Water Pumping Station and Main

The raw water pump station (RWPS) will have Vertical Turbine Pumps 1 Duty and 1 Standby of 70.66 lps discharge against a 136 m head and motor rating of 140 KW for immediate stage. The raw water pumping main (RWPM) will be a DI Pipe Class 40, DN-300 mm and 8.83 km long for immediate stage. The velocity in the RWPM will be about 1.1 m/sec, which is good for flushing out of any sediments that may enter with water.

3.3.1.3 Water Treatment Plant (WTP)

The total capacity of proposed WTP is 8.0 MLD (with Plate Settler and 1.0 – 4.0 MLD for immediate stage) as per the demand calculations for the scheme. Over and above the projected water demand, internal water treatment plant use and loss in distribution is considered in fixing the capacity of the treatment plant units. The water treatment plant will comprise the following treatment units (the layout the WTP is depicted in Annex 6).

3.3.1.3.1 Pre-Chlorination

Pre-chlorination is proposed before aeration to remove algae and odour etc. from the raw water. Removal of algae is required as it should not clog the treatment units.

3.3.1.3.2 Aeration

The purpose of aeration is to remove undesirable dissolved gases in water and to add oxygen to water to convert undesirable substances to a more manageable form. Gravity type Cascade aerator (Figure 3-5) is proposed. In this type of aerator, the water flows down the steps in the form of thin sheets and provides a large water surface area creating agitation.



Figure 3-5: An example of a Cascade Aerator

3.3.1.3.3 Rapid Mixing

Rapid mixing is the process by which a coagulant is rapidly and uniformly dispersed through the mass of the water. The process usually occurs in a small basin immediately preceding or at the head end of the 'coagulation basin'. This process is used to generate a homogeneous mixture of raw water and coagulants which result in the destabilization of the colloidal particles in the raw water to enable coagulation. Mixing is provided by pumps, venturi flumes, air jets or rotating impellers (paddles, turbines, or propellers).

3.3.1.3.4 Coagulation

Coagulation is the widely used process to remove the substances producing turbidity in water. The process of coagulation may be used in the softening of hard water with lime or lime and soda ash and removal of colour producing substances such as colloidal metallic hydroxides or organic compounds having a much smaller particle size. Coagulation treatment depends upon many factors such as pH, turbidity, chemical composition of the water, type of coagulant, temperature, and mixing conditions; with the pH being the most important factor. Coagulation should be carried out within the optimum pH range for the particular water. The selection of type and dosage of the chemical coagulant must be made by experimentation, most commonly with jar tests. Commonly used coagulants include those which are iron or aluminum-based, lime, and polymers. Aluminum sulphate, commonly known as alum, is effective for pH values of 5.5 to 8.0. Sodium aluminate is used in special cases or as an aid for secondary coagulation of highly colored surface waters and in lime soda softening to improve settling.

3.3.1.3.5 Flocculation

During flocculation, slow-moving paddle mixers gently stir a mixture of water and coagulant to generate floc. A series of flocculation chambers is usually employed rather than a single basin. The chambers are designed to enhance laminar flow conditions to prevent floc destruction. A stepped-down mixing intensity is utilized in each successive chamber. Flocculation time is also a governing factor in floc formation. Inlet and outlet design must be such as to prevent short-circuiting and destruction of floc. Mixing devices are driven by variable speed drives with the peripheral speed of paddles. Allowances must be made to minimize turbulence at bends and changes in direction. The common mechanical mixing devices are paddle flocculator, flat-bed turbines, and vertical-turbine mixers etc.

3.3.1.3.6 Sedimentation / Clarification

Sedimentation or clarification is the removal of particulate matter, chemical floc, and precipitates from suspension through gravity settling. The removal of particulate matter is accomplished in settling tanks (also called sedimentation tanks or clarifiers). Water clarification is a vitally important step in the treatment of surface waters. Poor design of the sedimentation basin will result in reduced treatment efficiency that may subsequently upset other operations.

One well known modification of conventional sedimentation basins used in water treatment is the application of laminar flow devices. These devices consist of bunks of small square shaped tubes (commonly called tube settlers) or plates (commonly called plate settlers), inclined at 45° to 60° angles from horizontal.

3.3.1.3.7 Filtration

The vast majority of present-day water treatment plants use the gravity rapid sand filter. This filter is normally a single-media, down flow, fine-to-coarse filter. Natural silica sand is the common filtering medium, but crushed anthracite coal is also widely used. The size and depth of sand used must be decided initially in the design of gravity rapid filters as these parameters affect a number of important features of plant design. The size of the sand and the depth of the bed determine the velocity of applied wash water and the height of the gutter edge above the sand surface.

Filters containing coarse sand must be deeper than those containing fine sand, and require a greater velocity of applied wash water to lift the sand and clean the bed properly. The best method of selecting the filter media for a particular plant is by pilot plant tests on the water to be treated. These filters are effective for raw or coagulated waters with turbidity as high as 10 NTU and are approximately 90 percent efficient in the removal of applied bacteria.

3.3.1.3.8 Chlorination/ Disinfection

Lastly, the treated water must be disinfected to make sure harmful pathogens are killed, while not all pathogens are required to be killed, what is required is pathogens to be inactivated so they do not replicate or reproduce. The water must travel a long way to end users, thus, to ensure it is pathogen-safe until then a certain amount of chlorine is added. The pH levels are controlled to make it as relatively neutral as possible. Water is collected in the treated water tank and pumped in distribution system, to reach end user.

3.3.1.3.9 Sludge Treatment

Sludge thickening will be done to reduce the bulk water and to reduce the size of subsequent dewatering units. Thickening is achieved in gravity thickeners. The gravity thickeners receive the underflow from the flocculation tank and sludge from the clarification tank. For dewatering of thickened sludge, sludge drying beds are proposed.

3.3.1.3.10 Dirty Backwash Tank

To keep the rapid sand filters functional, they have to be cleaned periodically to remove the particulate matter. A dirty backwash tank is proposed to collect this particulate matter after filter backwash. The particulate matter/heavy sediments will settle at the bottom of the tank in the form of sludge which will be pumped to Sludge Thickener for further processing. The dirty backwash tank will also collect the supernatant liquid from the thickener. The final supernatant from the tank will then be recycled back to the plant.

3.3.1.3.11 Sludge Drying Beds

Sludge drying beds are the oldest method of sludge dewatering. These are used extensively in small to medium sized plants to dewater digested sludge. Typical beds consist of a layer of coarse sand 15 - 25 cm in depth supported on a graded gravel bed that incorporates perforated pipe underdrains. Each section of bed contains watertight walls, underdrain system, and vehicle tracks for removal of sludge cake. Sludge is placed in 30 cm layers and allowed to dry. The drying period is in the range of about 3-5 weeks.

3.3.1.4 Treated Water Pumping Station and Pumping Main

Treated Water Pumping Station (TWPS) will have Vertical Turbine Pumps 1 Duty and 1 Standby of 66.49 lps discharge against a 176m head) and motor rating of 170 KW for immediate stage to pump the treated water from treated water tank (capacity 1,040 m³). The treated water pumping main (TWPM) will be a DI Pipe Class 40 DN-300 mm and 10.08 km long for immediate stage up to the Master Balancing Reservoir (MBR) which are the most economical to install and maintain.

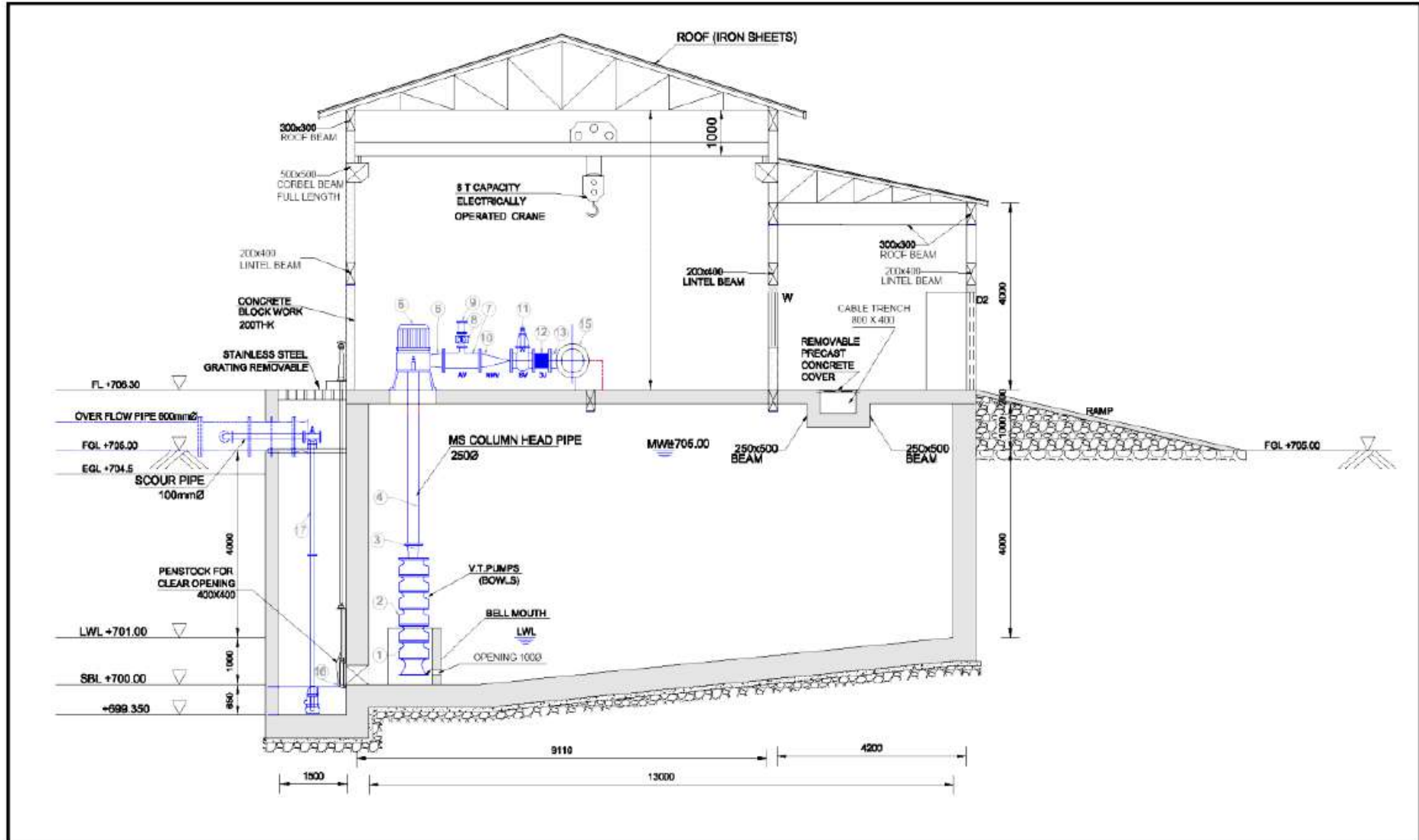


Figure 3-6: Section of TWPS

3.3.1.5 Gravity Feeder Mains (MBR to ESRs)

The proposed gravity feeder mains will include the MBR to Ciforo; MBR to Pakele and Pakele to Dzaipi pipelines. These will be uPVC Pipe (Class PN10) of 110 mm to 250 mm O.D and a total of 29.93 km in length. Table 3-6 shows the details of the gravity feeder mains.

From the MBR, one branch of DN150 mm (1.27 km) and DN 100 mm (6.19 km) is proposed for Ciforo ESR. A separate feeder main is proposed towards Pakele and Dzaipi, with DN300 mm (8.52 km) up to Pakele ESR and a branch of 200 mm (13.67 km) towards Dzaipi ESR.

Table 3-6: Details of Transmission Mains

Surface Water Transmission – Length in km			
Transmission	Description	Pipe Diameter (mm)	Length (km)
Feeder Gravity Main	MBR to Ciforo	150	1.28
		100	6.20
	MBR to Pakele	300	8.52
	Pakele to Dzaipi	200	13.67
Total			29.93

3.3.1.6 Storage Tanks (MBR and ESRs)

The Master Balancing Cum Adjumani ESR capacity for 3 hrs storage will be 2No, each of 655 m³. However, one reservoir will be constructed in the immediate phase. The MBR will supply the 3 other Elevated Storage Reservoirs (ESR) of Ciforo (Existing 50 m³); Pakele (Existing 150 m³) and Dzaipi (for construction in immediate phase 130m³). Both the MBR and ESRs will be reinforced concrete structures (Table 3-7).

Table 3-7: Capacity of MBR and ESRs

Name of ESR	Straight Height	ESR Capacity (m ³)
Adjumani ESR Cum MBR	15	655 (2No)
Ciforo	10	50
Pakele	12	150
Dzaipi	10	130

3.3.1.7 Distribution Network

The proposed distribution system comprises of Unplasticized polyvinyl Chloride (uPVC) PN10 pipes of 110 mm to 315 mm O.D pipes and High-Density Polyethylene (HDPE) PN10 pipes of 40 mm to 140 mm O.D pipes.

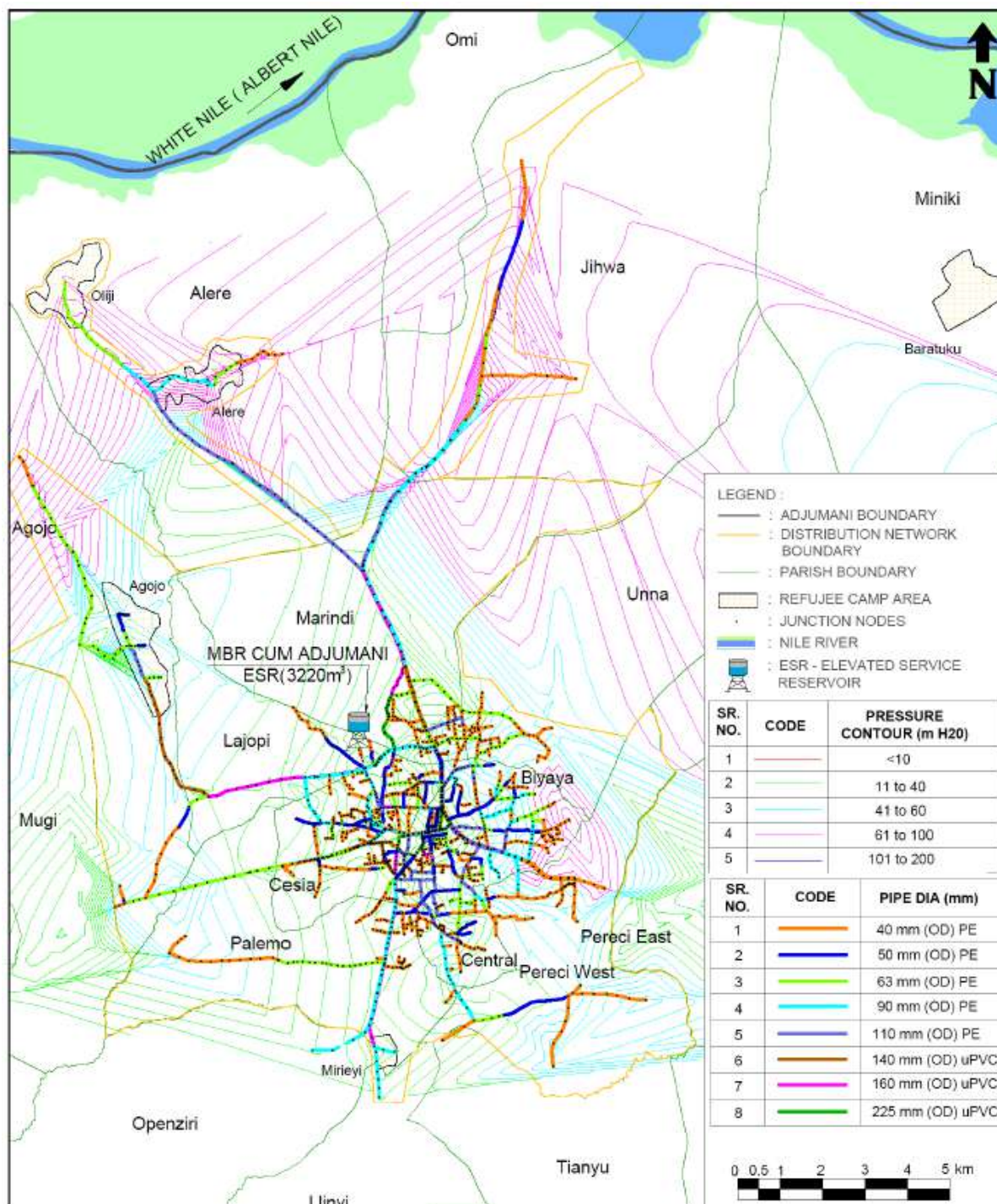


Figure 3-7: Adjumani Distribution Network

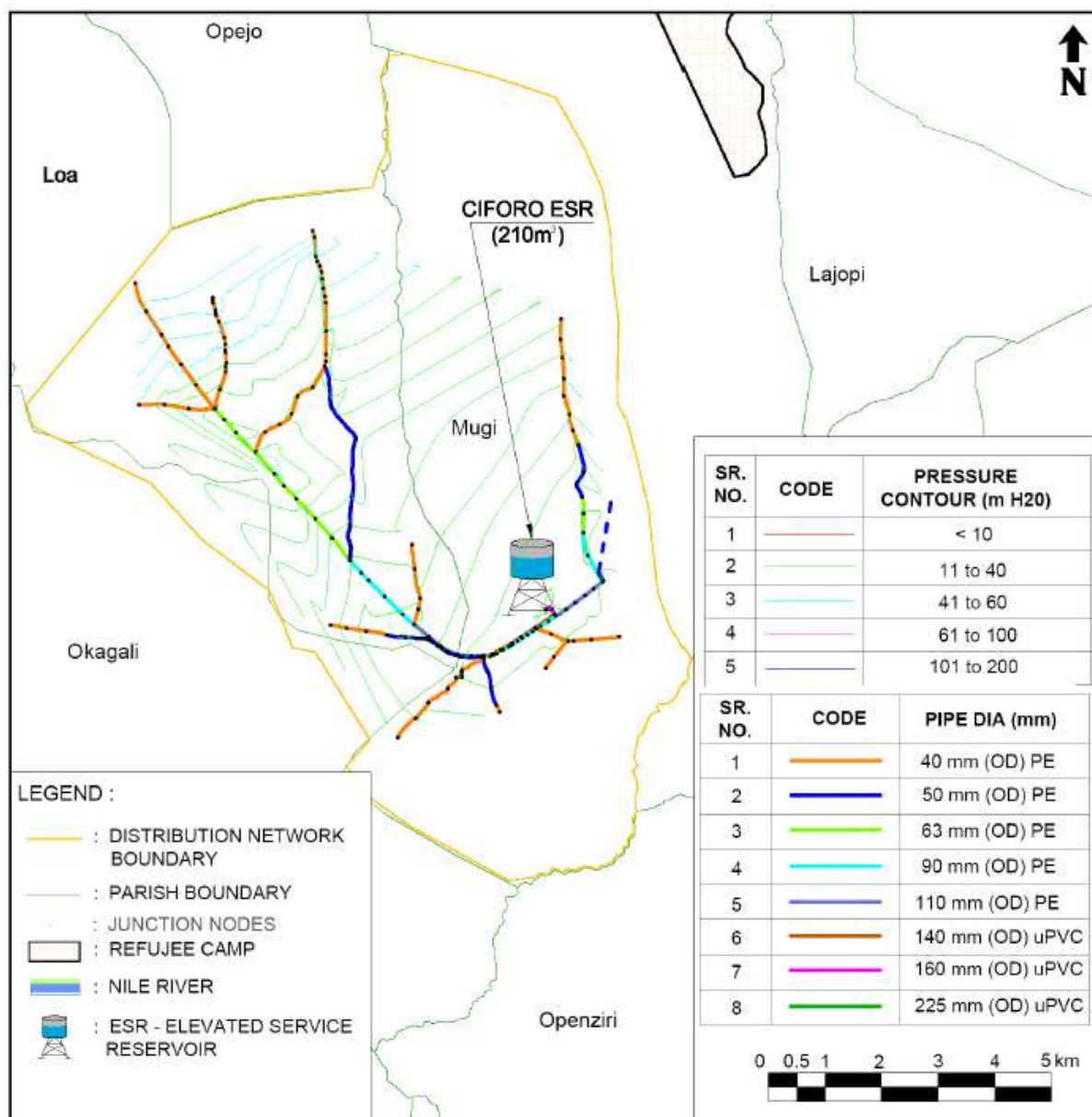


Figure 3-8: Ciforo Distribution Network

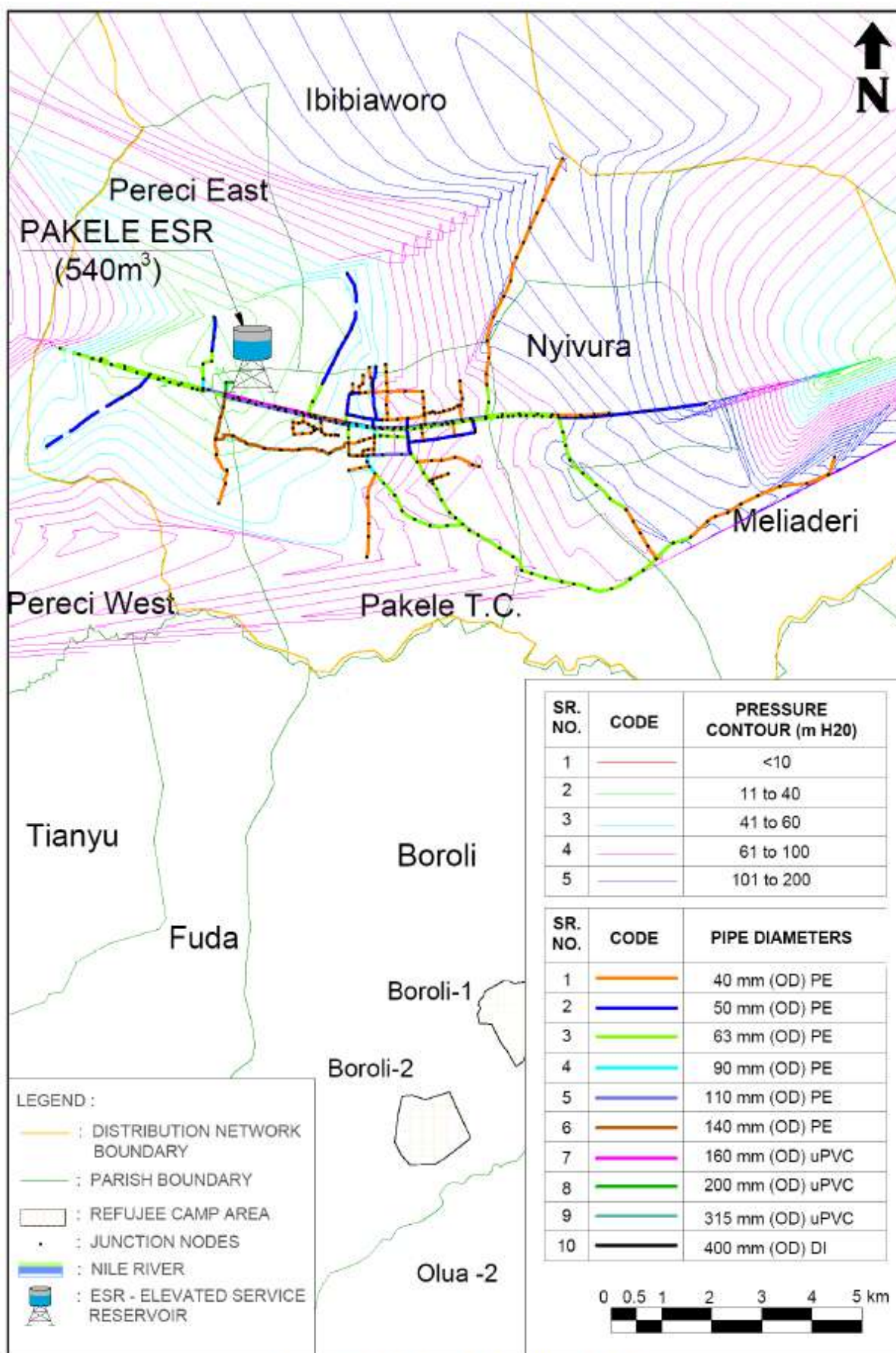


Figure 3-9: Pakele Distribution Network

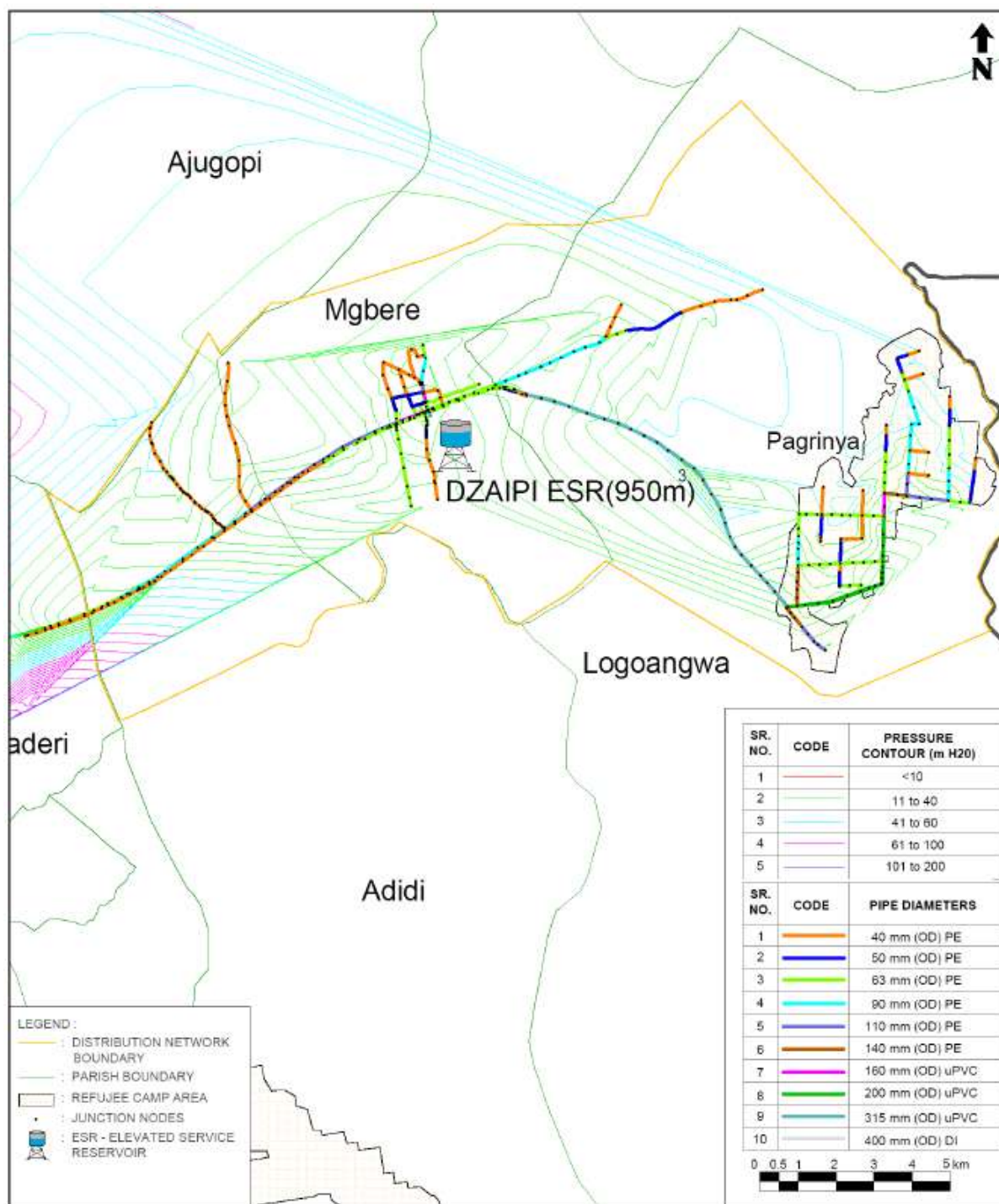


Figure 3-10: Dzaipi Distribution Network

3.3.2 Groundwater Transmission and Supply Infrastructure

The project area towards the South-East of Dzaipi is located at higher elevation compared to main towns and hence it is not feasible to supply these areas with surface water as pumps with a higher head and long pumping mains will be needed. Table 3-8 gives the summary of the proposed groundwater components under the Adjumani WSSP. Therefore, 3No groundwater supply systems (Figure 3-11) (based on individual boreholes) were identified for water supply to this area as follows:

- Area 1 - Part of Logoangwa Parish and Pagrinya refugee settlement.
- Area 2 - Part of Melijo, and Olua (1 and 2), Boroli (1 and 2) refugee settlements.
- Area 3 - Part of Ajugopi and Nyumanzi refugee settlements.

Table 3-8: Summary of component for surface water infrastructure

S/N	Component	Area 1	Area 2	Area 3
		Logoangwa GWS	Melijo GWS	Ajugopi GWS
1	Borehole	T1	T3	T4
2	Pump Discharge and Head	86.40 m ³ /hr with 117 m head	64.8 m ³ /hr with 111 m head	28.8 m ³ /hr with 93 m head
3	Borehole Pump Station Motor Rating	50 kW	40 kW	15 kW
4	Pumping Main	DI Pipe, DN-150 Class C40, L-3.96 km	DI Pipe, DN-150 Class C40, L-4.4 km	DI Pipe, DN-100 Class C40, L-3.36 km
5	ESR	Height 10 m, Capacity 110 m ³	Height 10 m, Capacity 200 m ³	Height 10 m, Capacity 60 m ³
6	Distribution Network	HDPE, uPVC pipes 63 to 200 mm O.D L-10 km	HDPE, uPVC pipes DN-40 to 200 mm O.D, L-07 km	HDPE, uPVC pipes DN-40 to 250 mm O.D, L-10 km
7	Access road to Borehole and ESR	6m wide road and 0.041km to T1		6m wide road and 0.77km to T1 6m wide road and 0.022km to ESR
8	Beneficiaries	Pagrinya Refugee Settlement Logoangwa Parish (part)	Melijo Parish (part) Boroli Parish (part) Refugee Settlements of Olua (I and II) and Boroli (I and II)	Nyumanzi Refugee Settlement Ajugopi Parish (part)

From boreholes, the water shall be pumped to ESR after inline chlorination and supplied to the refugees and host communities in the supply areas through Distribution Pipes.

3.3.2.1 Pipe Network Supply for Area 1 – Logoangwa Groundwater Supply

The water from the abstraction borehole will be pumped to the ESR (capacity 110 m³) through DN 150 mm diameter (about 3.96 km long) transmission main. A distribution network with 63 mm to 200 mm O.D of about 10km length will be established.

3.3.2.2 Pipe Network Supply for Area 2 – Melijo Groundwater Supply

The water from the abstraction borehole will be pumped to the ESR (capacity 200 m³) through DN 150 mm diameter (about 4.4 km long) transmission main. A distribution network with 40 to 200 mm O.D of about 10km length will be required.

3.3.2.3 Pipe Network Supply for Area 2 – Ajugopi Groundwater Supply

The water from the abstraction borehole will be pumped to the ESR (capacity 60 m³) through DN 100 mm diameter (about 3.36 km long) transmission main. A distribution network with 40 to 250 mm O.D of about 10km length will be required.

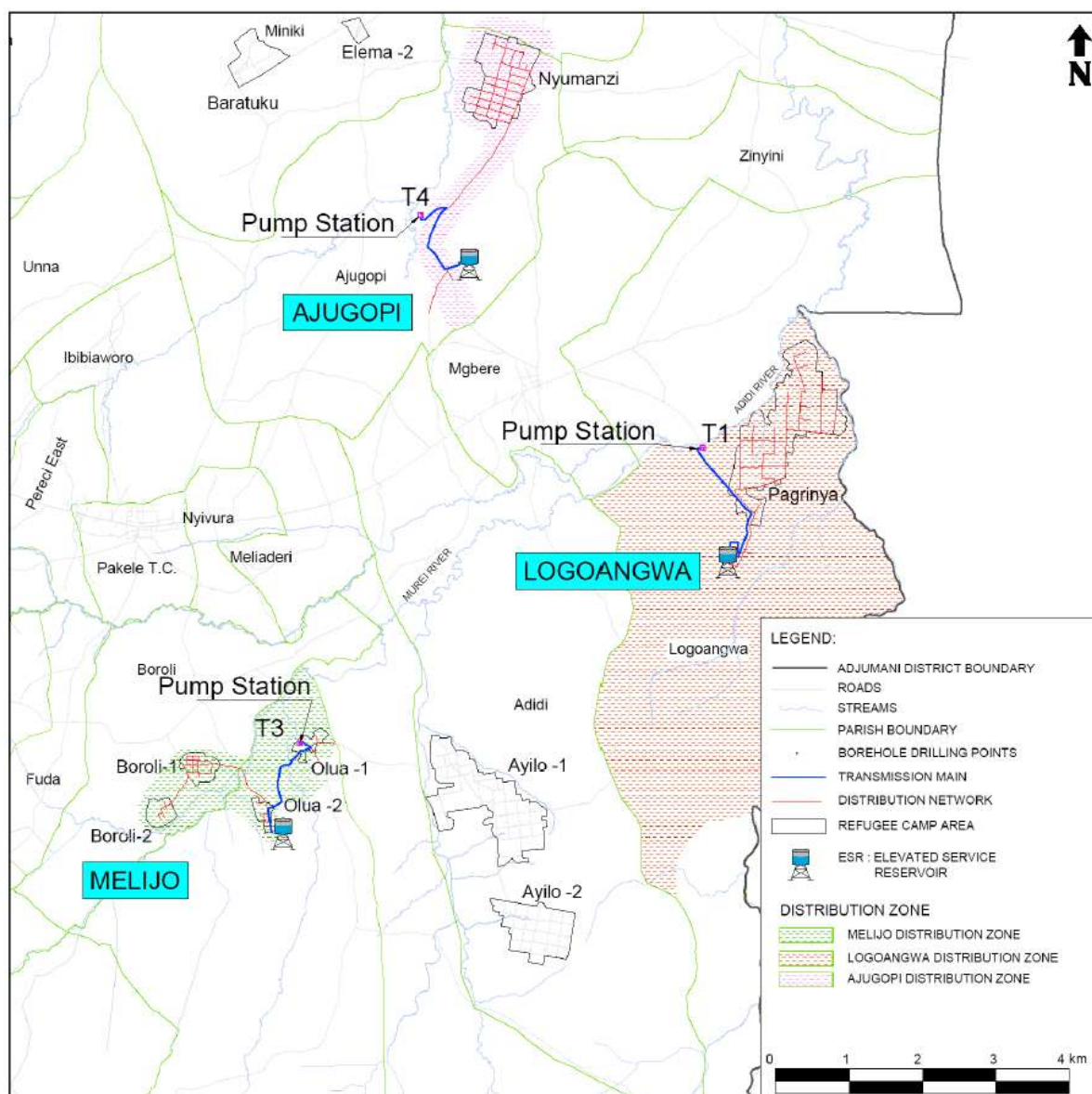


Figure 3-11: Groundwater Supply Systems (Areas 1 to 3)

3.3.3 Access Roads

The project area can be accessed from Gulu and Amuru District through the Gulu – Atiak – Adjumani Highway to the Moyo via Laropi Ferry crossing point. The road is being upgraded to an asphalted level about 140 km. Accessibility of project components or sites will be through existing public access roads, given their suitable location in closed proximity to the existing road network. These include the MBR, Ciforo ESR and Dzaipi ESR for the SW infrastructure. Under the GW infrastructure, accessible sites include the Ajugopi ESR and Melijo ESR. However, some project components are not in close proximity to the existing road network. These shall require opening or expansion of the access road as captured by the Resettlement Action Plan (RAP) and detailed in Table 3-9.

Table 3-9: Access roads for both surface and groundwater project components

Surface Water Infrastructure	
Access road ⁸ to Water Intake Site	6m wide road extension to Intake site 0.49km
Access road to WTP	6m wide road extension to WTP
Access road to Pakele ESR	6m wide road extension to ESR and 0.062 km
Groundwater Infrastructure	
Access road to Ajugopi Borehole (T4)	6m wide road extension to borehole site and 0.77km
Access road to Ajugopi ESR	6m wide road extension to ESR and 0.22km
Access road to Melijo Borehole (T3)	6m wide road extension to borehole site and 0.041km



Access road to the water intake



Access road to the WTP

⁸ All access roads will be expanded to 6m wide.



Figure 3-12: Access roads to different infrastructure

3.3.4 Power Supply

3.3.4.1 Hydroelectric Power Supply

The main source power for all infrastructure will hydropower (power grid) except the Ajugopi GWSS. The raw water intake and pumping station at Arra village, and WTP at Mijare will be powered by hydropower tapped from a 33-kV grid power to Moyo. This is located along Adjumani - Laropi Road only about 1 km from the intake (Figure 3-13). The diesel generator will be the backup power supply source for each infrastructure except for solar.

The Longoangwa (64.8 m³/hr with 111 m head and 40 kW) and Melijo (86.40 m³/hr with 117 m head and 50 kW) GWSS will also use the power grid tapped from nearby 33 kV power grids 6 and 2.5km away, respectively.

3.3.4.2 Solar Power Supply

Borehole T4: The 28.8 m³/hr with 93 m head and 15 kW borehole system will consist of multi-crystalline PV solar panels with a control unit, support structure, and electrical accessories and cabling at the pump station at Ajugopi.



Figure 3-13: A 33-kV grid powerline to Moyo near the intake



Figure 3-14: A 33-kV grid powerline near T1 and T3

3.3.5 Road Crossings

A road Contractor has been engaged by the Uganda National Roads Authority (UNRA), for the widening and rehabilitation of road from Laropi to Atiak. The Client (NWSC), Feasibility, Design and Construction Supervision Consultant and STRABAG (Road Contractor) had meetings for finalization of the road crossings required for the transmission main and the distribution mains along this road required for this project. Finally, 8 road crossings have been planned in agreement with the Contractor and service ducts of appropriate size will be provided by the Contractor based on design pipe sizes given to them. Figure 3-15 shows the road crossings planned for crossing of transmission main and distribution mains. The transmission main and the distribution mains shall be constructed inside the service ducts planned for crossing. Annex 6 shows the details of road crossing point.

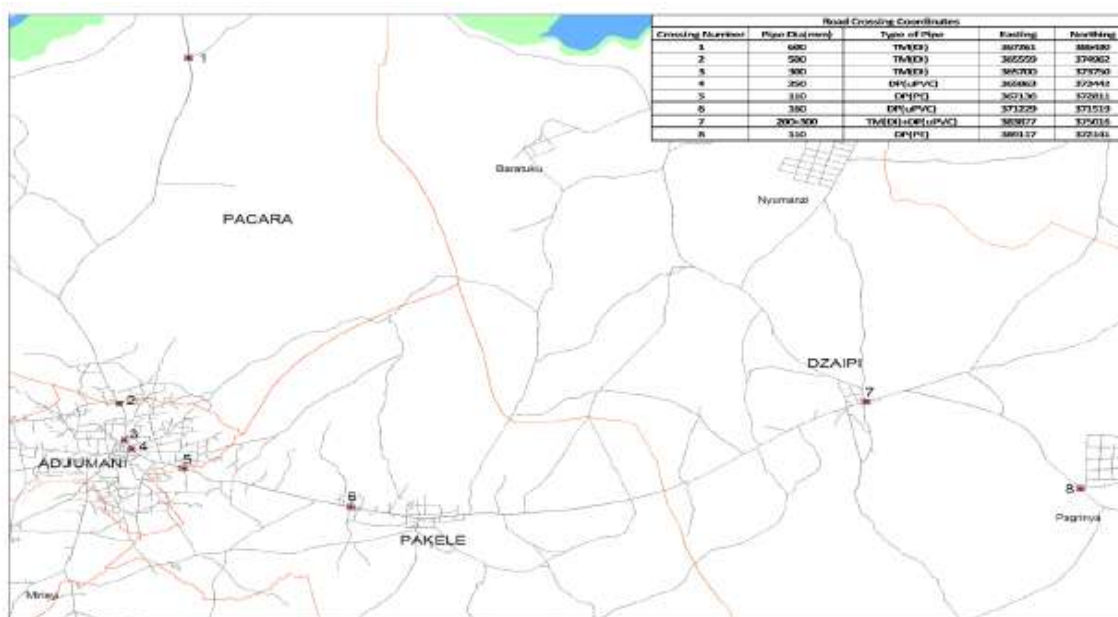


Figure 3-15: Road Crossings for Transmission and Distribution Mains

3.3.6 Auxiliary Facilities

These are project components that are not deemed part of the TL and DL, boreholes, ESR, Intake, and WTP infrastructure but are key in supporting the operations and functions of project. For this project, auxiliary facilities include; campsites, materials sources, materials yards, offices, stores among others.

3.3.6.1 Camp Sites

Majority of the workers will be casual labourers and who will be recruited from Adjumani and areas around. This means most of them will be commuting from their homes to the workplaces implying the project may not require construction of workers camps. However, some technical workers will be housed in rented houses in Adjumani Town Council.

However, during project implementation, should the contractor prefer to construct a workers' camp, to provide accommodation for workers mainly those who will be coming from outside the project area, the identification, selection, land acquisition, construction and operation shall be in line with the provisions in NEA 2019 and other relevant statutory requirements including securing all the mandatory permits e.g. the ESIA certificate.

Other facilities will also include project offices for the contractor and supervising consultants. Within the camp, other facilities shall include: parking yard, material storage yard, kitchen, sanitary facilities, site clinic, among others. All the auxiliary facilities shall be subjected to independent and comprehensive Environmental and Social Impact Assessment and approvals shall be secured.

Furthermore, the Contractor shall consider the following factors while selecting a site for the camp site;

- (a) The land use/cover 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;
- (i) Camp Access: The site should be easily accessed so that it negates the need to construct access roads;
- (ii) The safety and security of the personnel and materials;
- (iii) 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; and
- (iv) The site must be in proximity of the project area considering the length of transmission and distribution lines, location of the intake, WTP, ESRs and boreholes.

A no-objection from the Client (NWSC) before establishment of the camp shall also be secured by the Contractor. A no-objection for the site location and management plan shall also be secured by the Client from the Bank.

3.3.6.2 Material Sources

During construction phase, there will be a need for materials such as water, sand, aggregates, cement, gravels, among others. The contractor shall be required to get from locally legally existing and authorized sources before considering new ones. The proposed sources of water and aggregates/gravel identified during the assessment as in Table 3-10.

Table 3-10: Identified material sources in the project area

Merial	Possible Source(s)	Village, Parish, Subcounty	GPS Coordinates	Targeted infrastructure
Water	River Nile	Arra West, Omi, Pacara	E366239, N390126	Intake/Pumping Station, WTP, MBR
	R. Nyeguy	Pagirinya, Logoangwa, Dzaipi	E388234, N373384	T1, TL, Logoangwa ESR
	R. Adidi	Gonyila, Melijo, Pakelle	E377216, N365804	T3, TL, Melijo ESR
	R. Surumu	Ringa, Ajugopi, Dzaipi	E380272, N379481	T4, TL, Ajugopi ESR
Aggregates and Gravel	STRABAG Quarry site	Ojigo, Nyivura, Pakelle	E375248, N372360	Intake/Pumping Station, WTP, ESRs, TL, Boreholes
Murram	STRABAG Burrow pit		E375518, N371694	Intake/Pumping Station, WTP, ESRs, TL, Boreholes



Figure 3-16: Proposed quarry (existing) that is currently operated by STRABAG

For the existing rock material sources, the Contractor will be required to undertake due diligence to establish operational compliance status of this site before procuring the rock material. In case the Contractor opts for any new stone quarry site, it is a statutory obligation for the Contractor to undertake ESIA for facilities that will be under their direct control and accordingly be held responsible for their operations. However, NWSC will undertake due diligence to supervise the assessment process (review TORs, review ESIAs, RAPs for completeness and accuracy) and monitor implementation of the ESMPs/ RAPs.

3.3.6.3 Equipment and Materials Storage Yard(s)

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 and preferably near the houses where the workers will be staying. The selection of the area for the site will be done in close collaboration with the local leadership.

3.3.6.4 Waste Handling and Disposal

During the construction, the contractor shall generate both hazardous and non-hazardous wastes which must be managed in by a waste handler in accordance with the national environment (waste management) regulation 2020 and Local Government Act 1997 (Amended).

3.3.7 Project Management

The proposed construction, operation and management of the water supply system and public sanitation facilities will be handled by NWSC within Adjumani. This will also include determining the labour force for the project.

4 PROJECT ALTERNATIVES

Analysis of alternatives aids to maximize environmental and social safety. Alternatives can take on several forms including technological options, project site options, transportation options, labour sources and type, among others.

This ESIA considered analysis of the various feasible alternatives of the project under different scenarios to identify and describe the potential feasible alternatives that would allow the project to reach its objectives. It also presents a comparison of the potential alternatives on the basis of several factors which can influence the choice of alternatives to be considered by a Developer i.e. technical, economic, environmental and social criteria, as well as of public views and concerns.

The comparison of alternative was done to evaluate and address the design alternatives that were examined and proposed during the feasibility and pre-design study of the proposed project. Therefore, according to the 2011 EIA Guidelines for water resources related projects, the following alternatives/options were considered:

- a) Project or No Project Alternative;
- b) Site Location and Design Alternatives;
- c) Routing Alternatives
- d) Technology Selection Alternatives; and
- e) Operation and Maintenance (O&M) procedures for the proposed systems.

For each of the alternatives, the potential environmental and social impacts, including land and energy requirements implications were analysed as possible, including their economic values where feasible. The selected alternative/options were the most reliable and suitable under local conditions taking into account, their institutional, training, and monitoring requirements i.e., strikes a balance on the above factors with viable mitigations measures for residual impacts.

4.1 Project Vs No Project Option

4.1.1 “No Project” Alternative

Analysis of the “No project” option as an alternative, provides an environmental baseline against which impacts of the proposed action can be compared. Adopting this alternative means that the status quo remains and the proposed Adjumani Water Supply System is not developed. This means project site remains in its current state, with neither positive nor negative impacts e.g., water resource potential of River Nile would remain unchanged as water will not be extracted. This alternative ignores all the immense positive impacts. In this respect, government and the communities would lose all potential benefits associated clean water. The low water supply and sanitation services in the area would continue to exist.

In the long term, the no-project scenario would be more disastrous as the biggest population in Adjumani District would continue using point water sources that are far from homes, prone to contamination and presenting a high risk of spread of waterborne related diseases. With respect to the socio-economic environment, the “no project” option would eliminate improved access to safe and affordable water, and generation of employment to both skilled and unskilled labour.

According to the baseline, 69.1% of the population have insufficient water supply especially during the dry season. These are mainly areas of Arra, Pakele, Dzaipi, Nyumanzi, Adjumani TC, among others which force residents to move to fetch water from distant rivers such Nile and Echuku among others.

According to the UNHS (2016) overall, the majority of household members involved in fetching water were adult females (41%), followed by female minors (22%) and this was the trend in both male and female headed households. Specifically in Adjumani district, 58.8% of the adult females and 22.9% minor females are involved in fetching water in comparison to 9.3% adult males and 9% minor males. On average rural communities spend about 29 minutes waiting for water (queuing) at their main source of water. However, in some areas women and girls have to wait for over 1 hour due to poor water flows from the source owing to changes in seasonal flows of both surface and ground water sources.

This would imply more health burden on the local communities and perpetuate poverty because of lost revenue and productive hours. In short, Uganda's Vision 2040 of having a piped water supply across the country and poverty eradication would be futile. Construction of the WSSS will go away in lifting this burden as water points will be closer to households and therefore distances travelled by the women and girls will be less.

Therefore, the "No Project Alternative" is not sustainable in the short and long run because the growing demand for clean water in Adjumani needs a remedy. This option is therefore not recommended.

4.1.2 Project Alternative

Project alternative means proceeding with the current plan and implementing the project as it is with some adjustments to forestall environmental damage and risks associated with community and occupational safety. The proposed Adjumani WSSP is urgently needed by the community improve water access and to accelerate development in the project area. All stakeholders consulted had no objection to the proposed project. They were very optimistic about the project citing its contribution to developments in the district, through job creation, revenue collection by government and other secondary socio-economic benefits, which the proposed development will create.

Therefore, the minor benefits of the No-Project option are far outweighed by the benefits to be attained on implementing the project, hence, the "Project Alternative" is taken as feasible for implementation on condition that the identified impacts are mitigated as suggested.

4.2 Site Location and Design Alternatives

4.2.1 Location of Water Intake

Six (6) alternative locations were assessed for siting the water intake as follows: Intake 1 at Liri on R. Nile, Intake 2 at Ologonjo on R. Nile, Intake 3 at Ogujebe on R. Nile, Intake 4 at Laropi on R. Nile, Intake 4 at Obo near Laropi on R. Nile and Intake 6 at Logoangwa on R. Ayugi.

The criteria for selection of the most feasible alternative involved several factors listed below:

Criteria	Results	
	Obo	Arra West
Flooding	A lake (flooded) formed and fed by the river Nile located in Obo village on the road to Laropi	intake can be directly on the river Nile so reliability of water is assured
Energy	33 KV electricity supply is located only about 2.0 km	33 KV electricity supply is located only about 1.0 km from Ara Intake
Access roads	Available and needs expansion for about 3.8 km	Available and needs expansion for about 0.8 km
Water quality	After Laropi ferry crossing and landing site e.g. Turbidity is about 21 NTU	Better considering upstream activities ie before the Laropi ferry crossing point and landing site eg Turbidity is about 1.19 NTU
Environmental impacts (on other users and activities like fishermen and livestock farmers)	More fishing activity with several fishermen on the lake	Less number of fishermen and cattle keepers
Ground water infiltration	High – it being a lake (flooded area)	Low as water velocity are high
Distance to MBR (Adjumani)	8.4km	8.83 km
Static head	615	618 m
Sedimentation, sediment transport	High sedimentation chances being a lake and not flowing	Less chances of sedimentation given the velocity of water in the R. Nile at Arra West
Stability of riverbed and foundation condition	On a lake side (prone to flood in case water levels in the river increase) and in a flood plain	On a riverbank, well drained
Water depth	4-5 m higher than the River Nile bed levels	8 -10m deep normal water levels in River Nile throughout the year

From the analysis above and considering the bathymetry surveys at both sites, it was found out that Obo village water levels are 4-5 m higher than the R. Nile bed levels. This is a very big risk for reliable water incase the Nile water level recede. Alternative intake location was suggested at Ara Village by the Design Team. In consultation, the location was mutually agreed by the Client as well as the ESIA Consultant following the selection criteria above. Therefore, based on this criterion, siting the intake at Arra West Village on R. Nile was chosen as the most feasible option.



Figure 4-1: Intake alternatives

4.2.2 Location of Water Treatment Plant (WTP)

Two (2) alternative sites were considered: 1) locating the WTP near the intake in Arra West Village, and 2) locating the WTP away from the intake, between the intake in Arra West Village and the MBR. The factors considered in the assessment of these two options were energy requirements (distance from the energy source, cost (operation and maintenance e.g pumping treated water), ease of disposal of the backwash water. As a result, locating the WTP away from the intake was adopted. Hence a site was identified in Mijale village. This was aimed at reducing the cost of pumping treated water up to the MBR (the head). Since it be 10.08 km (WTP in Mijale to MBR) than the 18.57 km (from Intake to MBR). Additionally, land is available and no major economic activity and sensitive ecosystem on or near the site.

4.2.3 Routing Alternatives for the Main Water Transmission Mains

A detailed assessment was undertaken to establish the most feasible water transmission (both raw and treated under pumping and gravity) mains, from the intake at Arra West to the WTP and storage reservoirs at Adjumani, Ciforo, Pakele and Dzaipi. The evaluation involved an assessment of the:

- Environmental impacts, especially presence of valued ecosystem components (VECs) along the pipeline route
- Socio-economic impacts, especially presence of human settlements and property along the route, that could result into resettlement/relocation
- Investment, operation and maintenance cost
- Accessibility, including consideration of the land scape

In consideration of these factors, it was evaluated that a pipeline route that mainly moves along the existing UNRA road reserves would be less costly, and with minimal impact on the environmental and social setting of the project area since it crosses no major wetlands. Therefore, the main water transmission line (Figure 4-2) was mainly routed along the existing road reserves.

The advantage of this option is that the intermediate location of WTP will balance the static head of about 220m between intake and MBR that will allow providing lesser head pumps at WTP,

The map illustrates the water supply infrastructure for Dikgabo. Key components include:

- Intake Area:** Located at the top of the map, near the Orange River.
- Transmission Main:** A blue line representing the main water supply line, labeled "DN500 DI C30 PIPE (RWPM) L:8.83 km" and "DN500 DI C30 PIPE (TWPM) L:10.06 km".
- Water Treatment Plant (WTP):** A purple square symbol located near the intake area.
- Elevated Service Reservoirs (ESRs):** Represented by blue square symbols with a water drop icon. These include:
 - MBR CLM ADJUMANI ESR
 - DIFORD ESR
 - PAKELE ESR
 - PAKELE E.C.
 - OSAIPI ESR
- Pumping Stations:** Represented by blue square symbols with a pump icon. These include:
 - PAKELE ESR
 - PAKELE E.C.
- Feeder Gravity Main (FGM):** A blue line representing the main supply line to the town, labeled "DN100 (FGM) L:6.19 km" and "DN200 DI C40 PIPE (FGM) L:13.73 km".
- Legend:**
 - INTAKE
 - WATER TREATMENT PLANT (WTP)
 - TRANSMISSION MAIN
 - PARISH BOUNDARY
 - ROADS
 - REFUGEE SETTLEMENT CAMP
 - E.S.R. - ELEVATED SERVICE RESERVOIR
 - RWPM - RAW WATER PUMPING MAIN
 - TWPM - TREATED WATER PUMPING MAIN (TWPM)(Km)
 - FGM - FEEDER GRAVITY MAIN (km)
 - DN - NOMINAL DIAMETER (mm)
- Note:** Diameter in mm, Length in km.
- Scale Bar:** 0 0.5 1 2 3 4 5 km.
- North Arrow:** Indicated by an upward arrow.

4.3 Technology Selection Alternatives

Four (4) intake technologies were assessed: bank infiltration, counter flow constructed channel abstraction, intake well inside river, and floating pipe intake. After evaluation of the operational requirements of the intake technologies, and based on the conditions of the selected intake location, the counter flow constructed channel abstraction was selected as the most feasible intake technology.

Five (5) alternative water treatment technologies were assessed: conventional treatment process, treatment process with pressure filter, treatment process without sludge treatment, treatment process with clariflocculator and treatment process with plate settler. The assessment criteria considered the area requirement, energy input, efficiency, initial investment and maintenance cost and bulkiness. Based on these criteria, the treatment process with plate settler was chosen as the most feasible alternative.

The alternative technology for the storage tanks considered galvanized steel tanks (Steel) and reinforced concrete tanks (RCC). The evaluation of these two storage tank technologies considered the cost, availability and ease of installation. As a result, the steel tank technology was

been proposed in the revised design and selected as the most feasible option for the proposed project.

5 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

5.1 Introduction

This Chapter provides analysis of the policy, legal and institutional framework within which the proposed Adjumani Water Supply and Sanitation Project is expected to operate. It covers relevant Ugandan and Development Partner key policies, laws, guidelines, regulatory/standard and institutional framework relevant to the environmental and social aspects of the proposed piped water supply system. Key Ugandan legislations governing the conduct of Environmental Impact Assessment (EIA) are the National Environmental Act No. 5 of 2019 as amended and the Environmental Impact Assessment Regulations (1998). 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.

5.2 Policy Framework and Plans

5.2.1 Vision Uganda, 2040

In 'Vision 2040', Uganda sets goals to attain by the year 2040 ranging from political, economic, social, energy, water to environment. With respect to environmental goals, Ugandans aspire to have sustainable social-economic development that ensures environmental quality and preservation of the ecosystem. Vision 2040 recognizes water and sanitation infrastructure as a key driver of the economic development and notes that for Uganda to shift from a peasantry to an industrialized and urban society, it must develop its infrastructure.

The 2040 vision acknowledges that the slow accumulation of infrastructure i.e., water among others retards the economic development. 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. It must be propelled by water as a factor of production in agricultural and industrial sectors. It estimates that Uganda's water consumption using 2010 as a baseline stands at 26 m³ per capita and will require it to be raised to 600 m³ per capita by year 2040. This can only be achieved by raising percentage of population with access to safe piped water from 15 to 100 by 2040.

To provide the necessary stimulus to the economy, the government through NWSC in partnership with WB has embarked on the improvement of water supply infrastructure of which Adjumani Water Supply Project is part. Vision 2040 notes that in order to improve access and availability of water to the rural and urban areas, especially to economic zones and other productive areas, new water supply lines should be established at an accelerated rate. Therefore, the proposed project is in line with aspirations of Vision 2040.

5.2.2 National Development Plan III (2020/2021-2024/2025)

The National Development Plan III (NDP III) 2020/2021-2024/2025 developed under the theme "Sustainable Industrialization for inclusive growth, employment and wealth creation". NDPII aims to stop, reduce and reverse environmental degradation and the adverse effects of climate change

as well as improve utilisation of natural resources for sustainable economic growth and livelihood security.

Relevance: The project implementation will follow the ESMP put forward in this ESIS to ensure sustainable utilisation of natural resources and mitigation of likely impacts on the environment. In order to meet the objectives of National Development Plan III 2020/2021-2024/2025

5.2.3 The National Environment Management Policy, 1994

In Uganda, the National Environment Management Policy (1995) is the umbrella framework that recognizes the importance of conservation and restoration of ecosystems, biodiversity and ecological process and of enhancing public awareness and local participation in environmental actions. The key policy objectives include the enhancement of the health and quality of life of Ugandans and promotion of long-term, sustainable socio-economic development through sound environmental and natural resource management and use; and optimizing resource use and achieving a sustainable level of resource consumption. The policy calls for integration of environmental concerns into development policies, plans and projects at national, district and local levels, using ESIA as one of the vital tools. Thus, the policy requires that projects or policies likely to have significant adverse environmental and social impacts to undertake an ESIA before their implementation. This ESIA have been carried in full compliance with the provisions of this policy and has ensured that aspects for environmental and social sustainability are integrated in the project cycle.

Relevance: At the national policy level, environment and development are interrelated and this policy requires that environmental aspects are considered in all development projects such as the proposed Adjumani WSSS. Preparation of this ESIA is consistent with the provisions of the policy. In addition, the provisions in this policy are consistent with the World Bank safeguards policies that require preparation of environmental and social assessments for development projects before their implementation.

5.2.4 National Environmental Health Policy, 2005

The main objective of this policy is to create an enabling environment for the achievement and maintenance of healthy living conditions in rural and urban areas. It actively promotes and supports the adoption of a national sanitation, ensure that an environmental health community at national and local government level is suitably skilled and equipped to meet current environmental health challenges.

Significant adverse sanitation challenges especially in river banks of the Nile are likely to rise due to construction works. The proposed project involves construction of access roads, disposal of waste and pollutants hence the requirement for observation of this policy.

5.2.5 National Policy for Conservation and Management of Wetland, 1995

The overall aim of this policy is to promote the conservation of Uganda's wetlands in order to sustain their ecological and socio-economic functions for the present and future wellbeing of the people. To limit the rampant loss of wetland resources and ensure that benefits from wetlands are sustainable and equitably distributed. Wetlands acting as sources of water supply and

wastewater treatment should be fully protected. Application of environmental impact mitigation measures on all activities of the project to be carried out on affected wetlands. NWSC and DWD have to work hand in hand with WMD and NEMA to halt encroachment on wetlands such as the swamp and other riverine vegetation to ensure that the development in wetlands are well planned and managed

The raw water intake water is to be abstracted and the pumping facility are located along the buffers (wetlands and flood plains along River Nile) in Arra West village. Therefore, project management should ensure that construction and operation activities do not lead to a decline of wetland productivity i.e. ensure that these ecosystems are not affected during implementation of the project.

5.2.6 National Water Policy, 1999

The policy emphasizes the need for participatory planning at the lowest possible level and specifically mentions the requirement for districts to set priorities, by-laws and annual development plans within policies and guidelines set by national level ministries. It further emphasizes the need for an ESIA for projects that affect water resources. The objective of this policy is to provide guidance on development and management of the water resources in 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. The policy aims to:

- Promote rational use of water;
- Control pollution and promote safe storage, treatment and disposal of waste, which could pollute water and impact public health; and
- Promotion of awareness of water management and development issues and capacity building.

The project area has prominent water bodies of National importance specifically the Albert Nile. Sound measures shall be devised to avoid/minimise/mitigate the impact of construction on these water bodies. Therefore, it is relevant since it will promote rational use of source water and avoidance of contamination of water course. The policy advocates for integrated and sustainable development management and use of water resources with full participation of all the key stakeholders. Construction will require water, and therefore, the contractor shall secure the required surface water abstraction permit from Directorate of Water Resources Management (DWRM).

5.2.7 National Land Use Policy, 2006;

The overall policy goal is to achieve sustainable and equitable socio-economic development through optimal land management and utilization in Uganda.

5.2.8 Uganda National Land Policy, 2013

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. Therefore, the land policy addresses the contemporary land issues and conflicts facing the Country. The vision of the policy is: “Sustainable and optimal use of land and land-based resources for transformation of Ugandan society and the economy” while the goal of the policy is: “to ensure efficient, equitable and sustainable utilization and management of Uganda’s land and land-based resources for poverty reduction, wealth creation and overall socio-economic development”. The policy recognizes amongst others, the need for the protection of vulnerable groups on matters of land ownership and its utilization. In the planned project, land use needs to be taken into consideration.

All the land acquisition for project components which are to be installed on private land will be conducted following an approved Resettlement Action Plan (RAP), while involvement and discussions with UNRA and the District Local government are required to streamline the implementation of components like transmission pipes in the road reserve (public land).

Additionally, the Intake will be constructed on the left bank of R. Nile which lies within the jurisdiction of the Republic of Uganda. It is also within the buffer zone (100m) and therefore is held in trust by the Government of Uganda. The intended use of the left bank of R. Nile for construction of the Intake is consistent with The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, No. 3/2000 that facilitates the sustainable utilization and conservation of resources on river banks and lake shore by and for the benefit of the people and community living in the area. The compliance requirement is for NWSC to secure written approval (permit) from NEMA.

5.2.9 National Sanitation Policy for Uganda, 1997;

The Government of Republic of Uganda has formulated National Sanitation Policy (1997) to guide, promote and preserve the health of community through improved sanitation. However, the policy has set a number of strategic objectives to deal with specific sanitation problems including:

- Promotion of safe disposal of human excreta;
- Promotion of proper management of liquid and solid wastes;
- Promotion of resource mobilization for sanitation improvement;
- Enhancing development and maintenance of safe water chain; and
- Provision of a framework for development of appropriate laws/regulations and institutional framework for sanitation improvement.

Therefore, the policy needs undertaking of sanitation interventions to preserve public health. This calls for project to consider safe disposal of human excreta whose response includes construction of latrines and execution of sanitation promotion campaigns. These planned project activities are in-line with National Sanitation Policy for Uganda (1997).

5.2.10 National Health Policy, 2010

The overall objective of this policy is to reduce mortality, morbidity and fertility, and the disparities therein.

By ensuring availability of safe water supply and improved sanitation, the project will contribute to the reduction of water borne diseases thereby improving on the health of communities,

especially the girl child and mothers who are mainly involved in collection of water. This project is in line with the strategies of this policy.

5.2.11 National Gender Policy, 2007

This Policy is to guide and direct at all levels, the planning, resource allocation and implementation of development programmes with a gender perspective. Its overall goal is to mainstream gender concerns in the national development process in order to improve the social, legal/civic, political, economic and cultural conditions of the people in Uganda in particular, the women. Therefore, the goal is to achieve gender equality and women's empowerment as an integral part of Uganda's socio-economic development. The policy establishes a clear framework for identification, implementation and coordination of interventions designed to achieve gender equality and Women's empowerment by guiding to all stakeholders in planning, resource allocation, implementation and monitoring and evaluation of programmes with a gender perspective.

This policy would especially apply in the recruitment process of labour, both during construction and operation phase. Men and women should have equal opportunities for available jobs. This policy also requires provision of a work environment that is safe and conducive to women, as it is for men, considering gender-disaggregated differences and vulnerabilities. For example, women should have separate facilities from men at workers' camps e.g., toilets, washrooms, residences among others.

5.2.12 National Policy on Elimination of Gender Based Violence (GBV), 2016

The policy provides a framework for the implementation of comprehensive GBV prevention measures and provision of multi-sectoral support services for survivors. Under these provisions, the project will be required to prepare a gender action plan to support the project workers and the community during project implementation. Therefore, the policy seeks to promote, prevent and respond and end impunity of gender-based violation in the country. The highest prevalence of gender-based violence is among women aged between 15 and 45; and generally, involves sexual violence.

The proposed project shall have specific policy on eliminating of gender-based violence throughout project phases. This will be through putting up an anti-sexual harassment policy, workers code of conduct, anti-retaliation policy among others. In addition, the project will be required to work with community members, police, parents and all stakeholders to specifically address gender issues.

5.2.13 National Policy on Disability, 2006

The vision of the policy is a society where people with disabilities (PWDs) fully participate in all spheres of development. The mission is to provide a framework to the empowerment of PWDs in the development process.

The project shall ensure participation of PWDs in the planning, implementation, monitoring and evaluation for all the project phases.

5.2.14 National Orphans and other Vulnerable Children's (OVC) Policy, 2004

The vision of the policy is a society where all orphans and other vulnerable children live to their full potential and their rights and aspirations are fulfilled. The mission of the policy is to provide a framework for the enjoyment of the rights and fulfilment of responsibilities of the orphans and other vulnerable children. The policy objectives are:

- i. To ensure that the legal, policy, and institutional framework for child protection is developed and strengthened at all levels;
- ii. To ensure that orphans, vulnerable children and their families access basic essential services package. National Orphans and other vulnerable children Policy;
- iii. To ensure that resources for interventions that benefit orphans and other vulnerable children are mobilized and efficiently utilized; and
- iv. To ensure that the capacity of duty-bearers for orphans and other vulnerable children to provide essential services is enhanced.

However, the Ministry of Gender, Labour and Social Development (MoGLSD) is in the process of developing the National Children Policy to replace the existing National Policy on Orphans and Other Vulnerable Children (OVC) in Uganda.

The contractor in liaison with Local Council officials (especially Subcounty Community Development Officers) will undertake initiatives to do away with Gender Based Violence-GBV cases relating to project implementation activities.

5.2.15 National Equal Opportunities Policy, 2006

The National Equal Opportunities Policy provides a framework for re-dressing imbalances, which exist against marginalized groups while promoting equality and fairness for all, with a goal of. Providing avenues where individuals and groups' potentials are put to maximum use by availing equal opportunities and affirmative action.

Construction comes along with a lot of opportunities including service delivery, trainings and employment. The project will avail equal opportunities and affirmative action.

5.2.16 National Child Labour Policy, 2007

The overall objective of the policy is to guide and promote sustainable actions aimed at the progressive elimination of child labour starting with the worst forms. The vision of the policy is a society free of exploitative child labour in which all working children enjoy their right to childhood, education, dignity and the full development of their potential.

The project shall actively participate in efforts to eliminate child labour during pre-construction, construction and post construction.

5.2.17 National HIV/AIDS and the World of Work Policy, 2007

The goal of this National policy is to provide a framework for prevention of further spread of HIV and mitigation of the socio-economic impact of the epidemic within the world of work in Uganda. The policy recognizes HIV/AIDS as a workplace issue, which should be treated like any other serious illnesses / conditions in the workplace. It emphasizes the importance of promoting and protecting human rights, participation of people living with HIV/AIDS, gender equality as well as

prevention, care, support and treatment as the major tools to be used in addressing the impact of HIV/AIDS in the world of work. It guides the overall response to HIV/AIDS in the world of work in Uganda.

The project shall endeavor to promote human rights, participation of people living with HIV/AIDS, gender equality as well as prevention, care, support and treatment as the major tools to be used in addressing the impact of HIV/AIDS on the project.

5.2.18 National Climate Change Policy, 2015

The overarching objective of this multi-sector national climate change policy is to ensure that stakeholders, including the transport sector, address climate change. This is because the predicted impacts of climate change threaten people and their livelihoods. More so, Uganda's vital water supply components are also threatened by the predicted changes in climate. In order to adapt to climate change, water abstraction and supply projects must reflect climate predictions.

Construction of the water abstraction, transmission and distribution systems needs to adapt climate resilient designs that can mitigate impacts arising from increased peak flows and floods.

5.2.19 The National Equal Opportunities Policy 2006

The goal of the National Equal Opportunities policy is to provide avenues where individuals and groups' potentials are put to maximum use by availing equal opportunities and affirmative action.

The policy objectives amongst others are to:

- a) Guide the planning processes, affirmative action, and implementation of programmes and allocation of resources to all stakeholders.
- b) Guide the establishment of legal, policy and institutional frameworks of all stakeholders.
- c) Provide a framework for assessing responsiveness of programmes and activities to equal opportunities, in redressing any imbalances therein.
- d) Empower marginalized and vulnerable groups for their full participation in all development processes.
- e) Enhance capacity of implementing agencies to provide quality services with a view to monitoring compliance with affirmative action and the constitutional provisions

Discrimination and stigmatization, which acts as a barrier for marginalized and other groups of people in the project area to accessing employment and support opportunities will be eliminated throughout all project implementation phases. This entails equitable access to services by workers employed at the project.

5.2.20 Occupational Health and Safety (OHS) Policy

The OHS Policy Statement is guided by the Constitution of the Republic of Uganda and other global, national and sector regulations and policies. The OHS Policy also takes into consideration the Health Sector Strategic Plan, all of which aim to improve the quality of life for all Ugandans in their living and working environment. This policy seeks to:

- Provide and maintain a healthy working environment;

- Institutionalize OHS in the power-sector policies, programs and plans; and
- Contribute towards safeguarding the physical environment.

This policy will be especially relevant for OHS of construction crews and subsequently, operation and maintenance personnel in the Adjumani water project. This ESIA proposes in the ESMP measures to prevent, mitigate and compensate potential incidents, accidents and ensure safety in all project area in compliance with this policy. It will also have relevance in mitigation measures that in order to protect the workers and the public from health and safety impacts as a result of project construction and subsequent operation and maintenance activities. Contractors and NWSC will be responsible for acquiring insurance and provide personal protection equipment and first aid to all workers during construction and operation, respectively.

5.2.21 National Employment Policy 2011

The policy emphasizes adherence to guiding principles that include: consistency with overall National Planning Framework; Social Dialogue; Private Sector-led Growth and Employment Generation; Employment creation as a key indicator for economic performance; Education, Skills Development and Training; Compliance with labour standards; Affirmative action; Community participation; Addressing HIV/AIDS at the Work Place; Promotion of Gender Equality for all in employment.

The same policy also prioritizes key action areas namely: employment-intensive growth; labour market information; labour productivity, skills development and training; promotion of rural employment; improving informal sector, micro and small-scale enterprises; improving labour administration and labour standards; externalization of labour; employment of vulnerable groups and promotion of gender equality; promotion of youth employment.

These provisions of the Policy will be observed and implemented throughout the project cycle.

5.2.22 Uganda National Culture Policy 2006

The policy provides strategies to enhance the integration of culture into development. These strategies include advocating for culture, ensuring capacity building, ensuring research and documentation, promoting collaboration with stakeholders, and mobilizing resources for culture. These strategies are an integral part of the Social Development Sector Strategic Investment Plan (SDIP) whose mission is to create an enabling environment for social protection and social transformation of communities.

Cultural leaders and local leaders need to be involved and consulted during the ESIA process for the proposed project activities so that they can help guide the process especially on which natural-historical and traditional collections could be preserved based on their cultural importance or historical relevance in the project implementation process.

5.3 Legal Framework

5.3.1 Constitution of the Republic of Uganda, 1995 (as amended)

The Constitution is the supreme law of Uganda and it provides for protection of the environment. It places obligations on both the state and the citizens of Uganda to among other things: a) protect

the environment; b) protect important natural resources including land, water, wetlands and fauna and flora; c) promote sustainable development and conserve natural resources in a balanced manner for the benefit of the present and future generations and to prevent damage to natural resources resulting from pollution and other causes.

Article 39 and 41 of the Constitution of 1995 provide that everyone has a duty to maintain a sound environment. It also stipulates that every person in Uganda has a right to a healthy and clean environment and as such can bring legal action for any pollution or disposal of wastes. Chapter III, Section 245 stipulates that the Parliament shall by law provide measures intended to protect and preserve the environment from abuse, pollution and degradation. The articles detailed above place project development within the constitutional framework.

In Uganda this is the cardinal law requiring protection and conservation of the environment. Preparation of this ESIA is in line with requirements of Constitution of the Republic of Uganda. Therefore, the proposed project activities will be undertaken while ensuring safe and healthy environment is maintained as provided for in the Constitution.

5.3.2 National Environment Act No.5 of 2019 as amended

The National Environment Act (153) establishes and defines functions of NEMA as a body responsible for management, monitoring and supervision of all environmental conservation activities (Section 4). The act provides for various strategies and tools for environment management, which also includes the EIA (Section 19) for projects likely to have significant environmental impacts. It also mandates NEMA with a leading role to review environmental impact statements. NEMA sets multimedia environmental standards (Sections 24-32) to prevent contamination of air, water and soil resources. The Act also mandates NEMA with responsibility for in-situ and ex-situ conservation of biological fauna and flora resources either on land or in water (Sections 42 and 43). Section 48 empowers NEMA, district environment committees and local environment committees to be responsible for monitoring of local land-use plans, which should be in conformity with national land-use plan. Section 106 outlines provisions to enable compliance with obligations of international environmental conventions. Section 35 entrusts NEMA, lead agencies and local government environment committees with powers to protect the environment from human activities that could adversely affect it. Section 56 prohibits discharge of hazardous substances, chemicals, oil, etc. into the environment except in accordance with guidelines prescribed by NEMA. Section 12 on the Schedule requires that projects related to sewage disposal should undertake a full EIA. This Act also formed the basis for enactment of the EIA Guidelines, 1997 and EIA Regulations, 1998 which together prescribe the EIA process in Uganda.

This ESIA has been carried out in compliance with this Act. In addition, appropriate assessments shall be undertaken for all project support structures during the implementation phase. The ESIA will apply requirements of this regulation in the construction per requirements included in the bidding and contract documents of its contractors and subcontractors.

5.3.3 Local Governments Act, Cap 243

Local Governments Act, 1997 establishes a form of government based on district as the main unit of administration. Districts are given legislative and planning powers under this Act. (Sections 36-45) They are also enjoined to plan for conservation of the environment within their local areas. District Environmental Committees established under section 15 of the National Environment Act Cap 153 are supposed to guide district authorities in that regard.

The project management should plan closely with the Local government to ensure mutual understanding and fruitful achievements. The implementation of Adjumani WSSP will be consistent with Adjumani DDP and it is to be undertaken with technical guidance of the District technical staff supported by the political wing of the district as the Act provides guidance for requirements of implementation of water supply projects. Therefore, as required by Section 18(2) of this Act, NWSC will apply to DWRM and DWD for permits for abstracting water from River Nile and discharging effluents from the sludge drying beds to the environment, respectively.

5.3.4 Land Act, Cap. 227 1998

The 1995 Constitution restored all private land tenure regimes (which had previously been abolished under the Land Reform Decree, 1975). It divested the state and the Uganda Land Commission of radical title to land that was expropriated in 1975, and vested it directly in the citizens of Uganda. The constitution provides for, inter alia: a) the right of every Ugandan to a clean and healthy environment (Article 39); b) the responsibility of government to enact laws that protect and preserve the environment from degradation and to hold in trust for the people of Uganda such natural assets as lakes, rivers, wetlands, game reserves and national parks [Article 237(2)]; and c) the right of every Ugandan to fair and adequate compensation in instances of land acquisition.

The Constitution provides that every person has a right to own property and that no person shall be compulsorily deprived of property or any interest in or right over property without prompt payment of fair and adequate compensation, prior to the taking of possession or acquisition of the property. On land tenure regimes and transfer of land, the Constitution prescribes tenure regimes in accordance with rights and interests held in land. Article 237 of the Constitution, 1995, vests land in the citizens of Uganda and identifies four land tenure systems, namely: customary, mailo, freehold, and leasehold.

Understanding these systems (detailed in section 4 of the Land Act, 1998) is vital for compensation of households to be affected by the project. These tenure systems are delineated as below:

Mailo land tenure: The Mailo land tenure system is a feudal ownership introduced in Buganda by the British in 1900 under the Buganda Agreement. “Mailo” is a Luganda word for “mile” as the original grants under the agreement were measured in square miles. Prior to the 1975 Land Reform Decree, Mailo land was owned in perpetuity by individuals and by the Kabaka (hereditary King). Since no section of the proposed line traverses Buganda region, this type of tenure does not apply to the project.

Freehold tenure: This tenure derives its legality from the Constitution. It involves the holding of land in perpetuity or for a period less than fixed by a condition and enables the holder to exercise, subject to the law, full powers of ownership.

Leasehold tenure: Lease tenure is created either by contract or by operation of the law. It is a form of tenure under which the landlord or lessor grants the tenant or lessee exclusive possession of the land, usually for a defined period and in return for a rental fee. The tenant has security of tenure and a proprietary interest in the land. The Constitution and the Land Act also protect “rights of spouses and children” with regard to land transactions. The head of household must acquire the consent of spouse and children prior to any sale of land on which the family ordinarily resides.

Customary tenure: In this tenure, land is owned in perpetuity and tenure is governed by rules generally accepted as binding and authoritative by the class of persons to which it applies (that is, “customary regime is not governed by written law”). Customary occupants are occupant of former public land, and occupy the land by virtue of their customary rights; they have proprietary interest in the land and are entitled to certificates of customary ownership. Certificates for customary ownership are issued by the District Land Board, through application to the Parish Land Committee.

These tenure systems will be important during resettlement planning. Detail of land take and compensation are addressed in the line project resettlement action plan (RAP).

5.3.5 Land Acquisition Act, Cap 226

This Act makes provision for the procedures and methods of compulsory acquisition of land for public purposes whether for temporary or permanent use. The Act requires that adequate, fair and prompt compensation is paid before taking possession of land and property. Dispute arising from the compensation to be paid should be referred to the court for decision if the Land Tribunal cannot handle.

All land acquisitions for access roads and auxiliary facilities regarding this project will be guided by this Act.

5.3.6 Water Act, Cap 152

The objective of the Act is to enable equitable and sustainable management, use, and protection of water resources of Uganda through supervision and coordination of public and private activities that may impact water quantity and quality. Section 18(2) requires that before constructing or operation of any water works, a person should obtain a permit from Water Resources Management Directorate (WRMD).

The Act also aims to control pollution of water resources (Sections 20 and 31). The foregoing notwithstanding, Section 19 provides that subject to guidelines established by the Minister from time to time, the Director (of water resources management) may exempt a public authority or a class of persons or works from requirements in Section 18 on such conditions as he or she may deem fit. Since this decision is reached upon evaluation of an application submitted to the

Directorate, Section 19 does not automatically preclude works by public agencies from applying for permits prescribed by this Act.

The Act provides guidance for requirements of implementation of water supply projects. As required by Section 18(2) of this Act, NWSC will apply to DWRM and DWD for permits for abstracting water from River Nile and discharging effluents from the sludge drying beds to the environment, respectively.

5.3.7 Public Health Act, Cap 281

This Act aims at avoiding pollution of environmental resources that support health and livelihoods of communities. The Act gives local administrative units authority (Section 103) to prevent pollution of watercourses in interest of public good.

Relevance: This Act will not only be relevant in regard to the main watercourse (River Nile) but also land where workers camps, equipment yards and quarries will be located. Improved water supply leads to improved economic activities but also to generation of wastewater. NWSC will ensure that the wastewater generated in the service areas under them is appropriately managed so as to prevent risk to public health, in line with the provisions of this Act.

5.3.8 Occupational Safety and Health Act, 2006

The Act provides for the prevention and protection of persons at all workplaces from injuries, diseases, death and damage to property. The OSH Act covers not just the 'factory' but also any workplace where persons are employed and its provisions extend not just to employees but to the self-employed and any other persons that may be legitimately present in the workplace who may be exposed to injury or disease. Employers must provide for the protection of workers from adverse weather, provision of a clean and healthy work environment, sanitary conveniences, washing facilities, First Aid and facilities for meals. The Act provides for safe access to the workplaces and safe work practices. In Section 95, the Act requires employers to take preventive measures including administrative and technical actions to prevent or reduce contamination of working environment.

Section 96 requires provision of material safety datasheets (MSDS) containing essential information regarding identity of chemicals, their hazards, safety precautions and emergency procedures. In section 97 an employer is required to ensure that containers of hazardous chemicals are labelled and appropriate chemical data sheets are available in the workplace.

This Act will be especially relevant for OHS of construction crews and subsequently, operation and maintenance personnel in the Adjumani water project. This ESIA proposes in the ESMP measures to prevent, mitigate and compensate potential incidents, accidents and ensure safety in all project area in compliance with this Act. It will also have relevance in mitigation measures that in order to protect the workers and the public from health and safety impacts as a result of project construction and subsequent operation and maintenance activities. Contractors and NWSC will be responsible for acquiring insurance and provide personal protection equipment and first aid to all workers during construction and operation, respectively.

5.3.9 Investment Code Act, Cap 92

Section 18(2) (d) of the Act requires an investor to take necessary steps to ensure that development and operation of an investment project do not cause adverse ecological and socio-economic impacts.

NWSC is the implementing agency for the project that received funding from the World Bank on IWMDP. This ESIA is in partial fulfilment of the requirements of this Act, since adverse ecological and socio-economic impacts as a result of the project implementation have been identified and mitigation measures developed.

5.3.10 Employment Act, 2006

Employment Act, 2006 repeals the Employment Act (Cap 219) enacted in 2000. This Act is the principal legislation that seeks to harmonize relationships between employees and employers, protect workers interests and welfare and safeguard their occupational health and safety through:

- i) Prohibiting forced labour, discrimination and sexual harassment at workplaces (Part II; Part IV);
- ii) Providing for labour inspection by the relevant ministry (Part III);
- iii) Stipulating rights and duties in employment (weekly rest, working hours, annual leave, maternity and paternity leaves, sick pay, etc. (Part VI);
- iv) Continuity of employment (continuous service, seasonal employment, etc. (Part VIII).

The Act will govern labour type and conditions under which persons hired by the project work during both the construction and operational phases. It prohibits Child labour (a condition the contractor must comply with) as well as providing guidance on work rights during the post-construction phase. NWSC will ensure that no child labour is used by Contractor and sub-contractors on this project during construction by monitoring the recruitment process. The project shall develop and implement a comprehensive Labour Management Plan in consultation with the district labour offices of Adjumani.

5.3.11 Physical Planning Act, 2020 and the Physical Planning (Amendment) Act 2020

This Act replaced the Town and Country Planning Act, Cap 246 which was enacted in 1951 and revised in 1964 but is now inconsistent with contemporary government system in Uganda. The 1951 Act was enacted to regulate and operate in a centralised system of governance where physical planning was carried out at national level through the Town and Country Planning Board. Implementation of the Act was supervised by local governments, especially the urban local governments. Uganda has since gone through many social, political and economic changes.

The infrastructural developments are likely to traverse areas of special characteristics. The areas have special physical, social economic and development potential and considerations. Section 3 of the Physical Planning Act 2010 declares the whole country a planning area and brings it under the planning control. Provisions under the Act will have to be invoked by the mandated institutions to control developments in urban and rural areas in the proximities of the proposed Bridge and access routes to control unplanned developments. Section 37 of The Physical Planning Act, 2010 requires an EIA permit for developments before they are implemented. It states: "Where a development application related to matters that require an environmental impact

assessment, the approving authority may grant preliminary approval subject to the applicant obtaining an EIA certificate in accordance with the National Environment Act”.

Section 2A of the Amendment provides a right to clean and health environment. And every Ugandan has a duty to create, maintain and enhance a well-planned environment. Any result of act or omission by any person likely to breach a physical development plan or physical planning standard report to relevant authorities or file a civil suit against any person whose act or omission has breached or likely to breach a physical development plan or physical planning standard.

NWSC shall use established guidelines for planning schemes, to acquire land and compensate for acquired lands, as well as safeguarding the natural environment, in line with the provisions of this Act. This ESIA is being conducted in fulfilment of Section 37 of the Act. The project designs will incorporate the long-term district plans.

5.3.12 Children Act, Cap 59

The Act provides for the reform and consolidation of the law relating to children; to provide for the care, protection and maintenance of children; to provide for local authority support for children; to establish a family and children court; to make provision for children charged with offences and for other connected purposes. Part I section 5 states that: (1) it shall be the duty of a parent, guardian or any person having custody of a child to maintain that child and, in particular, that duty gives a child the right to - education and guidance; immunisation; adequate diet; clothing; shelter; and medical attention; and (2) any person having custody of a child shall protect the child from discrimination, violence, abuse and neglect. Part I, Section 8 protects children against harmful employment. No child shall be employed or engaged in any activity that may be harmful to his or her health, education or mental, physical or moral development.

During the construction and operation phases child labour must not be used as required by this law.

5.3.13 Mining Act, Cap. 148 2003

Stone quarry sites and gravel borrow pits will be necessary for materials needed to construct the concrete works of the project components. Several auxiliary activities are associated with construction. Such activities especially stone quarrying involves excavations or working where any operations are connected with mining including erections and appliance used in connection with such operations. Therefore, applicable licenses shall be obtained from the Commissioner of the Geological Survey and Mines.

The Act regulates mining developments including set up of new quarries and/or sandpits. Requirements under Part XI for the Protection of the environment under the Act are therefore, relevant. Such requirements include EIA and EA standards for the prevention and minimization of pollution of the environment and waste management. Under section 110 (2b) gives guidance on restoration activities. It provides that the environmental restoration plan shall include a detailed timetable for accomplishment of each major step to be carried out under the restoration plan which may include reinstatement, levelling, re-vegetation, reforestation and contouring of disturbed land, the filling in, sealing, or fencing off of excavations, shafts and tunnels.

This Act will apply to the project's contractors who will be required to obtain license for extraction of stone/ aggregate and murram materials required for construction. The project should ensure that relevant assessment/ studies are conducted for all auxiliary sites and will be restored basing on the guidance on restoration activities.

5.3.14 National Water and Sewerage Corporation Statute, 1995

Section 3 of this statute, states that the NWSC shall operate and provide water and sewerage services in areas entrusted to it under the Water Statute of 1995.

Some of the functions that are mentioned in the NWSC Statute include (a) management of water resources in ways which are beneficial to the people of Uganda (b) provision of water and sewerage services (c) development of water and sewerage systems in urban centres and big National Institutions throughout the country. NWSC is therefore fulfilling one of its mandates to supply water to the Adjumani District.

5.3.15 Historical Monuments Act, Cap. 146 1967

This Act was assented to on 21st October 1967, and came into force on 15th May 1968. It provides for preservation and protection of historical monuments and objects of archaeological, paleontological, ethnographical and traditional interest. The act, Cap 146 gives mandate to the Department of Museums and Monuments in the ministry of Tourism Wildlife and Antiquities to collect document and preserve cultural relics that have values to the community, the nation and the international community. The responsible Minister may, by statutory instrument, declare any object of archaeological, paleontological, ethnographical, traditional or historical interest to be a protected object. Once thus declared, the Act adds, no person whether owner or not shall do any of the following:

- Excavate soil so as to affect to its detriment, any object declared to be preserved or protected.
- Make alteration, addition to, or repair, destroy, deface or injure any object declared to be preserved or protected.

Sub-section 12(1) requires that any portable object discovered in the course of an excavation shall be surrendered to the Minister who shall deposit it in the Museum. The Act adds that, notwithstanding provisions of the subsection, where any object is discovered in a protected site, place, or monument, the owner of the protected site, place, or monument shall be entitled to reasonable compensation.

This Act requires that any chance finds encountered during project construction shall be preserved by the Department of Monuments and Museum in the Ministry of Tourism, Wildlife and Heritage. A Chance Finds Procedure has been attached to this report (Annex 5) to guide NWSC and the Contractor in fulfilling the requirement of this Act and it shall be adopted and implemented in case of any Chance Finds during the works on the project.

5.3.16 Rivers Act, Cap 357

Section 4 of this Act requires that any dredging in a river be licensed. It states that it shall not be lawful to dredge in any river without a license from the Minister. Section 6(1) stipulates that the

Regulations set forth in the Third Schedule of this Act shall be endorsed on every license to dredge.

NWSC should acquire the dredging license before the implementation of the proposed raw water intake and all river related activities should be carried in accordance with the provisions of this Act.

5.3.17 Traffic Act, 2002

The traffic Act 2002 consolidates law relating to traffic on all public roads. The Act also prohibits encroachment on and damage to roads including road reserves. However, most of the transmission pipelines will move along the UNRA road reserves, most roads will be temporarily cut off by the excavation activities, among others.

During the construction phase of the project, temporary road signs shall be installed following an approved traffic management plan.

5.3.18 Petroleum (Refining, Conversion, Transmission and Midstream Storage) Act, 2013

The Act enables the development of refining, gas conversion, pipelines, transmission pipelines and midstream storage. Under Section 3 of the Act, a licensee and any person who exercises or performs functions, duties or powers under the Act in relation to midstream operations is required to take into account and comply with environmental principles as prescribed by the National Environment Act and other applicable laws.

The proposed project requires a fuel storage facility to run the machinery and equipment.

5.3.19 Workers' Compensation Act Cap. 225, 2000

The Workman's Compensation Act outlines responsibilities and obligations for both parties (employer and employee) in guaranteeing the safety and health of the workers. This law requires that, compensation be paid to a worker who has been injured or acquired an occupational disease or harmed in any way in the course of his work. In case of injuries during construction of the proposed Adjumani WSSS infrastructure, the worker's compensation act will guide the compensation in case of legal pursuit.

It is mandatory for NWSC (employers)/contractor to have in place a workers' compensation insurance policy.

5.3.20 Labour (Dispute/Arbitration and Settlement) Act, 2000

The Act amongst others, makes provision for referring dispute to the industrial court subject to discretion of the labour officer and circumstances of the agreement or disagreement.

Labour officers shall be engaged during the project implementation in sensitizing and resolving any resulting labour disputes.

5.3.21 National Social Security Fund (Amendment) Act, 2022

The Act provides for the establishment of a NSSF and to provide for its membership, the payment of contributions to, and the payment of benefits out of, the fund and for other purposes connected therewith.

NWSC/contractor will ensure that all employees are registered under NSSF to and contribute to their savings.

5.3.22 National Climate Change Act, 2021

The Act gives the force of law in Uganda to the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement; provides for climate change response measures; provides for participation in climate change mechanisms; provides for measuring of emission, reporting and verification of information; provides for institutional arrangements for coordinating and implementing climate change response measures; provides for financing for climate change; and for related matters.

The project design needs to ensure measures are put in place to manage the effects of climate change. When the District Climate Action Plan is developed, implementation activities will have to ensure alignment.

5.3.23 Uganda Wildlife Act, 2019

In order to support sustainable utilization of wildlife for the benefit of the people of Uganda, the purpose of the Act among others is to provide for the conservation of wildlife throughout Uganda so that the abundance and diversity of their species are maintained at optimum levels commensurate with other forms of land use. The project is located on River Nile where there are chances of aquatic animals like Hippos and crocodiles showing up. Otze Forest White Rhino Sanctuary (wildlife reserve) is located north of the project area at approximately 12 km from the nearest beneficiary area (Arra West) where water supply will be implemented. However, during stakeholder consultations there was no concerns raised related to human-wildlife conflicts in the latest past. In addition, the project shall take into consideration to prohibit any worker in possession of unauthorised wildlife meat or products.

Considering that some of the water pipes will go through remote section of the countryside involving clearing of vegetation, and excavation of land to create holes etc, this Act is quite relevant, and relevant provisions should be complied forthwith for project implementation.

5.3.24 Access to information Act 2005

The Act aims to promote an efficient, effective, transparent and accountable Government; give effect to article 41 of the Constitution by providing the right to access to information held by organs of the State, other than exempt records and information; protect persons disclosing evidence of contravention of the law, maladministration or corruption in Government bodies; promote transparency and accountability in all organs of the State by providing the public with timely, accessible and accurate information; and empower the public to effectively scrutinise and participate in Government decisions that affect them.

Section 5 of the Act highlights the right of access to information and records in the possession of the State or any public body, except where the release of the information is likely to prejudice the security or sovereignty of the State or interfere with the right to the privacy of any other person.

5.4 Regulations/Standards/Guidelines

5.4.1 Water Resources Regulations, No. 33/1998

Regulations have been made to implement the Water Act cap 152. The regulations apply to motorized water abstraction from boreholes or surface watercourses or diverting, impounding or using more than 400m³ of water within a period of 24 hours. Part II, Regulation 3 requires a water permit for operation of motorized water pump from a borehole or waterway. Under Regulation 6, application for permit may be granted on conditions of projected availability of water in the area, existing and projected quality of water in the area and any adverse effect which the facility may cause among other considerations. As such, the project shall acquire water abstraction permits in compliance with these regulations.

NWSC intends to construct an intake and abstract water from River Nile (Victoria Nile) and should therefore fulfil the requirements of these regulations. NWSC and the Contractor will apply to DWRM for permits for abstracting water from River Nile. The same should be done to abide by provisions of this law in regard to drilling and operation of all production wells (boreholes) proposed in different locations in Adjumani.

5.4.2 The National Environment (Environmental and Social Assessment) Regulations, S.I No.143 of 2020

The regulations provide a framework within which ESIA for projects are undertaken. It also emphasises that an environmental and social impact study for relevant projects be undertaken in accordance with section 113 of the National Environment Act and Schedule 5 of the same Act. The regulations emphasise the adoption of the mitigation hierarchy during project planning. The regulations also introduce penalties for noncompliance to the Act.

This ESIA has been prepared in compliance with these regulations.

5.4.3 National Environment (Waste Management) Regulations S.I. No. 49 of 2020

These regulations categorise the different types of waste including hazardous waste. The regulations provide that only licensed handlers can collect, store, transport and dispose of hazardous waste. An adequate waste management plan for the project shall be developed and implemented in conformance with these regulations. More so, a licensed handler shall be procured to handle any hazardous waste generated by the project activities. The practices emphasised under these regulations are aimed at preventing the contamination of water, air, soil and other components of the environment.

The regulations promote cleaner production methods that enable the recovery and reuse of wastes, reclamation and recycling. Further the regulations would influence management of solid waste at workers' camps, equipment yards and construction site.

5.4.4 National Environment (Wetlands, River Banks and Lakeshores Management) Regulations S.I No. 2/2000

These regulations provide principles for sustainable use and conservation of wetlands, and riverbanks. The regulations provide for; Mandatory ESIA for all major activities on riverbanks and lakeshores, and Development and implementation of measures to prevent soil erosion, siltation and water pollution. Regulation 12(1) prohibits any person from carrying out an activity in a wetland without a permit issued by the Executive Director (ED) of NEMA. Under regulation 34(1), a developer desiring to conduct a project which may have significant impact on a wetland (for example dredging), river bank or lake shore, shall be required to carry out an environmental impact assessment in accordance with sections 20, 21, and 22 of the NES.

In Regulation 17 (1), every landowner, occupier or user who is adjacent or contiguous with a wetland shall have a duty to prevent the degradation or destruction of the wetland and shall maintain the ecological and other functions of the wetland. The tool used under these Regulations to ensure compliance is the permit. The ED of NEMA can only permit activities in a wetland if he or she is satisfied that such activities shall not degrade the wetland in question.

These regulations are important considering the major river of Albert Nile. Prior to any works at River Nile, NWSC will seek permission from the Executive Director of NEMA, as provided for in these Regulations. A soil erosion control plan shall be developed and implemented during construction of the intake and pumping station.

5.4.5 National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 2020

These regulations require that a permit is acquired before a developer discharges waste water into water bodies or on land. Maximum permissible levels for discharge of wastewater have been provided under Schedules 2, 3 and 4 of these regulations as shown in Table 5-1 to Table 5-3.

[Table 5-1: Standards for general chemicals and microbiological effluent discharge \(Schedule 2\)](#)

Parameter or pollutant	Unit	Maximum Permissible Limit
Temperature increase	°C	≤5
Odour		Not detectable
Color	TCU	50
pH	Units	5.0 -8.5
Electrical Conductivity	μS/cm	1000
Total Dissolved Solids	mg/L	750
Total Suspended Solids	mg/L	50
Biological Oxygen Demand ₅ (Unfiltered)	mg/L	50
Chemical Oxygen Demand	mg/L	70
Cyanide (Free)	mg/L	0.1
Cyanide (AD)	mg/L	0.5
Cyanide (Total)	mg/L	0.1
Nitrogen (Total)	mg/L	10
Nitrogen (Ammonia)	mg/L	10
Nitrogen (Nitrates)	mg/L	10
Total Kjeldahl Nitrogen	mg/L	10
Phosphorus (Total)	mg/L	5
Sulphates	mg/L	500
Chlorides	mg/L	250
Chlorine (Residual)	mg/L	0.2
Total Coliforms	CFU/100ml	400
Fluorides	mg/L	2
Sulphides	mg/L	1
Urea	mg/L	1

Table 5-2: Standards for inorganic substances effluent discharge (Schedule 3)

Parameter or pollutant	Units	Maximum permissible Limit
Aluminium	mg/L	0.5
Antimony	mg/L	0.5
Arsenic	mg/L	0.1
Barium	mg/L	10
Beryllium	mg/L	0.1
Cadmium	mg/L	0.01
Calcium	mg/L	100
Chromium (Hexavalent)	mg/L	0.05
Chromium (Total)	mg/L	0.5
Cobalt	mg/L	0.1
Copper	mg/L	0.5
Iron (Total)	mg/L	3.5
Lead	mg/L	0.1
Magnesium	mg/L	100
Manganese	mg/L	1
Mercury	mg/L	0.01
Nickel	mg/L	0.5
Selenium	mg/L	0.02
Silver	mg/L	0.5
Tin	mg/L	2
Total Metal	mg/L	10
Vanadium	mg/L	1
Zinc	mg/L	2

Table 5-3: Standards for organic substances effluent discharge (Schedule 4)

Parameters	Units	Maximum Permissible Limit
Active ingredients (each)	mg/L	0.05
Adsorbable Organic Halides	mg/L	0.5
Benzene	mg/L	0.05
Benzo (a) pyrene	mg/L	0.05
Detergents	mg/L	15
Dioxins/Furans (Total)	mg/L	0.00005
Ethylbenzene	mg/L	0.05
Fats Oils & Grease	mg/L	10
Nitro organic Compounds (each)	mg/L	0.05
Organochlorine pesticides each)	mg/L	0.05
Organophosphorus pesticides (each)	mg/L	0.05
Phenols	mg/L	0.5
Phenoxy Compounds (each)	mg/L	0.05
Polycyclic Aromatic Hydrocarbons (each)	mg/L	0.05
Pyrethroids (each)	mg/L	0.05
Toluene	mg/L	0.05L
Total chlorocarbons	mg/L	0.05
Total Hydrocarbons	mg/L	0.05
Total Organic Carbon	mg/L	50
Trichloroethane	mg/L	0.05
Trichloroethylene	mg/L	0.05
Vinyl Chloride	mg/L	0.05
Xylene	mg/L	0.05

Source: The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 2020.

Effluent discharged from the water treatment works should conform to these regulations. Since the project is funded by World Bank, the one that is more stringent, that is, Uganda regulations or IFC/WB General EHS Guidelines will dominate. NWSC and the Contractor for this project will apply to DWD for permits for discharging effluents from the WTP and construction activities, respectively, to the environment.

5.4.6 Water Supply Regulations, 1999

The Water Supply Regulations, 1999 manage the water supply works including:

- a) Permits requirements and procedures for water supply works by authority or connection to land owner (Division 1, clauses 4 to 6);
- b) Application, examination and approval of Water supply plan (Division 2, clauses 7 to 11);
- c) Cost of works, security deposit, inspection of works and penalty for violation (Division 2, clauses 12 to 18);
- d) Metering system and charging rates (Part III, clauses 19 to 21).

5.4.7 National Environment (Noise Standards and Control) Regulations, 2003

Part III Section 8 (1) requires machinery operators, to use the best practicable means to ensure that the emission of noise does not exceed the permissible noise levels. The regulations require that persons to be exposed to occupational noise exceeding 85 dBA for 8 hours should be provided with requisite ear protection. The regulatory noise limits at construction sites are presented in Table 5-4, Table 5-5 and Table 5-6.

The standards for noise control applicable to the proposed activities include:

- a) The maximum permissible noise levels from a facility in the general environment to which a person may be exposed: As prescribed under Regulation 6 (1) of the Noise Standards and Control Regulations, the limits apply to facilities and receptors which are not located within designated noise control zones but are nevertheless likely to receive noise emissions.
- b) The maximum noise levels of continuous or intermittent noise from a factory or a workshop to which a person may be exposed
- c) The limits may apply to workshops that could be used during execution of the proposed activities, for instance, at the asphalt plant.

Table 5-4: Acceptable noise limits Noise levels for the general environment

Facility	Noise Limits dB(A) (LAeq)	
	Day	Night
Construction sites	60	50
Mixed residential (with some commercial activities and entertainment)	55	45
Time frame: Day 6.00 a.m. – 10.00 pm; Night 10.00 pm – 6.00 a.m		

Table 5-5: Noise level guidelines for the general environment

Facility/Receptor	Noise limits dB (A) (Leq)	
	Daytime (07.00-22.00)	Night-time (22.00-07.00)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Time frame: as duration: Day: 6:00 a.m. - 10:00 p.m., Night: 10:00 p.m. - 6:00 a.m. The time frame takes into consideration human activities.

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

Table 5-6: Maximum Permissible Noise Levels (Continuous or Intermittent Noise Sources)

L _{Aeq} dB(A)	Duration (Daily)	Duration (Weekly)
85	8 hours	40 hours
88	4 hours	20 hours
91	2 hours	10 hours
94	1 hour	5 hours
97	30 minutes	2.5 hours
100	15 minutes	1.25 hours
103	7.5 minutes	37.5 minutes
106	3.75 minutes	18.75 minutes
109	1.875 minutes	9.375 minutes
Noise levels shall not exceed an L _{Aeq} of: Factory/Workshops 85dB(A), Offices 50 dB(A), Factory/Workshops 75dB(A)		

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

Both during construction and operation of the water project, noise generated should not exceed limits prescribed by these regulations. The ESMP recommends that vibrations, noise and movement of heavy machinery should be limited and monitored during construction, and where possible provide for vibration and noise proof or muzzling of all machines and power generators used at site.

5.4.8 Draft National Air Quality Standards, 2006

Considering that construction equipment and machinery are powered by diesel/ gasoline engines, pollutants such as CO₂, NO_x, SO_x, VOC and particulates are expected to be emitted. The draft national air quality standards provide the regulatory limits for these emissions as in Table 5-7. These standards shall be observed at worksites including equipment yards and workers' camps to ensure minimal impact on local air quality. The draft national air quality standards provide the following regulatory limits (Table 5-7).

Table 5-7: National regulatory air quality standards

Pollutants	Averaging time for ambient air	Standard for ambient air
Carbon dioxide (CO ₂)	8 hr	9.0 ppm
Carbon monoxide (CO)	8 hr	9.0 ppm

Hydrocarbons	24 hr	5 mgm ⁻³
Nitrogen oxides (NO _x)	24 hr 1-year arithmetic mean	0.10 ppm
Smoke	Not to exceed 5 minutes in any one hour	Ringelmann scale No.2 or 40% observed at 6m or more
Soot	24 hr	500 µg/Nm ⁻³
Sulphur dioxide (SO ₂)	24 hr	0.15 ppm
Sulphur trioxide (SO ₃)	24 hr	200 µg/Nm ⁻³

ppm = parts per million; “N” in µg/Nm⁻³ connotes normal atmospheric conditions of pressure and temperature (25°C and 1 atmosphere).

Source: Draft National Standards for air and noise pollution control; NEMA, 2019

These standards will apply particularly during construction of all project components. There should be a justification for applying a less stringent limit value, or in the absence of an acceptable justification, the WB EHS guidelines will apply.

5.4.9 National Environment (Audit) Regulations, 2020

The National Environment (Audit) Regulations operationalizes the National Environment Act 2019 which defines an “environmental audit” as the systematic, documented, periodic and objective evaluation of how well environmental organisation, management and equipment are performing in conserving the environment and its resources. Section 12 (1) of regulation, states, “The developer of a project or activity listed in Schedule 3 to these Regulations shall carry out an environmental compliance audit”. Section 12(3) states, “The environmental compliance audit referred to in sub-regulation (1) shall be undertaken annually, unless otherwise required by the Authority”.

The project will involve construction and operation of water supply facilities that may indirectly have a negative impact on the environment. The contractor is expected to elaborate the EMS in his construction environment and social management plan (C-ESMP). The EMS must contain an ESHS policy, management structure, roles and responsibilities and a budget for C-ESMP implementation. For all new materials sites to be established for the project, NEMA approval must be secured while all existing sites should undertake/provide proof of having undertaken environmental compliance audits. NWSC will take the responsibility to fulfil the requirements for an environmental and social audit, not less than 12 nor more than 36 months after project completion or commencement of operations respectively. The project will be audited by a NEMA registered Environmental Auditor.

5.4.10 Uganda National Roads Authority (General) Regulations, 2017

The purpose of these Regulations is to provide for a) clear and transparent framework for the use of national roads, road reserves and ferry landing facilities; b) the installation of traffic control devices; c) the carrying out of activities on national roads; d) including the temporary use of the roads, road reserves and ferry landing facilities for social, economic and political activities; e) the

keeping by the Authority of an up-to-date register of usage of road reserves; and f) the requirements and obligations of contractors.

6. Prevention of obstruction: (1) The Authority shall regulate any activity undertaken along a national road, road reserve or ferry landing facility; (2) A person who intends to undertake an activity on a national road, road reserve or ferry landing facility shall obtain a permit from the Authority.

7. Erection of structures and other works on, near, under or above a national road, road reserve or ferry landing facility. (1) A person shall not, except with the written approval of the Authority - (a) erect, construct or lay anything on, near, under or above a national road, road reserve or ferry landing facility.

Most of the transmission line will be constructed in the road reserve of the Atiak – Laropi National Road (currently under construction to bitumen level) hence NWSC has to make the necessary arrangements with UNRA in order to facilitate the planned activities.

5.4.11 National Environment (Control of Smoking in Public Places) Regulations, 2004

Regulations require that public smoking be avoided. Second-hand smoke (SHS) is a complex mixture of more than 4,800 chemical compounds, including 69 known carcinogens. The World Health Organization (WHO) indicates that, exposure to tobacco smoke causes disease, disability and death. According WHO, SHS is a human carcinogen for which there is no “safe” exposure level. The construction site is considered place and thus smoking shall be prohibited at all times.

These regulations should apply to areas communally used by construction workers such as site offices, eating areas in camps and workers transport vehicles. Requirements of these regulations should be fulfilled to avoid exposure of workers to tobacco SHS and attendant health risks.

5.4.12 Water Source Protection Guidelines

The Water Sources Protection Guidelines for Point Source Water Supply systems describe steps to follow to prepare a Water Source Protection Plan. The Water Source Protection Guidelines should help the user identify the risk to a water source and to engage the people and organisations responsible for the problem in a positive way that leads to a mutually beneficial outcome. The Guidelines recommend that if there is evidence of industrial or agricultural pollution of the groundwater, then alert the District Water Officer and/or NEMA. If levels in the water are above WHO guidelines, then look for alternative water sources (rainwater harvesting, shallow wells, and springs). The Guidelines recommends the following in terms of location of water sources:

Locate the well or borehole at least a minimum distance away from potentially polluting activities:

- **Within 50m** (80m if downhill) from: latrines, open defecation, soak ways, septic tanks, graveyards, livestock pens/kraals, waste storage or dumping, livestock spaying/dipping, bathing or washing activities.
- **Within 250m**: No prescribed trades or premises, petrol filling stations, or fuel/oil/chemical storage tanks or depots.

If there are threats nearby, the Guidelines recommend getting water quality samples tested for prescribed substances and to make sure that the water meets the national rural water quality standards or WHO guidelines.

Table 5-8: Urban drinking water standards

Characteristic	Unit	US-201: 2008 Requirement	WHO 2011 Requirement
Colour	Hazen units, max. Pt scale	15	No Guideline
Odour		Acceptable to consumers and no abnormal changes	No Guideline
Taste		Acceptable to consumers and no abnormal changes	No Guideline
Turbidity	NTU	5	1
Dissolved Solids	mg/l	700	No Guideline
Suspended Solids	mg/l	0	No Guideline
Electrical Conductivity (EC)	µS/cm	1500	250
pH		6.5 – 8.5	6.5 – 8.5
Total Hardness (as CaCO ₃)	mg/l	500	No Guideline
Calcium (as Ca)	mg/l	75	No Guideline
Sodium (as Na)	mg/l	200	200
Magnesium	mg/l	50	No Guideline
Arsenic (as As)	mg/l	0.05	0.01
Copper (as Cu)	mg/l	1.0	2.0
Chloride (as Cl)	mg/l	250	250
Chromium (as Cr 6+)	mg/l	0.05	0.05
Fluoride (as F)	mg/l	1.0	1.5
Iron (as Fe)	mg/l	<0.30	No Guideline
Manganese (as Mn)	mg/l	0.1	0.1
Nitrates (as NO ₃)	mg/l	5	50 (Total Nitrogen)
Barium	mg/l	1.0	0.7
Aluminium (as Al)	mg/l	0.1	0.2
Sulphates	mg/l	200	250
Zinc (as Zn)	mg/l	5.0	3.0
Lead (as Pb)	mg/l	0.05	0.01
Selenium (as Se)	mg/l	0.01	0.01
Cadmium (as Cd)	mg/l	0.01	0.003
Mercury (as Hg)	mg/l	0.001	0.001
Cyanide	mg/l	0.01	0.07
Residual free chlorine	mg/l	0.2	0.2
Mineral oil	mg/l	0.01	No Guideline
Anionic detergents	mg/l	0.2	No Guideline

Source: (UNBS, 2008; WHO, 2011)

5.5 Standards for consultation

The public consultation was guided by Ugandan guidelines as well as WB Ops. Although no regulations exist for public consultation, national guidelines for EIA in Uganda require that the public is given full opportunity for involvement and participation throughout the EIA process. People including individuals, or groups of local communities who may be directly affected by a proposed project should be a focus for public involvement.

Since identification of the “public” likely to be indirectly affected by the proposed activity is often more difficult, it is required to exercise care in deciding who participates to ensure that a fair and balanced representation of views is obtained and views of minority groups are not overshadowed by more influential members of the public.

The public may appropriately be involved in the EIA process through:

- i. Informing them about the proposed project;
- ii. Open public meetings on the projects;
- iii. Inviting written comments on proposed project;
- iv. Use of community representatives;
- v. Comment and review of the Environmental Impact Statements; and,
- vi. Making relevant documents available to any interested members of the public in specified places or at the cost of reproduction.

Three stages for public involvement in the EIA process are spelt out:

a) Public consultation before EIA is done

If after receiving and screening/reviewing the developer’s project brief, the Authority (NEMA), in consultation with the Lead Agency, decides that it is necessary to consult and seek public comment, it shall, within four weeks from submission of the project brief and/or notice of intent to develop, publish the developer’s notification and other supporting documents or their summary in a public media. It is required that objections and comments from the public and other stakeholders shall be submitted to the Authority and to the Lead Agency within 21 days from the publication of notice.

b) Public consultation during the EIA

The team conducting the EIA shall consult and seek public opinion/views on social and environmental aspects of the project. Such public involvement shall be during scoping and any other appropriate stages during the conduct of the study.

c) Public consultation after EIA (EIA Review)

The EIS shall be a public document and may be inspected at any reasonable time by any person. Considering the scale and level of influences likely to result from the operation of a project, the Authority, in consultation with the Lead agency, shall decide regions where it is necessary to display the EIA report to the general public.

5.6 World Bank (WB) Safeguard Policies

The Operational Policies/Safeguards provide basis on which the World Bank screens proposed projects to determine the appropriate extent and type of Environmental Assessment to be undertaken. The World Bank by policy requires that every development activity is assessed for compliance to the borrower's and the Bank's set environmental and social safeguards Operational Policies (OPs) and regulatory framework. The objective of these OPs is to prevent and mitigate undue harm to people and their environment during the development process. These policies provide guidelines for bank and borrower staff in the identification, preparation, and implementation of programs and projects. Safeguard policies provide a platform for the participation of stakeholders in project design, and are an important instrument for building ownership among local populations (World Bank, 2006).

The project will comply with these policies by implementing measures that will be described in the ESMP and the government will ensure its application by the staff and contractors. These E&S Safeguards Policies standards are described in Table 5-9 below;

Table 5-9: World Bank Ops/BP

OP No.	World Bank Safeguards Operational Policies	Triggered and Not Triggered	Key provisions and Relevance
OP/BP 4.01	Environmental Assessment	Yes	<p>During construction there will be vegetation clearance, excavations, vehicular movement of construction materials which are likely to cause noise, dust, vibrations, accidents, influx of immigrant labour, child abuse, land take etc. During operation the use of chemicals like Chlorine and Alum are likely to have an impact on the environment and may affect workers causing occupational hazards. The disposal of backwash water and water treatment sludge facilitate are likely to cause environment and social impacts.</p> <p>Additionally, the project is likely to have other auxiliary components which will equally necessitate to be subject to independent ESIAs e.g., quarries, camps, batching plants among others.</p> <p>The project triggers this policy because although there is justification for the proposed water supply infrastructure in the project districts, there are also environmental impacts associated with the construction and operation of these facilities. The proposed project is classified as EA Category B since its impact on the human populations and other important areas including wetlands/buffer and other natural habitats is less adverse as proposed project activities will be restricted within the user-communities.</p> <p>This is the umbrella policy for the World Bank's safeguard policies and requires an EIA carried out before implementation of category A and B projects. OP 4.01 requires an Environmental Assessment (EA) of projects proposed for WB financing to ensure that they are environmentally sound and sustainable, and thus to improve decision making. In this regard, a comprehensive ESIA has been undertaken by the proponent (NWSC) to establish a detailed Environmental Management Plan (EMP) that will</p>

OP No.	World Bank Safeguards Operational Policies	Triggered and Not Triggered	Key provisions and Relevance
			<p>provide guidelines for environmental stewardship of the construction and operational phases of the Project.</p> <p>The assessment demonstrates how the project will comply with all applicable rules and guidelines, including: (i) all triggered World Bank Safeguard Policies; (ii) relevant WB Group Environmental, Health and Safety Guidelines (EHSGs); and (iii) Uganda National Environment Management Authority's (NEMA) Guidelines for Environmental Impact Assessment and National Environment Act 2019.</p>
OP 4.04	Natural Habitats	Yes	<p>This OP seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Bank-supported project can damage natural habitats (land and water areas where most of the native plant and animal species are still present). Therefore, the OP supports the protection, maintenance, and rehabilitation of natural habitats and their functions. The conservation of natural habitats is essential for long term sustainable development.</p> <p>OP 4.04 is triggered as implementation of some project activities will involve use of some ecosystem areas such wetlands and buffers of the Nile thereby triggering this safeguards policy. The raw water intake and pumping station will be positioned in the R. Nile and in the buffers respectively. However, the project activities will have limited potential to trigger this policy as most of the areas in the project area are highly disturbed by agricultural and commercial activities.</p> <p>This project has been designed to minimize any adverse impacts on natural habitats as a result of Water Supply System development while strengthening the management of vulnerable catchment areas. Therefore,</p>

OP No.	World Bank Safeguards Operational Policies	Triggered and Not Triggered	Key provisions and Relevance
			impacts of the project on such habitats will be mitigated through measures outlined in this ESIA (ESMP).
OP/BP 4.36	Forests	No	<p>The World Bank's forests policy aims to reduce deforestation, enhance the environmental contribution of forested areas, promote reforestation, reduce poverty, and encourage economic development. Combating deforestation and promoting sustainable forest conservation and management have been high on the international agenda for two decades. However, little has been achieved so far and the world's forests and forest dependent people continue to experience unacceptably high rates of forest loss and degradation. Success in establishing sustainable forest conservation and management practices depends not only on changing the behaviour of all critical stakeholders, but also on a wide range of partnerships to accomplish what no country, government agency, donor, or interest group can do alone.</p> <p>Therefore, the objective of this policy is to assist borrowers to harness the potential of forests in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services.</p> <p>OP 4.36 is not be triggered because there are no Forest Reserves in the project area hence no need for a Forest Management Plan. 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. Most of the project areas are highly disturbed by agricultural and commercial activities.</p>
OP 4.09	Pest Management	No	The Adjumani WSSP aims at increasing access to safe water in the project area and has no agricultural that is likely bring problems of pests and diseases which will necessitate use of agro-chemicals. Therefore, the OP is

OP No.	World Bank Safeguards Operational Policies	Triggered and Not Triggered	Key provisions and Relevance
			not triggered and does not necessitate inclusion of a Pest Management Plan.
OP 4.10	Indigenous People	No	This safeguard is not triggered and therefore not considered under the Adjumani WSSP since there are no Indigenous people in the project area.
OP/BP 4.11	Physical Cultural Resources (PCRs)	Yes	<p>Cultural resources e.g like graves, shrines, etc; are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The loss of such resources is irreversible, but fortunately, it is often avoidable. The objective of OP/BP 4.11 on PCRs is to avoid, or mitigate, adverse impacts on cultural resources from development projects that the World Bank finances.</p> <p>The activities of the project trigger this policy as there are two graves encountered along the proposed distribution line in Marindi Central Village, Pacara Subcounty in the project area. Fortunately, there are no PCRs along the proposed water transmission. The RAP studies have been carried out on these graves and enumerated as structures and the affected PAP identified. A change in the alignment design of the proposed distribution line in Marindi Central Village has been proposed to use the opposite side of the road so as to minimise the impact on the PCRs</p> <p>Nevertheless, chance finds of archaeological / paleontological value could be encountered during construction especially while trenching channels for the water transmission pipes. Hence there is a possibility this safeguard may be triggered by the project. A detailed procedural guideline in the CFP developed shall be considered in the event that previously unknown heritage resources are exposed or found during the life of the project. The Chance Finds Procedure (CFP) to provide guidance on handling and management of any</p>

OP No.	World Bank Safeguards Operational Policies	Triggered and Not Triggered	Key provisions and Relevance
			PCRs that may be encountered during civil/earth works, is presented in Annex 5.
OP/BP 4.12	Involuntary Resettlement	Yes	<p>This policy is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts. It promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement. OP 4.12 prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects.</p> <p>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.</p> <p>OP 4.12 is triggered due to land take for the raw water intake, WTP, MBR, ESRs, pipelines, and borehole sites and incase of any auxiliary facilities.</p> <p>Therefore, this report conforms to the WB policy requirement on contents and structure. A separate Resettlement Action Plan (RAP) has been prepared as part of safeguards study in this project.</p>
OP 7.50	Projects on International Waterways	Yes	This policy recognizes the importance of cooperation and good will of riparians as essential for the efficient utilization and protection of international waterways and attaches great importance to riparian's making

OP No.	World Bank Safeguards Operational Policies	Triggered and Not Triggered	Key provisions and Relevance
			<p>appropriate agreements or arrangement for the entire waterway or any part thereof. Projects that trigger this policy include hydroelectric, irrigation, flood control, navigation, drainage, water and sewerage, industrial, and similar projects that involve the use or potential pollution of international waterways. This policy relates to the relations between the riparian states. In the absence of such agreements or arrangements, the Bank requires, as a general rule, that the prospective borrower notifies the other riparian of the project. The policy lays down detailed procedures for the notification requirement, including the role of the Bank in affecting the notification, period of reply and the procedures in case there is an objection by one of the riparians to the project. The policy applies to any river, canal, lake, or similar body of water that forms a boundary between, or any river or body of surface water that flows through, two or more states, whether World Bank members or not. It also includes any tributary or other body of surface water any bay, gulf, strait, or channel bounded by two or more states or, if within one state, recognized as a necessary channel of communication between the open sea and other states and any river flowing into such waters. The policy recognizes prior riparian states agreements/arrangements such as the Nile Basin which the project falls under. The policy also calls for notification of riparian states by parties that proposes to undertake project that affects international waters.</p> <p>The policy is triggered since water intake is located on the Albert Nile (River Nile) which is a transboundary river feeding to the Mediterranean Sea. In accordance with OP/BP 7.50, all riparian states should be notified on behalf of Government of Uganda and the Regional Vice President (RVP) cleared the project. However, it is not anticipated that the project will cause appreciable harm to any of the riparian through water deprivation, pollution or otherwise. Neither is it anticipated that the</p>

OP No.	World Bank Safeguards Operational Policies	Triggered and Not Triggered	Key provisions and Relevance
			implementation of project activities will adversely change the overall quantity or quality of water flowing to or from any of the riparian of the concerned international waterways (World Bank, 2018).
OP/BP 7.60	Projects in Disputed Areas	No	The planned Adjumani WSS project will not be implemented in disputed areas; hence this safeguards policy is not triggered.
OP/BP 4.37	Dam Safety	No	<p>The safe operation of dams has significant social, economic, and environmental relevance. When the World Bank finances new dams, OP 4.37: Safety on Dams requires that experienced and competent professionals design and supervise construction, and that dam safety measures are adopted and implemented through the project cycle. In addition to new dams, this policy also applies to existing dams where they influence the performance of a project.</p> <p>This policy is not triggered as the project will not in any way establish a new dam or rely on the performance of existing dams along the Nile. The proposed site for the intake structure is located about 40 km from the nearby Karuma dam.</p>
	World Bank Policy on Access to Information (2015)	Yes	This policy will be triggered since there is need for policy on disclosure of information to all the stakeholders. Compliance has been ensured by sharing the information with all the stakeholders such as district technocrats, Town Council/Municipal and Local council leaders, and communities among others during the consultations process. Information will remain accessible by them.

5.6.1 Gap Analysis Between the Key World Bank Safeguard Policies and Government of Uganda's Environmental and Social Requirements

This gap analysis has been adopted and updated from the IWMDP ESMF (2018) and Uganda Climate Smart Sgricultural Project ESMF (2022). The platform upon which Uganda's country system has been built is the Constitution, which commits government to protecting natural

resources on behalf of the people. It explicitly encompasses the concept of sustainability, including meeting the needs of present and future generations. The State is also committed to preventing or minimising environmental damage and upholding the right of “every Ugandan to a clean and healthy environment”. This represents the highest-level commitment to sustainability. The NEA 2019 is the key legislation for environmental (and to a lesser extent, social) risk management.

From an environmental perspective, Uganda’s institutions have well-enough defined mandates and adequate enabling legislation, albeit with some gaps, overlaps and weaknesses. For the most part, policies, laws, regulations, and guidelines are adequately aligned with regards to the World Bank Environmental and Social Safeguards Policies, especially given that the National Environment Act 2019 (NEA 2019) has been revised and significantly improved, and that new Environmental and Social Impact Assessment (ESIA) regulations have been revised following Good International Industry Practice, with participation of the World Bank.

It is worth noting that environmental management in Uganda has been largely supported by the World Bank, right from the development of the National Environment Management Policy in 1994, the National Environment Act in 1995 (updated in 2019) and the accompanying Regulations, including the establishment of NEMA. Owing to this, most of the environmental requirements are largely influenced by the World Bank’s Environmental and Social Safeguard Policies. Most of the provisions of OP 4.01 were adopted and as such the E&S screening and assessment methodology is virtually the same as seen in the Uganda’s EIA Guidelines of 1997 and Regulations 2020. *Therefore, in cases where gaps are found between the WB E&S Safeguards Policies and the Government of Uganda environmental requirements, the World Bank Safeguard Policies shall take precedence especially on matters which are not explicitly provided in the national legislation requirements.*

Some of the differences include the following: the Ugandan Laws do not provide for Framework Approach (ESMF and RPF) but rather only specific instruments (ESIA, ESMP, Environmental Audits, RAPs). Whilst Uganda’s ESIA systems are relatively strong on biophysical considerations, they are weaker regarding assessment of social and related issues. Whereas the WB Policies provide for independent review mechanism (the Inspection Panel), there is no explicit requirement for independent review of ESIA reports under Uganda’s laws, though the ESIA Regulations (2020) provide for a reference to relevant experts who may be consulted to provide specialist knowledge and to assist with understanding and interpreting technical aspects of the project. Furthermore, there is no applicable legislation on a minimum wage. Aspects of the Employment Act contradict other Ugandan laws, by allowing for the employment of children aged 14 for “light work” under adult supervision, in contradiction to Section 7 of the Children (Amendment) Act (2016) which sets the employment age at 16. The Employment Act does not clearly define hazardous employment. The legal framework also fails to provide penalties for the violation of laws prohibiting the employment of minors, contributing to high school drop-out rates, teenage pregnancies, and health issues as children find work on project sites.⁹

⁹ Uganda Social Risk Management (SRM) Technical Paper (2019)

Under OP 4.04 Natural Resources, Uganda lacks Regulations to implement the National Forestry and Tree Planting Act and the Wildlife Act. Therefore, OP 4.04 and OP 4.36 on Forests shall be used to assess any impacts on natural habitats. On OP 4.11 Physical Cultural Resources, the Ugandan legal framework is limited in scope. For example, it does not cover certain aspects such as the intangible heritage. The other area is under OP 4.12 (Involuntary Resettlement) whereby Uganda's Land Act legal framework is restricted to fair, adequate and prompt compensation (cash), while the World Bank policy requires the need to provide alternative land, resettling the Project Affected Persons (PAPs) to levels or standards of livelihood similar to or better than before compensation. The Ugandan legislation also does not provide for restoration of livelihoods, resettlement assistance and compensation at replacement value. Under circumstances like these regarding short-comings in the Uganda law on compensation and ESMF process, the provisions of OP 4.12 shall be applied.

The existing gaps are summarized in Table 5-10 below:

Table 5-10: Summary of Gap Analysis between Uganda and World Bank Safeguards

World Bank's Safeguard Policies	Uganda's Legal and Regulatory Framework	Gaps identified in Uganda legal and regulatory framework
Environmental Assessment (OP 4.01)	<ul style="list-style-type: none"> National Environment Management Policy, 1994. National Environment Act No.5 of 2019. National Environment (Environmental and Social Assessment) Regulations, 2020. 	<ul style="list-style-type: none"> Independent review is not specifically provided for under ESIA Regulations of Uganda and as a result, the review of ESIA is commonly reviewed by government agencies; In the EIA review process, there is no specific legal/regulatory framework that caters for examination of the quality of the ESIA reports. Only conditions of approval/reasons for non-approval of ESIA are provided by NEMA; There are no administrative mechanisms for appealing a decision taken on an EIA.
Natural Habitats (OP 4.04) and Forests (OP 4.36)	<ul style="list-style-type: none"> The Constitution 1995 as amended; the National Environment Act No.5 of 2019; The National Forestry and Tree Planting Act, 2003; The Uganda Wildlife Act 2019; The Land Act Cap 227; The Fish Act Cap 197; The Plant Protection Act Cap 31. 	There are general gaps which include lack of Regulations to implement the National Forestry and Tree Planting Act and the Wildlife Act.

Physical Resources (OP 4.11)	Cultural	<ul style="list-style-type: none"> The Constitution 1995 as amended The National Environment Act, 2019 The Historical Monuments Act, Cap 46 The Institution of Traditional or Cultural Leaders Act, 2011 	<ul style="list-style-type: none"> The legal framework is limited in scope. For example, it does not cover certain aspects such as the intangible heritage; There is no strong institution to regulate and manage heritage resources; The sites and monuments are not adequately maintained, documented and in addition, some of the antiquities are not collected; There is limited enforcement of the legal framework related to Physical Cultural Resources in Uganda because most developers and government officials do not understand the importance of conserving physical cultural resources.
<p>The current Historical Monuments Act is being reviewed to provide for an efficient law for the protection of the cultural resources of the country. The new law shall be inclusive of all aspects of culture, the tangible, intangible heritage of the country. The revised Environmental and Social Impact Assessment Regulations provide that risk assessment should include risks to cultural heritage.</p>			

Table 5-11: Gaps between World Bank and Ugandan legislation applicable to OP 4.12 Involuntary Resettlement

(Adopted from the Uganda Climate Smart Agricultural Project-RPF)

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
Land Owners	<p>The Constitution of Uganda, 1995 recognizes four distinct land tenure systems, Customary tenure, Freehold tenure, Leasehold tenure and Mailo land tenure.</p> <p>Land is valued at open market value and a 15% to 30% disturbance allowance must be paid if six months or less notice is given to the owner.</p> <p>Cash compensation is the recommended option.</p>	<p>World Bank Policy recognises the rights of those affected people:</p> <ul style="list-style-type: none"> Who have formal legal rights to the land or assets they occupy or use. Who do not have formal legal rights to land or assets, but have a claim to land that is recognized or recognizable under national law. 	<p>The Ugandan law does not compensate those without legal right or claim to the land.</p> <p>WB OP 4.12 does not consider disturbance allowance.</p> <p>Uganda laws and the WB OP 4.12 are consistent in compensation at full</p>	<p>Alternative land (wherever available) or Cash compensation at full replacement value or (based on market value + 15% to 30% disturbance allowance).</p> <p>All forms of tenancy based on formal or informal rights.</p> <p>In kind compensation should be offered as an option to the PAPs where (alternative land is available for the PAPs).</p>

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
		<ul style="list-style-type: none"> Who have no recognizable legal right or claim to the land or assets they occupy or use. Compensation of lost assets at full replacement costs. Cash compensation is recommended where there are active land markets and livelihoods are not land based. 	replacement cost and cash compensation.	
Land Tenants	Leasehold tenure is created either by contract or by operation of the law. The landlord grants the tenants or lease exclusive possession of the land, usually for a period defined and in return for a rent. The tenant has security of tenure and a proprietary interest in the land. Cash compensation is based upon market value of land and disturbance allowance (15-30%). Entitled to compensation based upon the amount of rights they hold upon land.	Must be compensated, whatever the legal recognition of their occupancy.	The Ugandan law does not compensate those without legal right or claim to the land.	Land owners Compensate for land and all assets at full replacement cost or replacement of land at equal/ greater value and compensate for other assets. World Bank OP 4.12 does not recognize depreciated value for replacement of assets (which should be replaced at market value). Additionally, 15% disturbance allowance will be given to the PAPs on top of the compensation.
Land squatters	Leasehold tenure is created either by contract or by operation of the law. The landlord grants the tenants or lease exclusive possession of the land, usually for a period defined and in	Must be compensated, whatever the legal recognition of their occupancy	The Ugandan law does not compensate those without legal right or claim to the land.	Squatters are only entitled to compensation for the development on the land and ample time will be given to the PAPs to harvest their crops.

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
	return for a rent. The tenant has security of tenure and a proprietary interest in the land. Cash compensation is based upon market value of land and disturbance allowance (15-30%). Entitled to compensation based upon the amount of rights they hold upon land.			Additionally, 15% disturbance allowance will be given to the PAPs on top of the compensation.
Owners of non-permanent buildings such as kiosks, butchery shops, wooden shacks for food vendors etc.	Cash compensation based upon rates per m2 established at District level, disturbance allowance (15% or 30%).	Recommends in-kind compensation or cash compensation at full replacement cost. Recommends resettlement assistance.	OP 4.12 does not provide for the disturbance allowance. Ugandan law does not provide for resettlement assistance.	District compensation rates + 15% disturbance allowance. Cash compensation. Livelihood restoration, including identification of alternative sites.
Owners of permanent buildings.	Valuation based on replacement value and guidance from CGV & disturbance allowance (15% or 30%).	Compensation at full replacement cost.	The Ugandan laws are consistent with OP 4.12 in regard to replacement cost.	Cash Compensation at replacement value + 15% disturbance allowance.
Perennial Crops	Cash compensation based upon rates per m2/bush/tree/plant established at District Level and disturbance allowance (15% or 30%).	Compensation at full replacement cost. Income restoration.	OP 4.12 does not provide for the disturbance allowance.	Cash compensation using affected District rates + disturbance allowance.
Seasonal crops	No compensation. 3-6 months' notice given to harvest crops.	No specific provision		No compensation is expected for crops to be harvested. However, in the event that livelihoods are lost compensation will be given.
Loss of income	No specific provision	Livelihoods and living standards are to be restored in real terms to pre-displacement levels or better	The Ugandan legislation does not provide for restoration of livelihoods.	In the context of this project, practical livelihood restoration measures have been proposed.

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
Vulnerable groups	The 1995 Uganda Constitution stipulates that: “the State shall take affirmative action in favour of groups marginalised on the basis of gender, age, disability or any other reason [...] for the purpose of redressing imbalances which exist against them”. This regulation is not fully described in the context of resettlement and land acquisition.	Particular attention should be paid to the needs of vulnerable groups among those displaced such as those below the poverty line, landless, elderly; women and children and indigenous peoples and ethnic minorities.	Both the Ugandan Constitution and WB OP 4.12 favour vulnerable groups. However, the Ugandan law, vulnerable groups are not fully described in the context of resettlement and land acquisition.	Special attention will be paid to vulnerable persons affected and necessary measures will be provided in the entitlement matrix of the RAP.
Relocation and Resettlement	Both the Constitution, 1995 and The Land Act, 1998 give the government and local authorities, power to compulsorily acquire land. The Constitution states that “no person shall be compulsorily deprived of property or any interests in or any right over property of any description except” if the taking of the land is necessary “for public use or in the interest of defence, public safety, public order, public morality or public health.”	Avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	There is no requirement under the Ugandan law to minimize land acquisition.	Measures to minimize involuntary resettlement shall be considered in the RAP following a WB mitigation hierarchy.
Livelihood restoration and assistance	There are no explicit provisions under resettlement or relocation for livelihood assistance.	Livelihoods and living standards are to be restored in real terms to pre-displacement levels or better	Ugandan policy and legislation would need to be aligned with Bank policy to effectively guarantee rights of all affected persons of involuntary resettlement.	The project will provide transition allowance.

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
Consultation and disclosure	There are no explicit provisions for consultations and disclosure but there are guidelines issued by separate ministries (e.g. roads and energy). The Land Acquisition Act, however, makes provision for an enquiry whereby the affected person can make formal written claim and the assessment officer is obliged to conduct a hearing before making his award.	Consult project-affected persons, host communities and local NGOs, as appropriate. Provide them opportunities to participate in the planning, implementation, and monitoring of the resettlement program, especially in the process of developing and implementing the procedures for determining eligibility for compensation benefits and development assistance (as documented in a resettlement plan), and for establishing appropriate and accessible grievance mechanisms.	While the consultation requirement is inherent in the ESIA, it contains several differences with the requirements of Bank policy.	No gap.
Grievance mechanism and dispute resolution	The Land Act, 1998 states that land tribunals must be established at all districts. The Land Act empowers the Land Tribunals to determine disputes and it provides for appeal to higher ordinary courts. The Land Acquisition Act provides for the aggrieved person to appeal to the High Court.	Establish appropriate and accessible Grievance Redress Mechanism.	GRC structures exist within the Local Councils of Governance in Uganda, but in most cases, they are dysfunctional and ineffective given the limited projects knowledge.	Grievance committees to be instituted within the procedure and will not replace the existing legal process in Uganda; rather it seeks to resolve issues quickly so as to expedite receipt of entitlements and smooth resettlement without resorting to expensive and time-consuming legal action. If the grievance procedure fails to provide a settlement, complainants can still seek legal redress.

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
Calculation of compensation and valuation	<p>According to the Land Act, Cap 227 (section 77), the value of Customary land shall be the open market value of the unimproved land. Value of the buildings shall be at open market value for urban areas and depreciated replacement cost for rural areas.</p> <p>The crops and buildings of a non-permanent nature are compensated at rates set by District Land Boards</p>	<p>Bank policy requires: (a) prompt compensation at full replacement cost for loss of assets attributable to the project; (b) if there is relocation, assistance during relocation, and residential housing, or housing sites, or agricultural sites of equivalent productive potential, as required; (c) transitional support and development assistance, such as land preparation, credit facilities, training or job opportunities as required, in addition to compensation measures; (d) cash compensation for land when the impact of land acquisition on livelihoods is minor; and (e) provision of civic infrastructure and community services as required.</p>	<p>There is no equivalent provisions on relocation assistance, transitional support, or the provision of civic infrastructure. The basis of compensation assessment is not stated in the Land Acquisition Act (an old law due for review), although the Constitution provides for 'prompt, fair and adequate' compensation. (article 26).</p>	<p>Market value is based on recent transactions and thus if alternative property is purchased within a reasonable period of the payment of compensation, it is likely that market value will reflect full replacement value. However, local inflation in price land or construction materials can affect what is determined as replacement cost. If this is not reflected in recent transactions, market value may not reflect replacement value.</p>

5.7 IWMDP ESMF

The ESMF is to ensure that planned activities and interventions under the IWRDP are undertaken in a manner that avoids and minimizes environmental and social impacts as much as possible. Where they cannot be avoided, the ESMF identifies and assesses such impacts and outlines necessary mitigation measures following relevant Government of Uganda environmental and social legislation, and World Bank's safeguards policies amongst others as well as international best practice. It summarises likely environmental and social risks and their mitigation measures that need to be specified and managed during project implementation. The ESMF describes the process of how risks shall be identified, how corresponding plans are developed and how the ESMF will be amended to reflect the identified risks.

Therefore, under the Adjumani WSSP, the compliance of the project to environmental requirements of the WB and GoU have been ensured through diligent application of an the IWMDP ESMF and site specific ESIA/ESMPs for implementation. Therefore, specific ESIA/ESMPs for the complete detailed engineering designs for the Ajumani WSSP shall be reviewed and cleared by the Bank and and disclosed.

5.8 WB - EHS Guidelines (International Standards)

The WB 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, these EHS Guidelines are applied as required by their respective policies and standards. 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 (World Bank EHS Guidelines, 2007). The environmental, health and safety (EHS) guidelines that are of relevance to the proposed project include:

- a. EHS Guidelines - Water and Sanitation
- b. EHS Guidelines - Air and Noise Emissions and Ambient Air Quality and Noise Levels
- c. EHS Guidelines – Occupational Health and Safety
- d. EHS Guidelines – Community Health and Safety
- e. EHS Guidelines - Waste Management
- f. EHS Guidelines - Hazardous Materials Management
- g. EHS Guidelines - Construction and decommissioning

5.8.1 WBG EHS Guidelines: Water and Sanitation

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
- (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 EHS Guidelines for water and sanitation project shall be used together with the General EHS guidelines to provide guidance on management of common EHS issues during construction and operational phases, depending on project-specific characteristics and components.

Table 5-12: Elements of water and sanitation projects provided under the EHS guidelines

Environment Safety	<ul style="list-style-type: none"> • Drinking water <ul style="list-style-type: none"> - Water withdrawal; - Water treatment; and - Water distribution. • Sanitation <ul style="list-style-type: none"> - Faecal sludge and septage collection; - Sewerage (Domestic wastewater discharges; - Industrial wastewater discharges; - Leaks and overflows); and - Wastewater and Sludge Treatment and Discharge (liquid effluents, solid waste, air emissions and odours, hazardous chemicals, ecological impacts).
Occupational Health and Safety	<ul style="list-style-type: none"> • Accidents and injuries; • Chemical exposure; • Hazardous Atmosphere; • Exposure to pathogens and vectors; and • Noise.
Community Health and Safety	<ul style="list-style-type: none"> • Drinking water <ul style="list-style-type: none"> - Water Intake (Water Supply Protection) - Water Treatment (Drinking Water Quality and Supply, Hazardous Chemicals) - Water Distribution. • Sanitation <ul style="list-style-type: none"> - Faecal sludge and septage collection; - Sewerage (Domestic wastewater discharges; - Industrial wastewater discharges; - Leaks and overflows); and - Wastewater and Sludge Treatment and Discharge (liquid effluents, solid waste, air emissions and odours, hazardous chemicals, ecological impacts).
Performance Indicators and Industry Benchmarks	<ul style="list-style-type: none"> • Environment • Occupational health and safety

The WB EHS Guidelines (Water and Sanitation, 2007) are relevant to the Project as they provide the latest internationally accepted GIIP for relevant OHS issues. EHS Guideline parameters are required in cases that the country does not have legislation or in cases the requirements are the most stringent. The recommendations contained within the Guidelines have been reviewed during the development of this ESIA and incorporated in to the prescribed management and mitigation measures as appropriate. Drinking water quality standards to be applied are those set out in the EHS Guidelines.

5.8.2 WBG EHS Guidelines: Air and Noise Emissions and Ambient Air Quality and Noise Levels

These guidelines require projects with “significant” sources of air emissions, and potential for significant impacts to ambient air quality to prevent or minimize impacts by ensuring that emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards (or in their absence, the current WHO Air Quality Guidelines, or other internationally recognized sources). Uganda currently has (draft) national air quality standards applicable to this project.

Emissions of air and noise pollutants can occur from a wide variety of activities during the construction, operation, and decommissioning phases of a project. These activities can be categorized based on the spatial characteristic of the source including point sources, fugitive sources, and mobile sources and, further, by process, such as combustion, materials storage, or other industry sector specific processes. Where possible, facilities and projects should avoid, minimize, and control adverse impacts to human health, safety, and the environment from emissions to air and sound levels. Where this is not possible, the generation and release of emissions of any type should be managed through a combination of: energy use efficiency; process modification; selection of fuels or other materials; the processing of which may result in less polluting emissions; and application of emissions control techniques.

Table 5-13: World Health Organisation (WHO) ambient air quality guidelines

Pollutants	Averaging time for ambient air	Standard for ambient air ($\mu\text{g}/\text{m}^3$)
Sulphur dioxide (SO_2)	24-hour	125 (Interim target 1)
	10 minutes	50 (Interim target 2) 20 (guideline) 500 (guideline)
Nitrogen dioxide (NO_2)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM_{10}	1-year	70 (interim target 1)
		50 (interim target 2)

	24-hour	30 (interim target 3) 20 (guideline) 150 (interim target 1) 100 (interim target 2) 75 (interim target 3) 50 (guideline)
Particulate Matter PM _{2.5}	1-year 24-hour	35 (interim target 1) 25 (interim target 2) 15 (interim target 3) 10 (guideline) 75 (interim target 1) 50 (interim target 2) 37.5 (interim target 3) 25 (guideline)
Ozone	8-hour daily maximum	160 (interim target 1) 100 (guideline)

Source: IFC/WB General EHS Guidelines (2007, p.4)

Table 5-14: Community Noise Level Guidelines

Receptor	One Hour LAeq (dBA)	
	Daytime 07:00 - 22:00	Night-time 22:00 - 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Source: IFC/WB General EHS Guidelines (2007, p.53).

Baseline investigations considered the following parameters: particulate matter, PM (measured as particles with an aerodynamic diameter <10 µm (PM10) and <2.5 µm (PM2.5)), Sulphur Dioxide (SO2), Nitrogen Dioxide (NO2), Volatile Organic Compounds (VOCs) and Carbon Monoxide (CO). PM2.5 is an important indicator of risk to health from particulate pollution and might also be a better indicator than PM10 for anthropogenic suspended particles in many areas. PM2.5 and PM10 baseline data will be useful in monitoring the dust nuisance around construction sites as well as vehicular emissions. The baseline for the gases (SO2, NO2, VOCs and CO) will also be useful in monitoring impact of construction fleet, generators as well as use of volatile materials on

ambient air quality. The ESMP elaborates continuous monitoring to regularly track the deviations in air quality parameters and thus apply appropriate mitigation measures in a timely manner.

5.8.3 WBG EHS Guidelines: Occupational Health and Safety

Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. It provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. Although the focus is placed on the operational phase of projects, much of the guidance also applies to construction and decommissioning activities. Companies should hire contractors that have the technical capability to manage the occupational health and safety issues of their employees, extending the application of the hazard management activities through formal procurement agreements.

The WB Environmental, Health, and Safety (EHS) Guidelines (Water and Sanitation, 2007) are relevant to the Project as they provide the latest internationally accepted GIIP for relevant OHS issues. The recommendations contained within the Guidelines have been reviewed during the development of this ESIA and incorporated in to the prescribed management and mitigation measures as appropriate. Drinking water quality standards to be applied are those set out in the EHS Guidelines.

5.8.4 WBG EHS Guidelines: Community Health and Safety

This complements the guidance provided in the environmental and occupational health and safety sections, specifically addressing some aspects of project activities taking place outside of the traditional project boundaries, but nonetheless related to the project operations, as may be applicable on a project basis. The issues of consideration that may arise at any stage of a project life cycle and can have an impact beyond the life of the project highlighted would be related to any of the following: i) Water quality and availability; ii) Structural safety of project infrastructure; iii) Life and fire safety (L&FS); iv) Traffic safety; v) Transport of hazardous materials vi) Disease prevention; and vii) Emergency preparedness and response.

The health and safety of the communities in the project area is important just like safety and health of workers directly engaged in project activities. These guidelines are therefore very important for guiding the project to ensure that no health and safety issues arise within the project communities. The recommendations contained within the Guidelines have been incorporated in the management and mitigation measures as appropriate.

5.8.5 WBG EHS Guidelines: Waste Management

This guideline provides for construction waste generated by and throughout all implementation phases. Large waste volumes will be generated especially at project/construction site, material holding/stockpile yards, site workshop and construction equipment parking lot, batching plant, temporarily contractor workforce shelters among others. The guidelines advocate for waste management planning where waste should be characterized according to composition, source, types, and generation rates. These guidelines call for implementation of a waste management hierarchy that comprises prevention, recycling/reuse, treatment, and disposal. The guidelines require segregation of *conventional waste* from *hazardous waste* streams. Examples of hazardous

construction waste are waste oil from vehicles and machinery paint waste, thinners, and concrete wash water (e.g., from cleaning concrete mixers).

Improper management of construction waste would pose environmental and public health impacts. The contractor will have a contractual obligation to ensure proper construction waste management. To this end, provisions of these guidelines should be utilized as vital guiding documents.

5.8.6 WBG EHS Guidelines: Hazardous Materials Management

These guidelines apply to projects that use, store, or handle any quantity of hazardous materials (Hazmats), defined as materials that represent a risk to human health, property, or the environment due to their physical or chemical characteristics. Hazmats can be classified according to the hazard as explosives; compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials; radioactive material; and corrosive substances.

Facilities which manufacture, handle, use, or store hazardous materials should establish management programs that are commensurate with the potential risks present. The main objectives of projects involving hazardous materials should be the protection of the workforce and the prevention and control of hazardous chemicals releases and accidents. These objectives should be addressed by integrating prevention and control measures, management actions, and procedures into day-to-day business activities. Implementation of the proposed project activities involves handling of hazardous materials such as fuel and lubricants, paint, compressed gas cylinders especially at the construction site, fuel storage area and mechanical workshop among

5.8.7 WBG EHS Guidelines: Construction and Decommissioning

This provides additional, specific guidance on prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities. Cross referencing is made to various other sections of the General EHS Guidelines.

5.8.7.1 Environment

a) Noise and vibration: During construction and decommissioning activities, noise and vibration may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. Some recommended noise reduction and control strategies to consider in areas close to community areas include:

- Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance
- Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines.
- Avoiding or minimizing project transportation through community areas

- b) Air Quality:** Project will involve excavations and handling of construction materials such as aggregates, sand, cement among others and this could generate fugitive dust affecting adjacent environs. A secondary source of emissions may include exhaust from diesel engines of earth moving equipment, as well as from open burning of construction waste.
- c) Solid Waste:** Non-hazardous solid waste generated at construction and decommissioning sites includes excess fill materials from grading and excavation activities, scrap wood and metals, and small concrete spills. Other non-hazardous solid wastes include office, kitchen, and dormitory wastes when these types of operations are part of construction project activities. Hazardous solid waste includes contaminated soils, which could potentially be encountered on-site due to previous land use activities, or small amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill cleanup materials from oil and fuel spills.
- d) Hazardous Materials:** Construction and decommissioning activities may pose the potential for release of petroleum-based products, such as lubricants, hydraulic fluids, or fuels during their storage, transfer, or use in equipment. These materials may also be encountered during decommissioning activities in building components or industrial process equipment.
- e) Wastewater discharges:** Construction and decommissioning activities may include the generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved. Adequate portable or permanent sanitation facilities serving all workers should be provided at all construction sites.
- f) Soil erosion:** Soil erosion may be caused by exposure of soil surfaces to rain and wind during site clearing, earth moving, and excavation activities. The mobilization and transport of soil particles may, in turn, result in sedimentation of surface drainage networks, which may result in impacts to the quality of natural water systems and ultimately the biological systems that use these waters.

5.8.7.2 Occupational Health and Safety

- a) Work in heights:** Falls from elevation associated with working with ladders, scaffolding, and partially built or demolished structures are among the most common cause of fatal or permanent disabling injury at construction or decommissioning sites. If fall hazards exist, a fall protection plan should be in place which includes one or more of the following aspects, depending on the nature of the fall hazard 95.
- b) Dust:** Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements and PPE, such as dust masks, should be used where dust levels are excessive.
- c) Struck by objects:** Construction and demolition activities may pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities.

- d) **Over-exertion:** Over-exertion, and ergonomic injuries and illnesses, such as repetitive motion, overexertion, and manual handling, are among the most common causes of injuries in construction and decommissioning sites.
- e) **Slips and falls:** Slips and falls on the same elevation associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at construction and decommissioning sites.
- f) **Confined spaces and excavations:** Examples of confined spaces that may be present in construction or demolition sites include: silos, vats, hoppers, utility vaults, tanks, sewers, pipes, and access shafts. Ditches and trenches may also be considered a confined space when access or egress is limited.
- g) **Moving machinery:** Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions, and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. Centre-articulated vehicles create a significant impact or crush hazard zone on the outboard side of a turn while moving.

5.8.7.3 Community Health and Safety

The guidelines recommend implementation of risk management strategies to protect the general community from physical, chemical, or other hazards associated with sites construction and decommissioning:

- a) **General site hazards:** Projects should implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning. Risks may arise from inadvertent or intentional trespassing, including potential contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards.
- b) **Disease prevention:** Increased incidence of communicable and vector-borne diseases attributable to construction activities represents a potentially serious health threat to project personnel and residents of local communities. Recommendations for the prevention and control of communicable and vector-borne diseases also applicable to construction phase activities are provided.
- c) **Traffic safety:** Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment increasing the risk of traffic-related accidents and injuries to workers and local communities. The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising, and the adoption of procedures described in these guidelines.

During decommissioning and maintenance of the project components, same impacts as those anticipated during project construction and operation may arise. Therefore, these guidelines are very important and relevant during this phase of the project as highlighted in Chapter 9.

5.9 International Conventions and/or Agreements to Which Uganda is a Party

Uganda has signed and/or ratified several international agreements and conventions relating to the environment both at regional and global level such as ones below. However, due to the low environmental sensitivity of the project sites no impact associated with these conventions are anticipated as shown below:

5.9.1 The EAC Protocol on Environment and Natural Resource Management

The Protocol on Environment and Natural Resources Management was signed by the Republic of Kenya, Republic of Uganda and United Republic of Tanzania on 3rd April 2006.

Article 13: Management of Water Resources

1. The Partner States shall develop, harmonize and adopt common national policies, laws and programmes relating to the management and sustainable use of water resources.
2. The Partner States shall utilize water resources, including shared water resources, in an equitable and rational manner.
3. The Partner States shall:
 - Cooperate in the management of shared water resources, which may include the establishment of joint management mechanisms;
 - Cooperate with regard to the management and execution of all projects likely to have an effect on shared water resources;
 - Cooperate to respond to the needs or opportunities for regulation of the flow of the waters of shared water resources;
 - Develop and use water resources with a view to attain optimal and sustainable utilization thereof and benefits there from consistent with the adequate protection of those water resources;
 - Individually or jointly take measures to prevent or mitigate conditions related to a water resource including shared water resources that may be harmful to other Partner States whether resulting from natural causes or human activities;
 - Individually or jointly, protect and conserve the water resources and their ecosystems in the Community through protecting and improving the water quality; preventing the introduction of alien species into the water resources; and protecting and conserving biological diversity in the water resources;
 - Take all necessary measures to promote river and lake basin management in order to protect water resources;
 - Improve water catchment management; and
 - Promote rain harvesting, protection of wells and springs and other water sources.
4. The Partner States shall:
 - Establish mechanisms for exchange of available data and information on existing measures and on the condition of the water resources in the Community; and

- Establish and harmonise water quality standards and water quality and quantity monitoring and surveillance systems.
- 5. The Partner States shall promote the participation of the private sector, civil society and women in the management of water resources.
- 6. The Partner States shall develop strategies and actions for the management of water resources for production, consumption and other uses within the Community.
- 7. The Partner States shall develop programmes for improvement of domestic sanitation and urban waste disposal in order to protect water resources from pollution.

Implications and compliance requirements: River Nile drains about 9 countries before pouring its waters in the Mediterranean Sea and due to its immense water quantity, the project raw water intake for this water stressed region has to be located on the river. However, the Nile being a Trans-Boundary water body i.e. shared by several state including Uganda, it may present a precarious situation that water abstraction has to be allowed and negotiated by the governments under the auspicious of international law on the use of shared river resources, the East African Community (EAC) Protocol and the Nile Basin Initiative (NBI).

International laws and EAC guidelines require Uganda to notify other States in the Nile Basin about the proposed project and them to provide a no objection. All countries (mainly in the downstream) should discuss the need to abstract the proposed water and the location for its abstraction. Where grievances arise, such will be solved by following guidance in the Convention on the Law of the Non-Navigational Uses of International Watercourses (NNUIW) and the EAC Protocol on Environment and Natural Resource Management (PENRM). The Department of International and Transboundary Water Affairs (DITWA) within MWE coordinates national efforts to manage shared water resources.

The ESIA recommends that NWSC creates a forum for regional participation during construction works by inviting representatives of the partner states to be part of project supervision teams and to share progress reports to partner states and regional bodies such as the Nile Basin Initiative. Catchment protection activities such as tree planting and promoting sustainable land management are critical for the sustainability of the project. Building climate resilience of the Nile Basin requires regional efforts. A wider stakeholder engagement should be pursued, not only on the Ugandan side, but other riparian states should also engage in activities to maintain the riverine ecosystem.

5.9.2 The Convention on the Law of the Non-Navigational Uses of International Watercourses

The UN Watercourses Convention was adopted (A/RES/51/229) and opened for signature during the 51st session of the UN General Assembly (UNGA) on 21 May 1997. The Convention applies to non-navigational use of international watercourses and measures to protect, preserve and manage those waters. The Convention embodies a number of principles on: equitable and reasonable utilization, including definition of factors relevant to equitable and reasonable utilization; the obligation not to cause significant harm; the general obligation to cooperate; regular exchange of data and information; the relationship between types of uses; notification and response, relating to planned measures; protection and preservation of ecosystems; prevent,

reduce and control pollution; introduction of alien or new species; protection and preservation of the marine environment; and international watercourses and installations during time of armed conflict. The Convention contains an innovative dispute resolution mechanism, which includes possible use of an impartial fact-finding commission in the event negotiations are unable to resolve the conflict.

Article 7: Obligation not to cause significant harm

- Watercourse States shall, in utilizing an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States.
- Where significant harm nevertheless is caused to another watercourse State, the States whose use causes such harm shall, in the absence of agreement to such use, take all appropriate measures, having due regard for the provisions of articles 5 and 6, in consultation with the affected State, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.

Article 8: General obligation to cooperate

- Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse.
- In determining the manner of such cooperation, watercourse States may consider the establishment of joint mechanisms or commissions, as deemed necessary by them, to facilitate cooperation on relevant measures and procedures in the light of experience gained through cooperation in existing joint mechanisms and commissions in various regions.

Article II: Information concerning planned measures

Watercourse States shall exchange information and consult each other and, if necessary, negotiate on the possible effects of planned measures on the condition of an international watercourse.

Implications and compliance requirements: Uganda (NWSC) should discuss the need to abstract the required amounts and the location for its abstraction. Where grievances arise, such will be solved by following guidance in the Convention on the Law of the Non-Navigational Uses of International Watercourses and the EAC Protocol on Environment and Natural Resource Management. The International and Transboundary Water Affairs Department within MoWE coordinates national efforts to manage shared water resources. The ESIA recommends that NWSC creates a forum for regional participation during construction works by inviting representatives of the partner states to be part of project supervision teams and to share progress reports to partner states and regional bodies such as the Nile Basin Initiative.

5.9.3 The Convention on Protection and Use of Transboundary Watercourses and International Lakes (1992)

The Convention of the Protection and Use of Trans-boundary Watercourses and International Lakes (Water Convention) is intended to strengthen national measures for the protection and ecologically sound management of trans-boundary surface waters and groundwater's.

Under Article 1, The Parties shall take all appropriate measures to prevent, control and reduce any transboundary impact on the watercourses and the Parties are obliged to: prevent, control and reduce pollution of waters causing or likely to cause transboundary impact; ensure that transboundary waters are used with the aim of ecologically sound and rational water management, conservation of water resources and environmental protection; ensure that transboundary waters are used in a reasonable and equitable way, taking into particular account their transboundary character, in the case of activities which cause or are likely to cause transboundary impact; ensure conservation and, where necessary, restoration of ecosystems; and measures for the prevention, control and reduction of water pollution shall be taken, where possible, at source.

The Convention also includes provisions for monitoring, research and development, consultations, warning and alarm systems, mutual assistance, institutional arrangements, and the exchange and protection of information, as well as public access to information. Article 3 calls for the application of EIA and other means of assessment for the prevention, control and reduction of transboundary watercourses and international lakes.

In the implementation of the project, modalities for amicable involvement of the member States in the implementation of the project has been part of the ESIA process through joint workshops to discuss the deliverables as well as issues of design as in the feasibility study which ensured that, there is equitable availability of water for various users both up and downstream of the river. Therefore, the foregoing notwithstanding, the contractor(s) and NWSC will have a contractual obligation to avoid impacts that may violate above conventions, wherever encountered.

5.9.4 The African Convention on the Conservation of Nature and Natural Resources (1982)

The African Convention on the Conservation of Nature and Natural Resources (Organization of African Unity - OAU) notes that soil, water, flora and fauna constitute valuable capital, and that these are currently under threat. The convention notes that these resources have economic, nutritional, scientific, educational, cultural and aesthetic value. The main principle of the convention is that measures necessary to ensure conservation, utilization and development of these resources are undertaken in accordance with scientific principles and with due regard to the best interests of the people.

5.9.5 The Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and Their Disposal

The Basel Convention is a global treaty aimed at protecting human health and the environment from risks posed by hazardous wastes and their transboundary movement. The treaty was adopted in 1989, came into force in 1992 and Uganda acceded to it on 11th March 1999. The overall goal of the Basel Convention is to protect, by strictly controlling, human health and the environment against the adverse effects which may result from the generation, transboundary

movement and management of hazardous and other wastes. When hazardous wastes are dumped indiscriminately, spilled accidentally or managed improperly, they can cause severe health problems, or even death, and poison water and land for decades.

All chemicals used in road constructions will be managed in accordance to this convention

5.9.6 The Convention on Biological Diversity (CBD)

Uganda signed the Convention on Biological Diversity (CBD) in 1992 and ratified it in 1993. The CBD requires Contracting Parties to conserve their biological diversity and promote sustainable use of biological resources. Of specific relevance to future development projects in the area is Article 14 of the CBD which requires its Contracting Parties to introduce appropriate procedures for ESIA of proposals that might have effects on biological diversity, and to provide mechanisms for taking the biodiversity impacts of programmes and policies into account. Emphasis is given to in situ conservation in Protected Areas where rehabilitation of degraded ecosystems, recovery of threatened species, and protection of natural habitats and maintenance of viable populations of species in natural surroundings is carried out (CBD, Article 8).

Therefore, as part of the decision-making process, the ESIA outcomes will need to be considered in the context of the responsibility of the Ugandan government to protect and conserve threatened species and natural habitats (if found).

5.9.7 The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES recognises that there exist many endangered species whose vulnerability is increased due to trade. The convention's main aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

5.9.8 The United Nations Framework Convention on Climate change (UNFCCC), 1992

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty negotiated at the Earth Summit in Rio de Janeiro from 3 to 14 June 1992, then entered into force on 21 March 1994. UNFCCC has 197 parties as of December 2015 of which Uganda is a member. Its sister Rio Conventions are the UN Convention on Biological Diversity and the Convention to Combat Desertification. Preventing "dangerous" human interference with the climate system is the ultimate aim of the UNFCCC.

Therefore, all water works should maintain the ecological integrity of the habitat by avoiding activities that could enhance climate change especially massive vegetation clearance.

5.9.9 The Convention on the Conservation of Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals aims at conserving terrestrial, marine and avian migratory species throughout their range. It is an inter-governmental treaty, concluded under the aegis of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale.

There is a possibility of recording migratory bird species within the project area in the due course of construction activities, because the project area lies in a possible migratory route to Murchison Falls National Park in the South. All habitats within the intake area will be protected through sound mitigation measures.

5.9.10 The Strategic Approach to International Chemicals Management (SAICM)

Uganda UNEP/UNDP Partnership initiative for the implementation of SAICM is intended to assist the Government, through the National Environment Management Authority (NEMA), to take up the strategic priorities of SAICM Quick Start Program (SQSP), namely: develop and strengthen national chemicals management institutions, plans, programs and activities to implement the Strategic Approach for chemicals management, building upon work conducted to implement international chemicals-related initiatives; and undertake analysis, interagency coordination, and public participation activities directed at enabling the implementation of Strategic Approach by integrating the sound management of chemicals in national development priorities and strategies. Provisions of SAICM will be considered in the project by developing PMP for the project to ensure information, capacity building and general safe handling of agrochemicals.

5.9.11 The Convention on Protection of Migrant Workers

The International Convention on the Protection of the Rights of all Migrant Workers and Members of their Families is a United Nations multi-lateral treaty governing the protection of migrant workers and families. Signed on 18 December 1990, it entered into force on 1 July 2003 after the threshold of 20 ratifying States was reached in March 2003. The Committee on Migrant Workers (CMW) monitors implementation of the convention, and is one of the seven UN-linked human rights treaty bodies.

Implementing Contractors of this project may have foreign workers whose rights need to be protected. Additionally, the project area is characterized by numerous refugee settlements who might work on the project.

5.9.12 The Convention on Elimination of All Forms of Discrimination against Women

The Convention on the Elimination of all Forms of Discrimination against Women (CEDAW) is an international treaty adopted in 1979 by the United Nations General Assembly. Described as an international bill of rights for women, it was instituted on 3 September 1981 and has been ratified by 189 states including Uganda.

Article 1 defines discrimination against women as; any distinction, exclusion or restriction made on the basis of sex which has the effect or purpose of impairing or nullifying the recognition, enjoyment or exercise by women, irrespective of their marital status, on a basis of equality of men and women, of human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field.

Therefore, all forms of discrimination against women during implementation of all water activities shall be condemned.

5.9.13 The United Nations Conventions on the Rights of the Child and its Optional Protocols and Declarations on Children

The United Nations Convention on the Rights of the Child (commonly abbreviated as the CRC or UNCRC) is a human rights treaty which sets out the civil, political, economic, social, health and cultural rights of children. The Convention defines a child as any human being under the age of 18 years, unless the age of majority is attained earlier under national legislation.

Two (2) optional protocols were adopted on 25th May 2000. The First Optional Protocol restricts the involvement of children in military conflicts, and the Second Optional Protocol prohibits the sale of children, child prostitution and child pornography. Both protocols have been ratified by more than 160 states including Uganda.

5.10 Institutional Framework

5.10.1 National Environmental Management Authority (NEMA)

The National Environmental Act 2019 establishes NEMA as the principal agency responsible for coordination, monitoring and supervision of environmental conservation activities. NEMA is under the Ministry of Water and Environment (MWE) but has a cross-sectoral mandate to oversee the conduct of EIAs through issuance of guidelines, regulations and registration of practitioners. It reviews and approves environmental impact statements in consultation with any relevant lead agencies. It reviews and approves environmental impact statements in consultation with any relevant lead agencies. NEMA works with District Environment Officers and local environment committees at local government levels who also undertake inspection, monitoring and enforce compliance on its behalf. In Government ministries, NEMA works with Environmental Liaison Units to ensure incorporation of environmental issues in their activities, policies and programs.

NEMA is also responsible for issuing permits including: waste (both hazardous and non-hazardous) storage, disposal and transportation permit; permit to carry out regulated activities in wetlands, riverbanks and lakeshores; license to emit noise in excess of the permissible noise levels; and permit to use river banks. In the Adjumani WSSP.

NEMA will: a) review and approve the ESIA report (ESIS); b) through the Project Districts' Environment Officers, undertake environmental monitoring during project implementation; and issue relevant permits and licenses as highlighted above.

5.10.2 National Water and Sewerage Corporation (NWSC)

The National Water and Sewerage Corporation (NWSC) Statute establishes the NWSC as a Water and Sewerage Authority and gives it the mandate to operate and provide water and sewerage services in areas entrusted to it on a sound commercial and viable basis. NWSC is a parastatal that operates and provides water and sewerage services in more than 250 towns across the country, of which Adjumani is part. Sector reforms in the period 1998-2003 included commercialization and modernization of the NWSC operating in cities and larger towns as well as decentralization and private sector participation in small towns. NWSC also operates small conventional sewage treatment plants in a series of towns.

NWSC is the project implementer and is responsible for ensuring the relevant environment and social requirements are complied with.

5.10.3 Ministry of Water and Environment (MWE)

The Ministry of Water and Environment is responsible for policy formulation, setting standards, strategic planning, coordination, quality assurance, provision of technical assistance, and capacity building. The ministry also monitors and evaluates sector development programmes to keep track of their performance, efficiency and effectiveness in service delivery. The ministry has three directorates: Directorate of Water Resources Management (DWRM), Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA).

Directorate of Water Resources Management (DWRM) aims at promoting sustainable development of Uganda's water sector. The directorate is into design and implementation of water quality assessments, monitoring ground and surface water resources, laboratory and field works and ultimately water pollution control. It is also mandated to issue water abstraction permits; river dredging permits, waste (effluent) disposal and discharge permits.

Directorate of Water Development (DWD) is a lead agency responsible for policy guidance, coordination and regulation of all water sector activities including provision of oversight and support services to the local governments and other water supply service providers. DWD has the mandate to promote the provision of clean and safe water to all persons, investigate, control, protect and manage water in Uganda for any use in accordance with the provisions of the Water Statue, 1995

Directorate of Environmental Affairs (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. Specifically, the Wetlands Management Department (WMD) is mandated to manage wetland resources and its goal is to sustain the biophysical and socio-economic values of wetlands in Uganda for present and future generations. Wetlands are under a lot of pressure from conversion for industrial development, agriculture, wastewater treatment facilities. WMD has an inventory of the major wetlands in country in the National Wetlands Information System (NWIS). The inventory provides an overview of wetland resource, their values, threats and possible management options.

MoWE Victoria Water Zone - Northern Region: the ministry has set up in its structure, four (4) zonal regional water management zones which are charged with the sustainable use of its water resources and catchment areas, improving the catchment areas and setting up catchment management organizations, supporting sensitization of communities on sustainable management of water resources in the zones. The Zone Supports sustainable management of water resources, with a focus on benefiting the people within the catchment, economically and socially. The zone plays a role in catchment based integrated water resources management i.e., supporting the preparation of Catchment Management Plans (CMPs) and establishment of Catchment Management Organizations (CMOs) to promote coordination and collaboration among the various stakeholders. The Management Zone will be key in Sustainable Land Management (SLM)

aspects in the project so that, the catchment is protected from degradation thus ensuring proper use and management of the river water.

The mandate of the MWE regarding sanitation and hygiene activities are stipulated in the memorandum of understanding (MoU) that was signed by Ministry of Health, Ministry of Education and Sports and the MWE. The role of MWE is limited to development of public sanitary facilities and promotion of good hygiene in small towns and rural growth centres (RGCs).

5.10.4 Ministry of Gender, Labour & Social Development (MGLSD)

The Ministry has the overall mandate to mobilize and empower communities to harness their potential through Skills Developments, labor productivity and Cultural Growth for Sustainable and Gender Responsive Development of all Ugandan citizens. MGLSD works through its Directorate of Gender and Community Development, Department of Gender and Women Affairs, Department of Culture and Family Affairs, Department of Community Development, Directorate of Social Protection (Specifically the Department of Youth and Children Affairs, Department of Disability and Elderly, and Department of Equity and Rights).

The Ministry promotes cultural growth, non- formal skills development, labour productivity and gender responsive development, while focusing on reducing vulnerability associated to being or becoming poor. In addition, the Ministry rectifies imbalances to eliminate discrimination and inequalities against any individual or group of persons and takes affirmative action in favour of the marginalised.

The Ministry works with other stakeholders including the National Women's Council, National Youth Council, National Council for Children, and National Council for Disability, Industrial Court and the Equal Opportunities Commission. These councils are also decentralized from the district to the sub-county levels. Non-state actors include the Civil Society Organizations (NGOs and Faith Based Organisations), Cultural institutions and Development Partners.

The Ministry will supervise the project to ensure Gender aspects, child protection and workers health and safety, among others are adhered to.

The OHS Department in the ministry is responsible for inspection and mentoring of occupational safety in workplaces and this could be during project construction and operation of the laboratory facilities. It is responsible for work place registration and certification of equipment.

5.10.5 Uganda National Roads Authority (UNRA)

UNRA was established by the National Authority Act, No. 15 of 2006. UNRA became operational on 1st July 2008. 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. Since there is a likelihood that the pipeline will move through the road reserve, UNRA must provide approval for that to happen since it owns the road reserves.

One of UNRA's responsibilities is the establishment and maintenance road reserves. Given that the water pipelines are in some places located in the road reserve especially on the transmission line along the Atiak – Laropi road, UNRA has to be informed so that any plans with respect to the project area takes into consideration the pipeline.

5.10.6 Ministry of Internal Affairs (MIA)

MIA facilitates legal and orderly movement of persons to and from Uganda, regulates the residence of immigrants in the country, verifies and processes Uganda citizenship and enforces national and regional immigration laws for the development and security of Uganda.

This Ministry will be responsible for issuing work permits and permit for blasting, importation, storage and transportation of explosives during project implementation

5.10.7 Ministry of Lands, Housing and Urban Development (MoLHUD)

MoLHUD is responsible for providing policy direction, national standards and coordination of all matters concerning lands, housing and urban development. It is responsible for putting in place policies and initiating laws that ensure sustainable land management; promote sustainable housing for all; and foster orderly urban development in the country. The Chief Government Valuer must approve the RAP report to pave way for acquisition of the corridor.

5.10.8 District Local Administration Structures

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

Adjumani District Local Government structures are important for mobilising support for the project as well as monitoring its social-environmental impacts both during construction and operation phases.

5.10.9 Directorate of Geological Survey and Mines (DGSM)

Geological survey and mines is a directorate under ministry of Energy and Mineral Development whose mandate is to control all forms of mining in Uganda through the Mining Act. Stone quarrying, sand mining and gravel excavation are key to providing materials for construction of the proposed Adjumani WSSP. Quarrying and sand mining shall require an appropriate mining license issued by the Department.

Therefore, NWSC and its contractors should secure a mining license for the quarry or else, local suppliers who are license to provide such materials will be used.

5.10.10 Office of the Prime Minister

The Office of the Prime Minister (OPM) through its Department for Refugees is mandated to lead and enhance National Response Capacity to Refugee Emergency Management through:

- i) Receiving and granting asylum to refugees in accordance with both international and national legal frameworks;
- ii) Settling refugees granted asylum, developing and implementing humanitarian interventions;
- iii) Advising government and other stakeholders on refugee matters;
- iv) Providing physical protection to refugees;
- v) Improving the physical infrastructure of the Refugee settlements, ranging from roads; staff accommodation, offices, reception centres among others; and
- vi) Enhancing the Refugee livelihoods through provision of Income Generating Activities (IGAs).

In parallel, OPM is implementing and coordinating activities under the Uganda Development Response to Displacement Project (DRDIP), whose Project Development Objective (PDO) is to improve access to basic social services, expand economic opportunities, and enhance environmental management for refugees and communities hosting refugees in the target areas of Uganda. OPM is a key stakeholder in the proposed project as it will impact refugee hosting communities, and their involvement could avail lessons learnt and contacts that can facilitate smooth project implementation.

5.10.11 Uganda Wildlife Authority

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 provide guidance for instances where wildlife is encountered during project implementation and undertake any wildlife capture and relocation activities.

5.10.12 Utility Companies and Agencies

There are utility agencies and companies that have utilized the road reserve. Such utilities can be damaged if not handled well. Therefore, NWSC will have to engage the Rural Electrification Agency/ UMEME and their contractors as well as private companies (MTN, UTL, etc.) to temporarily relocate their utilities to enable civil works for the pipeline.

5.11 Required Approvals, Permits and Licenses

Several approvals and licenses will be required before commencement of certain construction activities. Securing of approvals requires preparation of the relevant documentation and payment of fees. This needs to be done during mobilization to ensure that all approvals are secured in a timely manner to avoid construction delays. It is important to ensure that all materials (sand and aggregates) are sourced from quarries, borrow pits and sand mines approved by NEMA and compliant with environmental laws. For all new materials sites to be opened up, NEMA approval must be secured while all existing sites should undertake/provide proof of having undertaken environmental compliance audits. For the success of the Adjumani WSSP, the following permits and licenses may be required by the project as presented in Table 5-15.

Table 5-15: Approvals, permits and licenses potentially required by the project

Approvals, Permits and Licenses Required	Issuing Authority	Party responsible for acquiring permit/license	Legal Framework
Water Abstraction Permit	DWRM	NWSC & Contractor	Water Act, cap 152
River Dredging Permit	DWRM	Contractor	Rivers Act, cap 357
Wastewater Discharge Permit	DWRM	NWSC & Contractor	Water Act, cap 152
Waste Disposal Permit	NEMA	NWSC & Contractor	National Environment Act Cap 153; National Environment (Waste Management) Regulation
Waste Transportation License	NEMA	Contractor	National Environment Act Cap 153; National Environment (Waste Management) Regulation
Campsites, Batching Plants, among others	NEMA	Contractor	
Storage of Hazardous/ Non-Hazardous Waste	NEMA	Contractor	National Environment Act Cap 153; National Environment (Waste Management) Regulation
Permit to carry out a Regulated activity in a Wetland, Riverbank, Lakeshore (River Nile)	NEMA	Contractor & NWSC	National Environment Management (Wetland, Riverbank, Lakeshore) Regulation 2000
License to emit noise in excess of permissible noise levels	NEMA	Contractor	National Environment Act Cap 153
Blasting, importation, storage and transportation of explosives	Ministry of Internal Affairs	Contractor	Explosive Act, Cap 298
Mining Permit, Extraction of minerals, opening up of quarries and sand pits	DGSM/ MEMD/ NEMA approval	Contractor	Mining Act, Cap 148

Permit for Storage of Petroleum Products and dispensing license	PSD/MEMD	Contractor	Petroleum Act, Cap 2003
Work Place Registration Permit	MGLSD	Contractor	OHS Act, 2006
Work Permits	Ministry of Internal Affair	Contractor & Supervising, Consultant/ NWSC	Immigrations Act, Cap 66
Certification of statutory equipment	MGLSD, UNBS	Contractor	OHS Act, UNBS Act
Approval of Water Treatment Plant layout plan	MLHUD	NWSC	Physical Planning Act Cap 281
River Bank Use Permit (Waiver for Blasting in the River Bed)	NEMA	NWSC	National Environment Management (Wetland, Riverbank, Lakeshores) Regulations 2000
Permit if the water transmission line is to cross the UNRA road (Road Permits)	UNRA	NWSC	The Uganda National Roads Authority (General) Regulations 2017
Traffic Diversions consent	Uganda Police	Traffic and Road Safety Act 1998	Traffic Diversions consent
RAP approval conditions for this project	CGV	The Land Act Cap 227	RAP approval conditions for this project

6 MAINSTREAMING COVID-19 MEASURES INTO THE PROJECT

The Covid-19 pandemic threatens to overwhelm health systems globally, but especially in developing countries. With the spread in Uganda and its neighbouring countries, the question is whether Uganda health system was resilient enough to respond to the pandemic and its short, medium term and long-term effects. Concerted action needed to be undertaken at national, regional and international levels to effectively contain this pandemic, underscoring the importance of cooperation, coordination and communication. Some of the COVID-19 control measures during the study involved a combination of Ministry of Health Guidelines for COVID-19, WHO Guidelines as well as World Bank COVID-19 guidelines (Technical Note: Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings March 20, 2020). The following key Covid-19 measures have been included in the ESMP and this additional BEFMP and contractors will be required to implement during construction:

- a. Some of the project discussions with stakeholders were conducted via electronic media especially through zoom/teams' meetings, webinars, emails and tele-conferencing amongst others;
- b. For meetings which were held by physical presence, the attendance was maintained at a possible minimum number of individuals in line with Ministry of Health COVID-19 Standard Operating Procedures (SOPs) during the public consultations and effort was made to see that, a social distance of one meter between each other is observed in the meetings
- c. Ensure provision of adequate hand washing facilities with soap and water or alcohol-based hand rub. Everyone MUST wash and sanitize before entry to the meeting places and as frequently as possible;
- d. Handwashing facilities and alcohol-based sanitizers were placed at strategic points accessible to the meeting venues;
- e. Meeting venues were in open and well aeriated areas
- f. Chairs and tables were cleaned with alcohol-based sanitizers.
- g. Arrangements had been made to have temperature guns in place as well as records for details of those participating in the meetings;
- h. Displayed posters with information and key messages on COVID-19 preferably, in English in places that were easily visible;
- i. Provided guidelines on the SOPs to individuals attending project public meetings and the SOPs such as:
 - Covering your mouth and nose with tissue or a handkerchief when coughing and sneezing;
 - The handkerchief must be washed and ironed by you daily. In case of use of disposable tissue, ensure it is disposed of in a waste bin or a designated area where it can be burnt on a daily basis. In this way, you protect others from any virus released through cough and sneezing;
 - Wash your hands with soap and water or use an alcohol-based hand rub immediately after using the tissue or handkerchief;

- Maintain a distance of at least 1 meter from anyone who is coughing or sneezing and remind participants to have a face mask to avoid infecting others;
- Avoid touching your eyes, nose and mouth at all times. Hands touch many surfaces including money which can be contaminated with the virus and you can transfer the virus from the surface to yourself;
- AVOID hand-shakes and hugging at all times; and
- Emphasizing observance of NOT SPITTING in the public. Identify secluded places like pit latrines or toilets for purposes of spitting and wash your hands immediately with soap and water.

These were all done before and during the meetings and in conformity with Ministry of Health SOPs for mitigating the pandemic.

7 ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE

7.1 Introduction

This section describes environmental and social baseline conditions of the area in which the proposed water supply project is to be located and in which impacts may be experienced. This baseline information is established from verifiable data such as geology and soils, climate, topography among others; intermediate data such as vegetation conditions, fauna distribution among others; and other additional data; about occupation, employment, and Safety. The service areas for the project are fit only within the boundaries of Adjumani district.

7.2 Description of Proposed Sites

7.2.1 Surface Water System

7.2.1.1 Water Intake and Raw Water Pumping Station

The proposed raw water intake and pumping station facilities at R. Nile will be installed in the river at Arra West Village, Omi Parish, Pachara Subcounty in Adjumani District. The site is located in a relatively open and gentle sloping area, along the river bank at location E366339, N390075 and 620 mASL. It is located about 2.3 km upstream of the Umi Ferry Crossing point, however, this will have no impact on the proposed Intake it being upstream and far. The river edges at the site are characterised by a variety of natural vegetation like papyrus. The site is about 250 m away from the nearest settlements and 1km from the Adjumani – Laropi Road (currently being upgraded to bitumen standard by UNRA). The required land size is a 50m x 50m plot (0.25 ha).

The selected site (intake) is currently characterized by no big economic uses except cattle farming in the surrounding openland and partially fishing on site as the main activities or key land uses practiced close to the intake site (Figure 7-2). In the north and south, the site is partially bordered by the dryland and R. Nile, in the west by R. Nile and in the east by an access footpath and an open land with shortgrass (often burnt during the dry season) and scattered tress. The access to the site is possible through a footpath hence a need to open up an access road during construction.

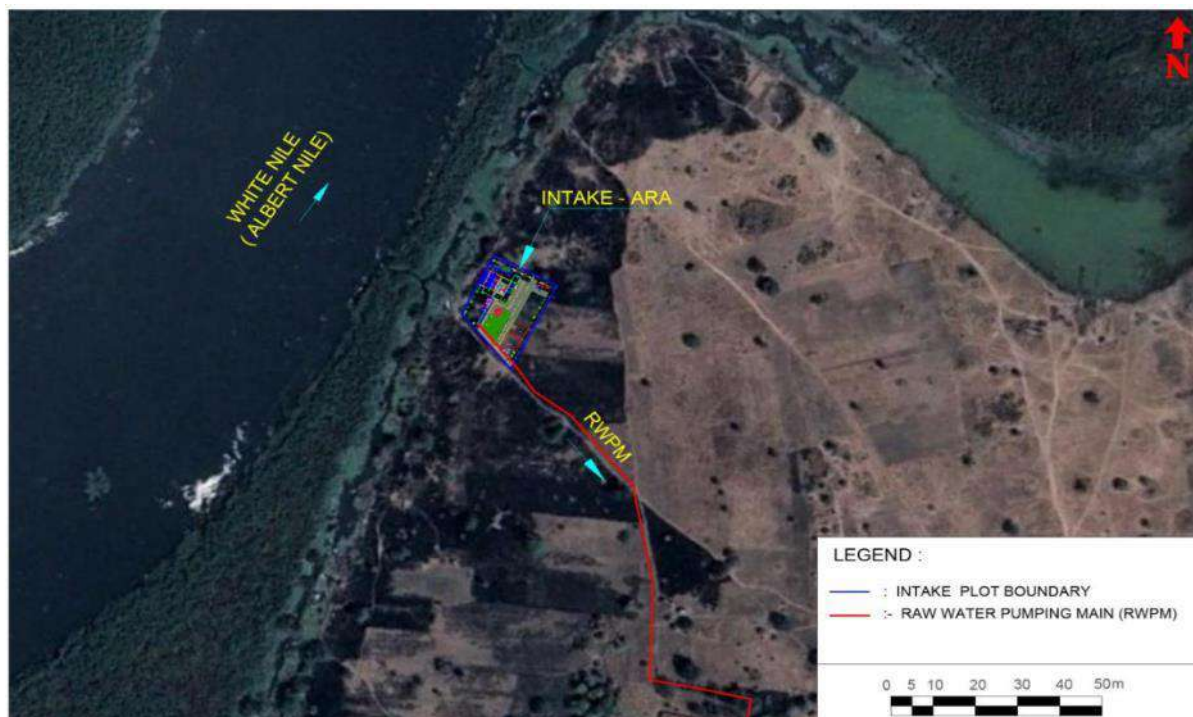


Figure 7-1: Intake and its surrounding environment in Arra West



Selected Intake point at E366339, N390075



Cattle grazing near the intake



Figure 7-2: Land use/cover and the surrounding environment of the intake

7.2.1.2 Water Treatment Plant (WTP)

The 8.0 MLD capacity WTP proposed site is located at E366578, N382069 and 705 mASL in Mijare village Jihwa parish and Pachara subcounty. It is on the left side of the road at 8.8 km from the Intake. The size of the required land is 120m x 100m (1.2ha). The immediate neighbourhood

includes homesteads in the north (about 10m), Adjumani – Laropi Road and a church across the road in the west, open/bushlands in the immediate flowed by homesteads in the far towards the east and south directions. The selected site is currently of no economic use but previously a garden area. The site access is possible through a small access road that needs to be expanded during implementation.



Figure 7-3: Land use/cover and surrounding of the WTP environment

7.2.1.3 Master Balancing Reservoir (MBR)

The MBR - Adjumani ESR of 3 hrs storage capacity will be 2No each of 655 m³. this will be located at E364089, N374784 and 825 mASL in Mukolo West village, Lajopi Parish and Adropi Subcounty, 10.08 km from the WTP. The size of the required land is 80m x 70m (0.56 ha). The immediate neighbourhood includes homesteads in all directions. The selected site is an open land and currently of no economic use. The site access is possible through a small access road that needs to be expanded at most points during implementation.

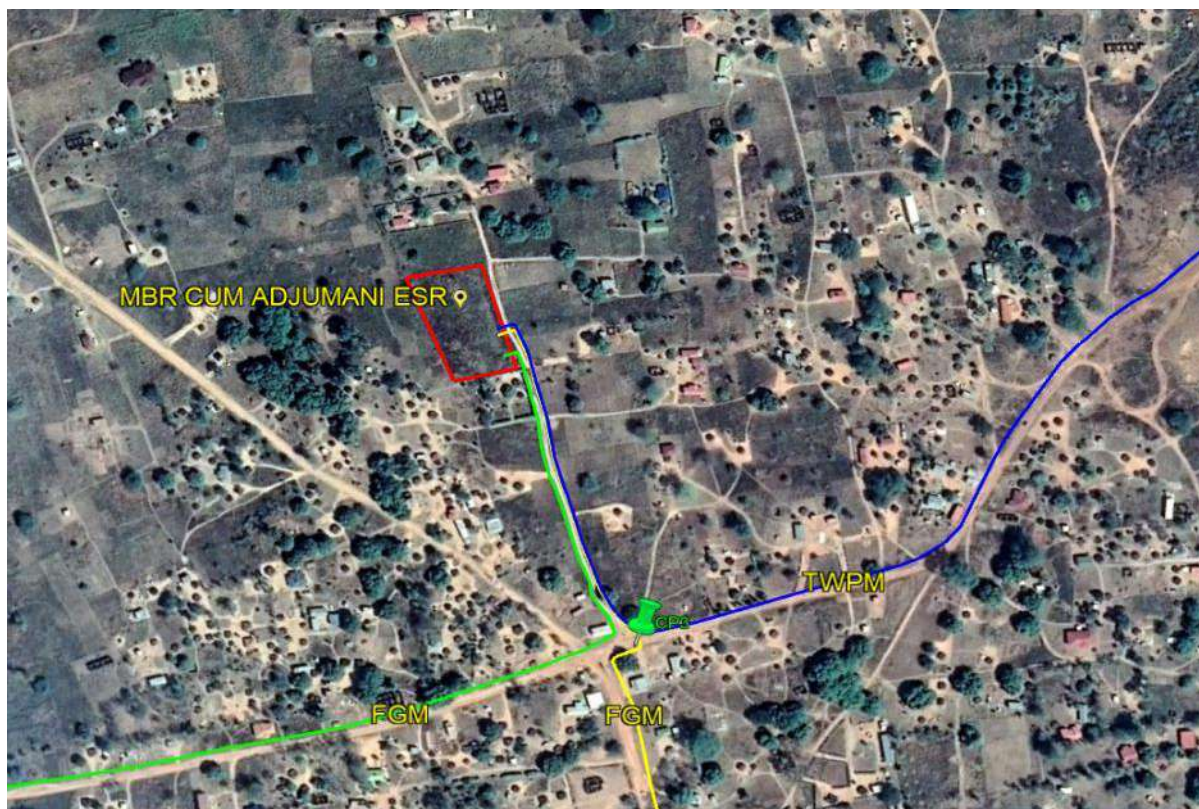


Figure 7-4: MBR cum Adjumani ESR and its surrounding environment in Mukolo

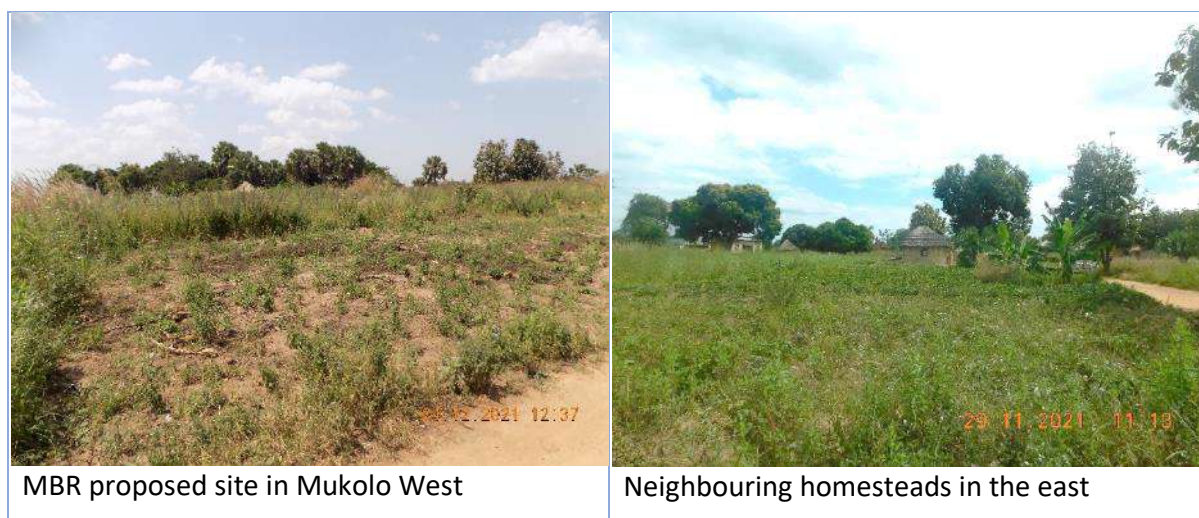




Figure 7-5: Land use/cover and the surrounding environment of MBR cum Adjumani ESR

7.2.1.4 Ciforo ESR

The Ciforo ESR of 50m³ is proposed an existing elevated tank site in Mocope village, Mugi parish and Ciforo subcounty at E358228, N371292 and 790 mASL. This is about 7.47 km from the MBR and the required land is 50m x 50m (0.25ha) plot (existing). The immediate neighbourhood of the proposed site includes homesteads (including a church) in the west, east and a road in the south. Towards the north, the selected site neighbourhood is an open land and currently of no economic use. The site access is possible through existing access road that needs to be opened up during implementation.



Figure 7-6: Ciforo ESR and its surrounding environment in Mucope



Figure 7-7: Land use/cover and the surrounding environment of Ciforo ESR

7.2.1.5 Pakele ESR

The Pakele ESR of 150m³ is proposed an existing elevated tank site in Karelu cell, Pakele Town Council at E371318, N371666 and 802 mASL (near Pakele Catholic Church). This will be about 8.46 km from the MBR and the required land is 30m x 30m (0.09ha) plot (existing). The immediate neighbourhood of the proposed site includes homesteads (including a Catholic church), schools in the west, east and north and a road in the south. The selected site neighbourhood is an open land and currently of no economic use. The site access is possible through existing access road up to the church but it needs to be opened up during implementation.



Figure 7-8: Pakele ESR and its surrounding environment in Karelu cell



Proposed Pakele ESR site near the church



Pakele Girls P/S neighbouring the ESR site

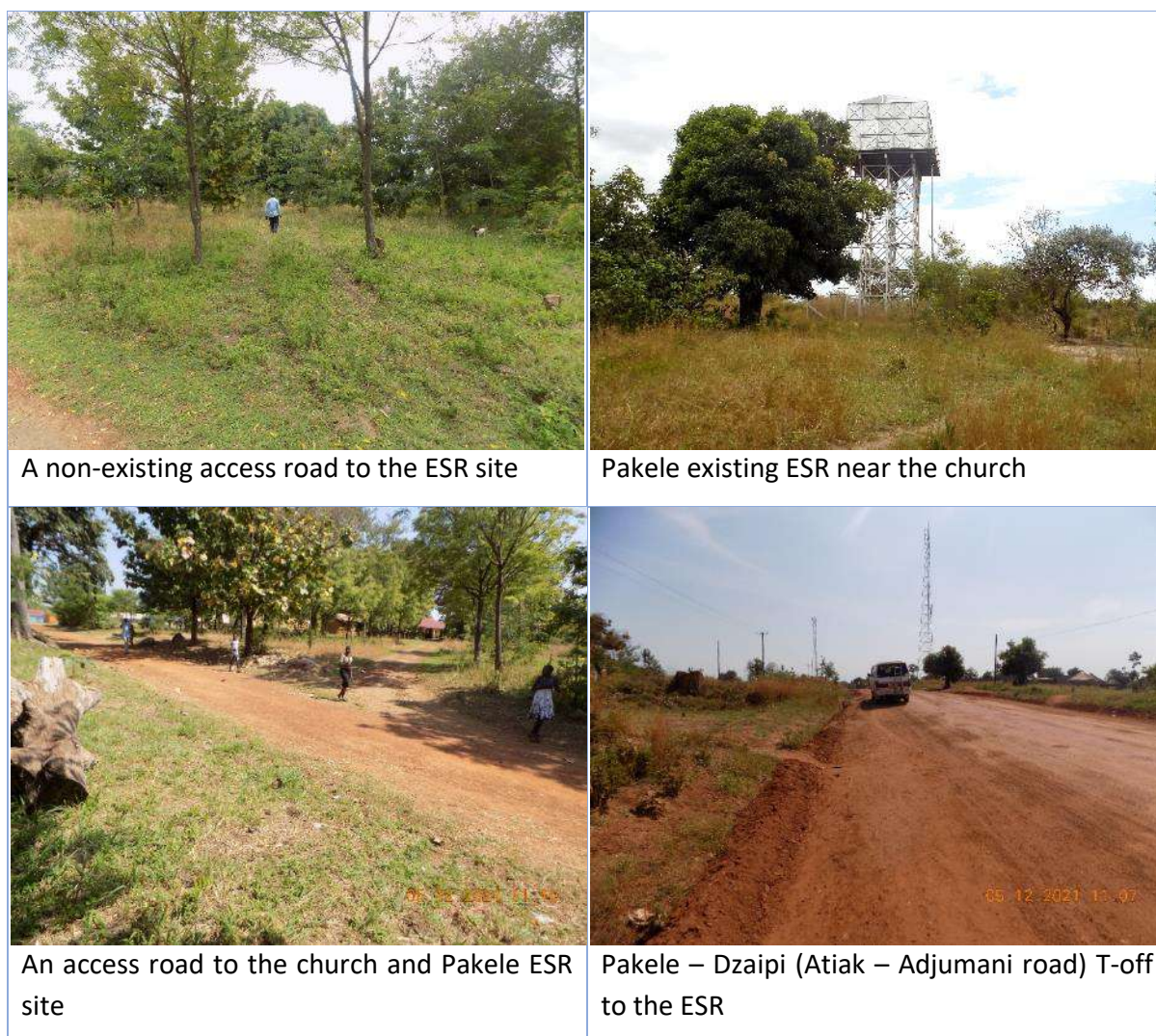


Figure 7-9: Land use/cover and the surrounding environment of Ciforo ESR

7.2.1.6 Dzaipi ESR

The Dzaipi ESR of 900m³ (130m³ for construction in immediate phase) is proposed an near existing elevated tank site in Dzaipi Central cell, Mgbere Parish and Dzaipi Subcounty at E383913, N374946 and 720 mASL (near Dzaipi Subcounty). This will be about 13.73 km from the Pakele Junction and the required land is 30m x 30m (0.09 ha) plot (existing). The site is in a trading centre and its immediate neighbourhood includes the Dzaipi Subcounty Headquarters in the east, residentials and shops in the west, Atiak – Adjumani Road, Dzapi HC, market and Police in the north. The site access is possible using the existing Atiak – Adjumani road and an access road off the main one.



Figure 7-10: Dzaipi ESR and its surrounding environment in Dzaipi Central cell



Proposed ESR site (existing)



Subcounty headquarters in the east



Figure 7-11: Land use/cover and the surrounding environment of Dzaipi ESR

7.2.1.7 Transmission System

Intake to WTP

The overall raw water pumping main (RWPM) from Intake to WTP will cover a distance of about 8.83km with a discharge of 70.66lps against a 136 m head. The DI Pipe Class 40 DN-300mm will traverse an open land with short grass for the first 0.25 km, then meanders around a homestead Etojo Church and Etojo P/S at 0.25 to 0.5 km in the bush. Beyond the school, it will move along the right side of the existing access road for about 0.6km before reaching the Adjumani – Laropi Road at the junction (at 1.2 km) near Arra HC II. At 1.35km from the intake, the RWPM will traverse a 0.45 km flooded floodplain of the buffers of R. Nile in the lowland. The RWPM will maintain the right side of the road (UNRA road reserve) for another 2.5 km before reaching the next road junction where it will make its first major UNRA road crossing to the left side of the road. Beyond this point, the pipe will maintain the left side traversing several open lands and grasslands up to the WTP after 4.6km (Figure 7-12).

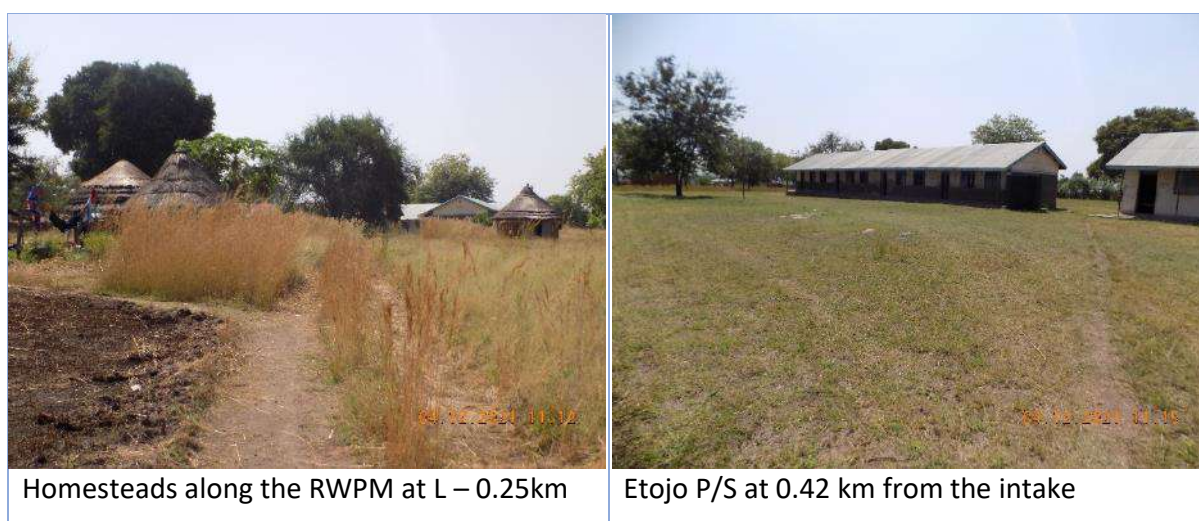




Figure 7-12: Description of the ecosystem environment along the Intake – WTP RWPM

WTP to MBR

The DI Pipe Class 40 DN-300mm treated water pumping main (TWPM) will cover a distance of about 10.08 km with discharge of 66.49lps against a 176m head. The pipe will bushlands and several access road T-offs before reaching the MBR. It will maintain the left side of the road up to E365572, N374969 (Russia East Cell, Marindi Ward, Adjumani TC). It will have a second major UNRA road crossing at this point. At 0.015km (E365530, N374956) there is permanent building in the road reserve, at 0.33km (E365226, N374960) there is perimeter wall and at 0.49km (E365035, N374967) there is a factory perimeter. At 0.8km (E364764, N374910), the pipe will make another road crossing, at 1.1km (E364526, N374781), the pipe will meet a rocky surface where blasting may be a requirement or else the pipe will be laid on the surface while at 1.3km (E364414, N 374637), there is a permanent house in the road. The rest of the section will lead the pipeline to the MBR site without disruption except a borehole at 1.5km (E364206, N374559) in Mukolo (Figure 7-13).



Bushlands along the TWPM towards the MBR – pipe will move on the left side of the road



Adjumani – Laropi – MBR junction where the TWPM will make a major UNRA road crossing



Permanent building in the road corridor at 0.15km from the Adjumani – Laropi junction



Perimeter wall in the road corridor at 0.33km from the Adjumani – Laropi junction



DIA Company C/O perimeter wall in the road corridor at 0.49km from the Adjumani – Laropi junction



Rocky surface where blasting may be a requirement at 1.1km

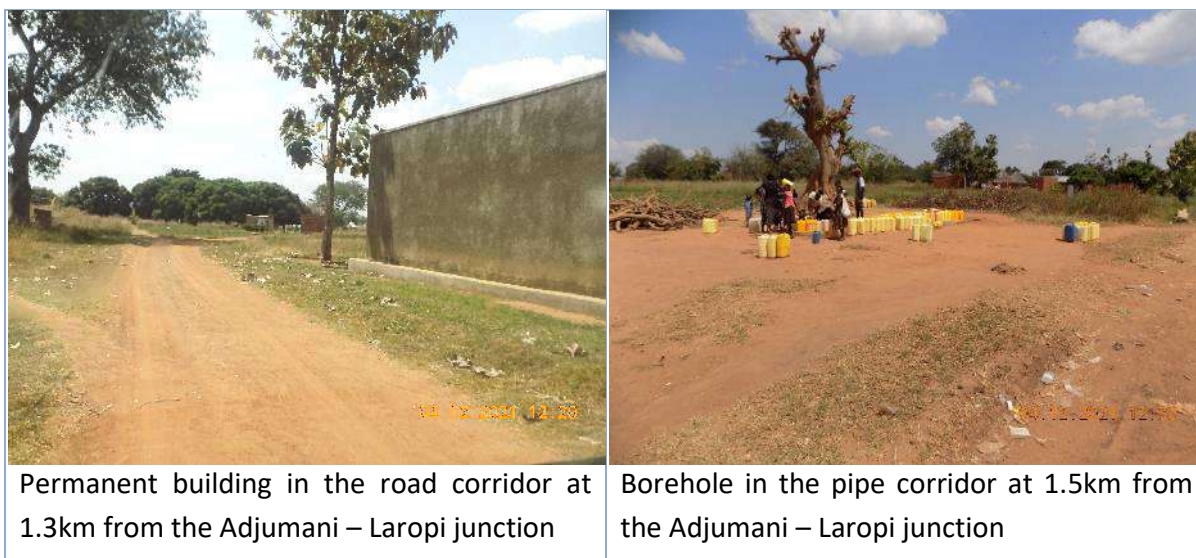


Figure 7-13: Description of the ecosystem environment along the WTP – MBR TWPM

MBR to Ciforo

From the MBR, a flow gravity main (FGM) of DN150 mm (1.27 km long) and DN 100 mm (6.19 km long) will feed the proposed Ciforo ESR. The pipeline diameter size will reduce at Rende Primary School playground (E362879, N374375) in Mokolo East village in Lajopi Parish and Adropi Subcounty. The pipeline will only cross 3 muram roads at 0.24km, 0.34 km and 7.0 km from the MBR. The largest section of the pipe will traverse bushlands and open lands with no interferences including the permanent buildings up to Ciforo ESR.



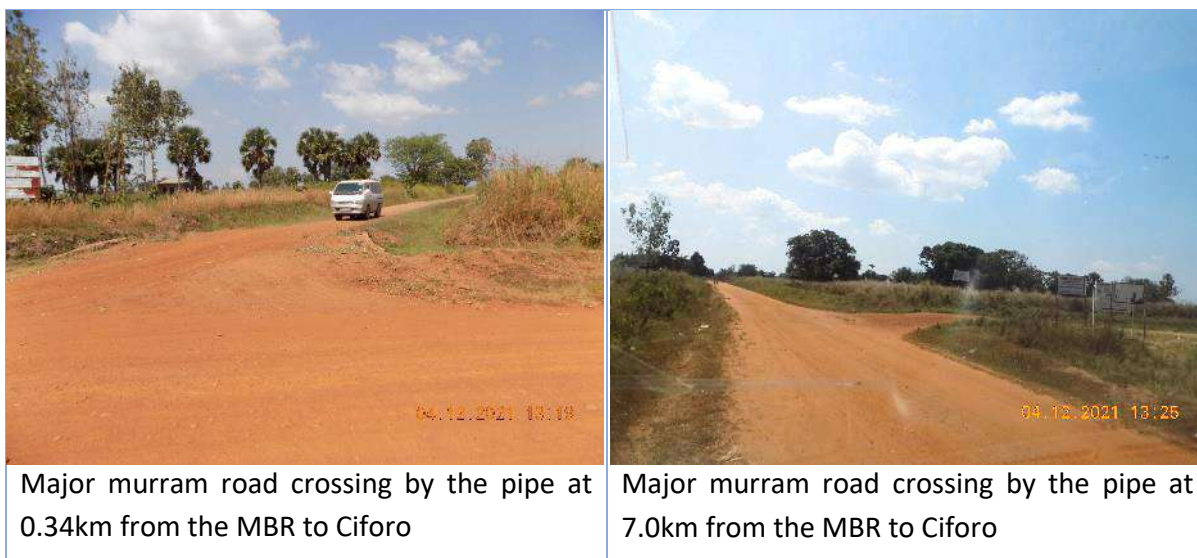
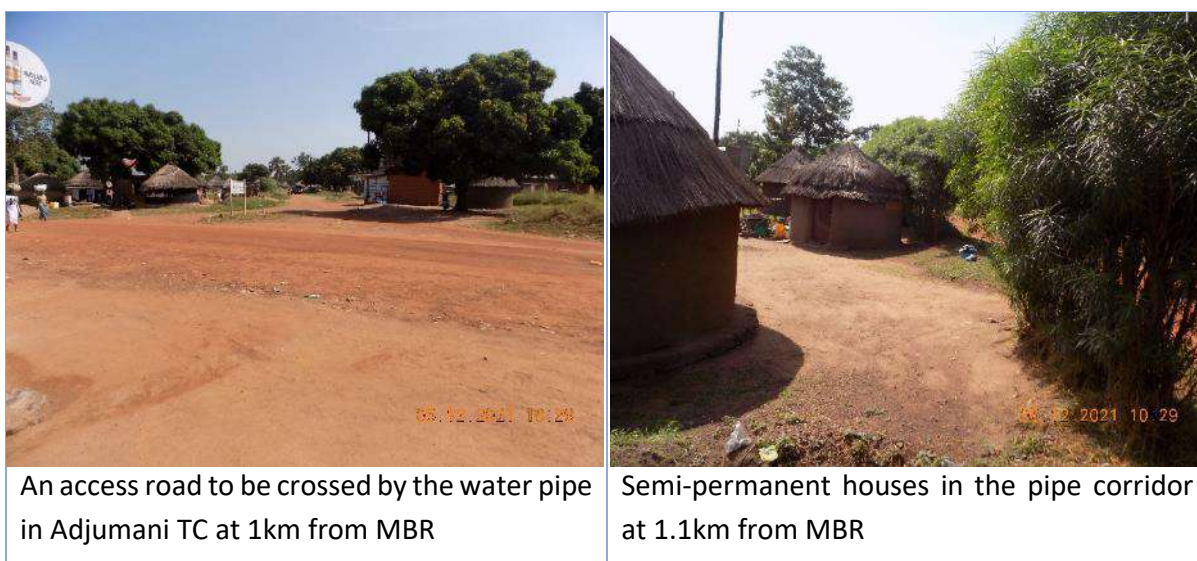


Figure 7-14: Land use/cover along the MBR – Ciforo TL

MBR to Pakele to Dzaipi

From the MBR, a flow gravity main (FGM) of DN250 mm (8.52 km) up to Pakele ESR and a branch of 200 mm (13.67 km) towards Dzaipi ESR. The road will not traverse any major ecosystems except obstacles along the route to Pakele and Dzaipi. It will make 2 major UNRA road crossings (in Adjumani TC and Dzaipi respectively) and more than 10 other access road crossings before reaching Dzaipi. The major obstacles to be encountered by the pipeline also include permanent and semi-permanent structures, trees, small streams, among others within the pipeline corridor. These will be encountered at 1.04 km, 1.18 km, 2.1 – 2.4 km, 4.67km and in Dzaipi trading centre from the MBR. Fortunately, due to the ongoing engagements between the Designing team and the Contractor on the Atiak – Adjumani – Laropi Road, most sections where the pipeline will cross the UNRA road, provisions have been put in place by considering them in the design to avoid breaking the road. Beyond Adjumani Town, the largest section of the pipe will traverse bushlands, open lands, lowlands, farmlands (prisons) and trading centres (Pakele and Dzaipi) with no much interferences.





An access road to be crossed by the water pipe in Adjumani TC at 1.1 km from MBR



Semi-permanent houses in the pipe corridor at 1.18 km from MBR



A eucalyptus woodlot in the pipe corridor at 1.64 km



Permanent building and a road crossing at 2.12 km from MBR



Permanent buildings and a tarmac road crossing at 2.2 km from MBR



Permanent buildings, congested areas and a tarmac road at 2.3 km from MBR



Figure 7-15: Land use/cover along the MBR – Pakele – Dzaipi TL

7.2.2 Ground Water System

7.2.2.1 Borehole (T1) to Logoangwa ESR

The drilled borehole (T1) and the ESR sites are located in Pagirinya village, Logoangwa Parish, Dzaipi Subcounty at E388258, N373301; E389210, N370144; 678 m and 730m ASL, respectively. Water from the borehole will be pumped by a 50 kW at a rate of 86.40 m³/hr to a 117m head. The pumping main will be a DN-150 Class C40 pipe covering 3.96 km length to reach Logoangwa ESR (110 m³). The distribution Network will consist of both the HDPE and uPVC pipes of 63 to 200mm O.D covering 10km length to supply Pagirinya Refugee Camp.

The borehole is located in the bushland of the buffers of R. Nyegai along the Atiak – Adjumani road near the Strabag (Contractor on the road) Stockpile for aggregates. The site currently seems to be of no economic use except cattle grazing. The pumping main from the borehole will maintain the right side of the road up to the main road junction to Pagirinya Refugee camp (1.5km) where it will make a major UNRA road crossing to the left side of the road. Beyond this point, it will maintain the same side of the road up the ESR site traversing several bush and grassland lands

with patches of settlements. The ESR site is on an open land with short grass and currently there is no any economic activity is going on. The nearest homesteads in the north and east are 50m away. Access the ESR site is possible using an unpaved road that requires opening up during construction phase since it is bushy and narrow. The major obstacle includes the big trees encountered at E389354 and N370390 about 0.3 km before the tank site.

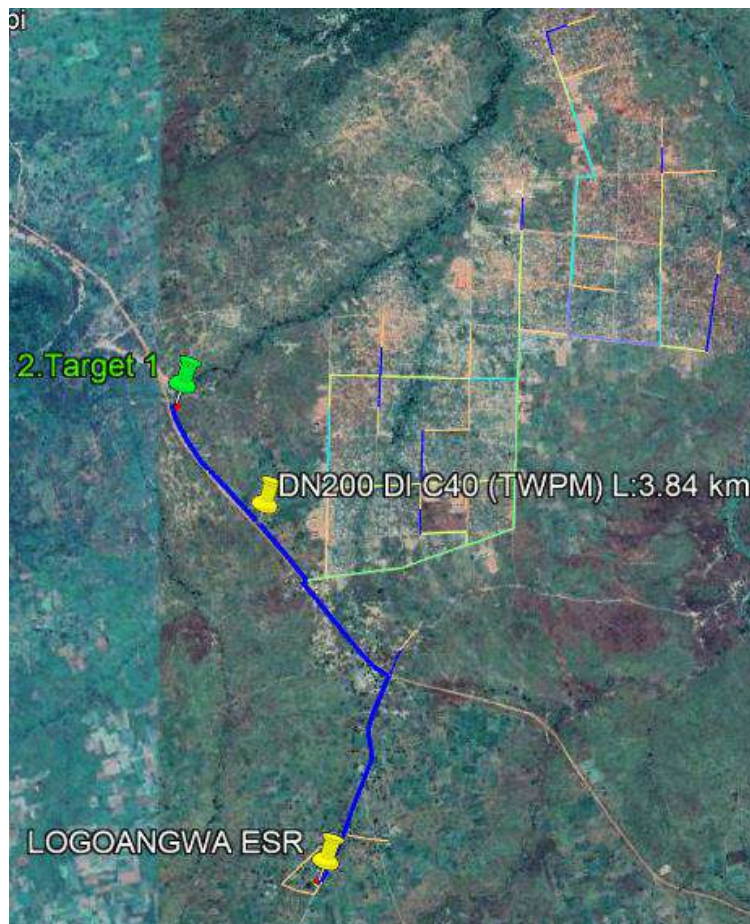


Figure 7-16: Logoangwa Groundwater Supply in Pagirinya



River Nyegai near the borehole site and cattle grazing taking place on the proposed site

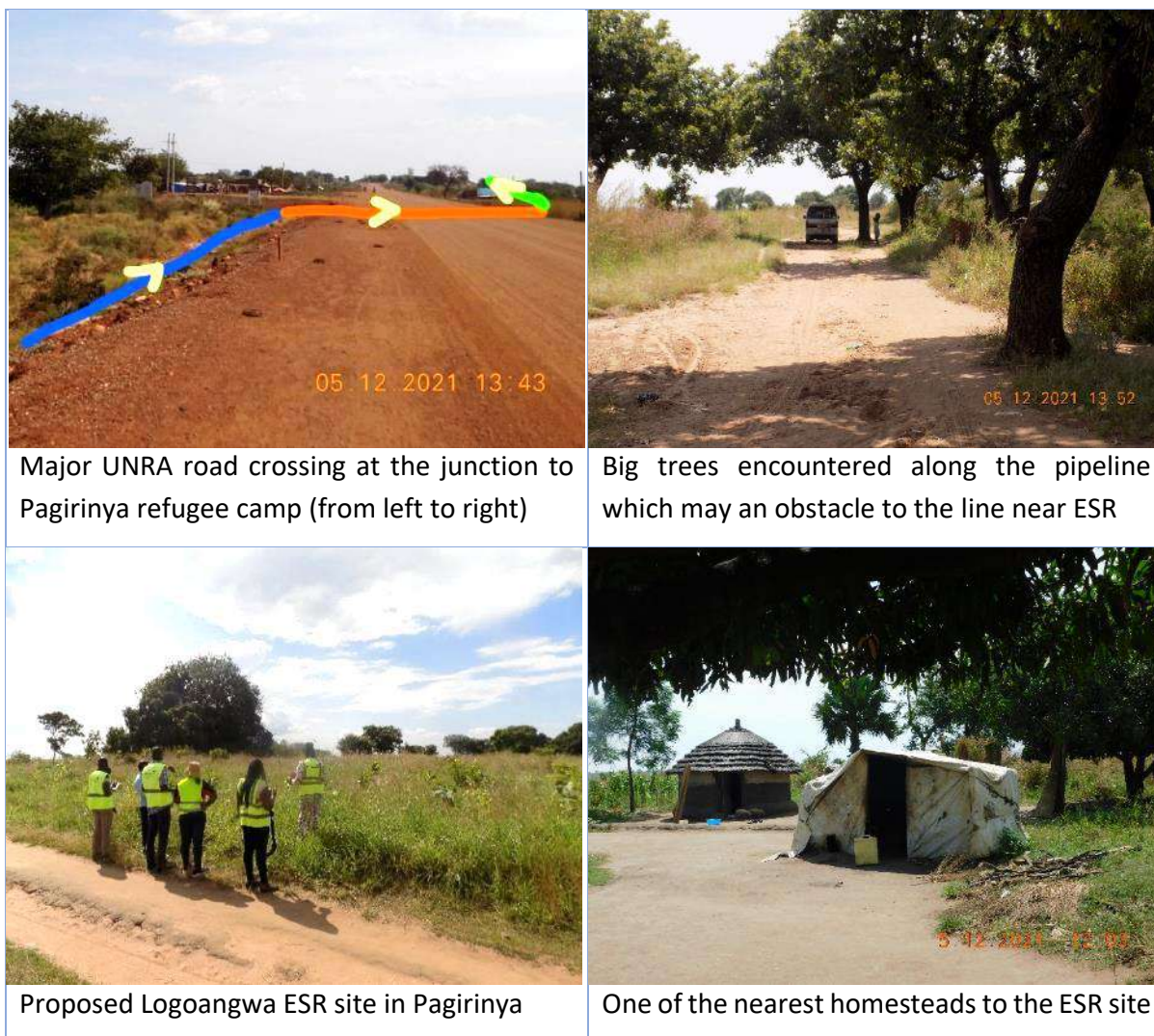


Figure 7-17: Land use/cover from Borehole (T1) to Logoangwa ESR

7.2.2.2 Borehole (T3) to Melijo ESR

The drilled borehole (T3) is located in Gonyila village (Olua II refugee camp), Melijo Parish, Pakele Subcounty at E377363, N365264 and 735m ASL whereas its ESR site will be located Melijo Central village (Olua I refugee camp) at E376557, N362839 and 770 m ASL. Water from the borehole will be pumped by a 40 kW at a rate of 64.8 m³/hr to a 111 m head. The pumping main will be a DN-150 Class C40 pipe covering 4.4 km length to reach Logoangwa ESR (200 m³). The distribution Network will consist of both the HDPE and uPVC pipes of DN-40 to 200 mm O.D covering 07 km length to supply both Olua and Boroli refugee camps.

The pipeline will move along the road for about 0.3 km, traverse the Olua II camp for the first about 0.4km and at 0.8 km, it joins the main road to Olua I and makes a major road crossing to the left side of the road. At 1.0 km, the pipeline will cross River Adidi at 2.5km, it will enter Olua I camp, traversing it for 0.85 km before reaching the tank site which is slightly outside the camp.

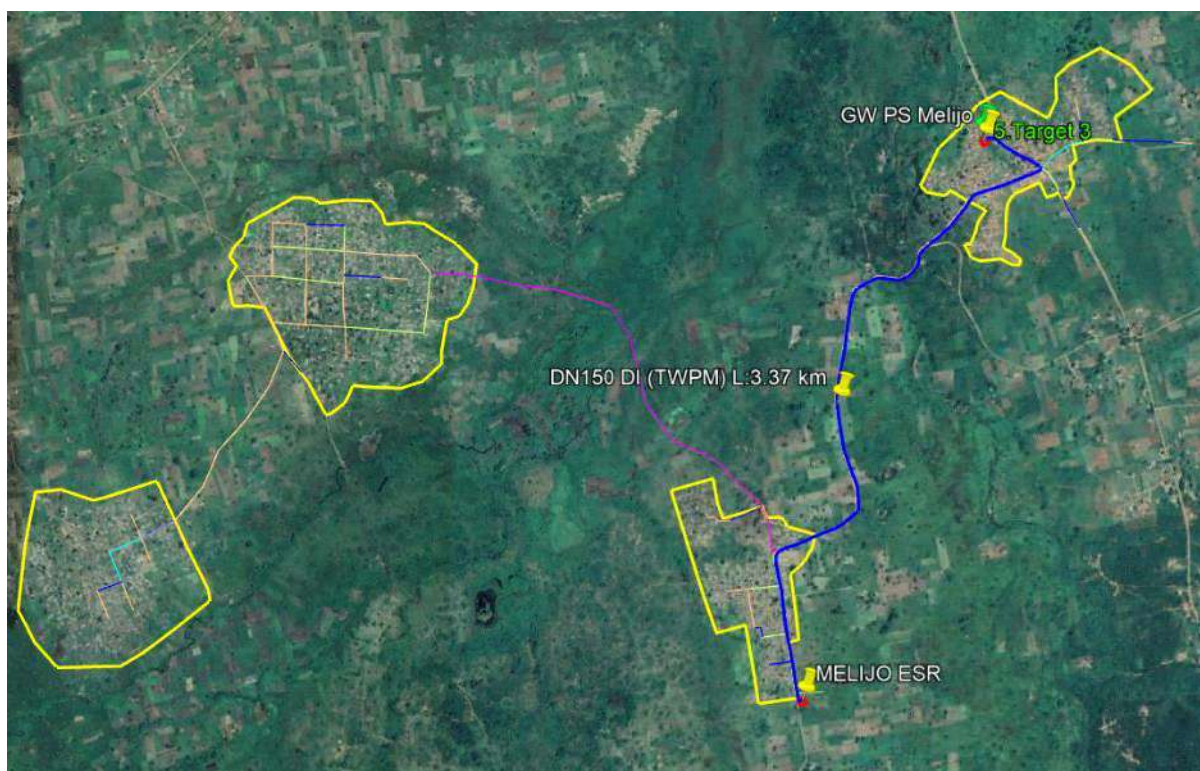


Figure 7-18: Melijo Groundwater Supply in Olua and Boroli



Access to the borehole (T3) in Olua I refugee camp



Olua I trading centre in the camp where the pipe will pass

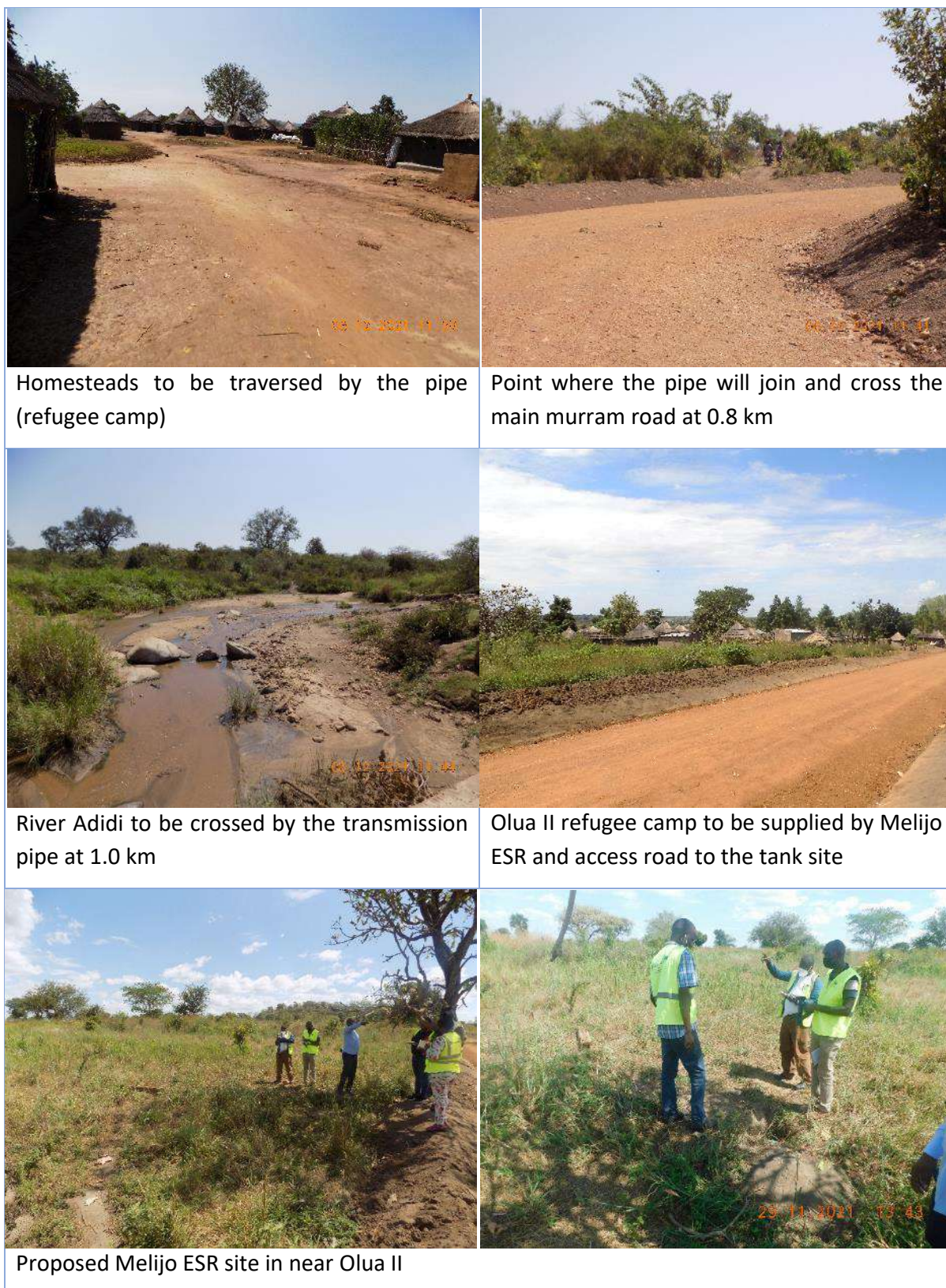


Figure 7-19: Land use/cover from Borehole (T3) to Melijo ESR

7.2.2.3 Borehole (T4) to Ajugopi ESR

The drilled borehole (T4) is located in Ringa Village, Ajugopi Parish Dzaipi, Subcounty at E380630, N379578 and 650 m ASL whereas its ESR site will be located Miaciku at E381635, N378329 and

678 m ASL. Water from the borehole will be pumped by a 15 kW at a rate of 28.8 m³/hr to a 93 m head. The pumping main will be a DN-100 Class C40 pipe covering 3.36 km length to reach Ajugopi ESR (60 m³). The distribution Network will consist of both the HDPE and uPVC pipes of DN-40 to 250 mm O.D covering 10 km length to supply Nyumanzi refugee camp.

The pipeline will traverse bushlands while moving along a very narrow footpath for 0.9km and then joins the Miaciku – Nyamanzi access road which also in a bad condition. The pipe will maintain the right side of the road until it reaches the tank site. However, at 2.1 km, the pipe will cross the Dzaipi – Onigo access road. The pipe will not cross any sensitive ecosystems; however, the borehole access will not be easy unless an access road is opened up during construction. The nearest homesteads to the tank site are about 20m away.

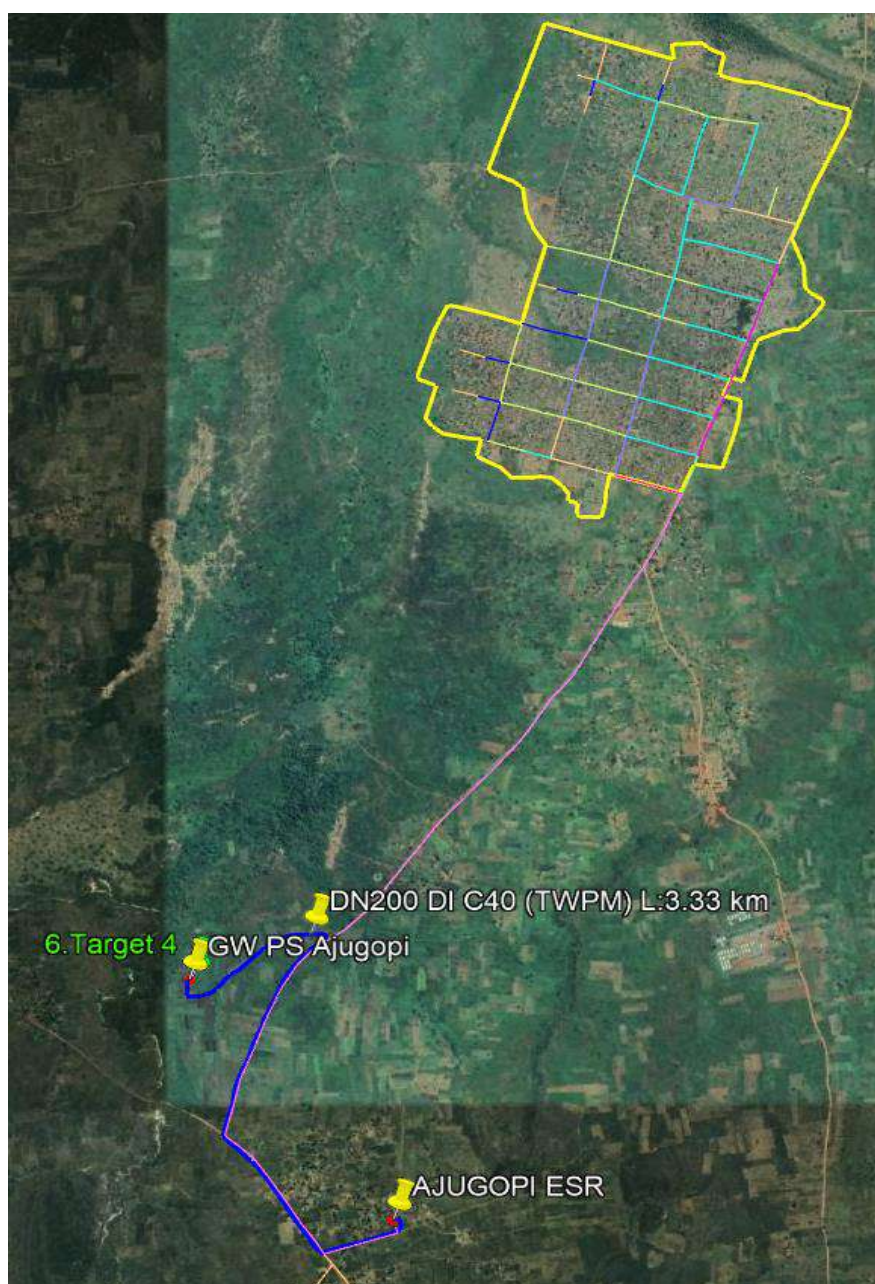


Figure 7-20: Ajugopi Groundwater Supply in Olua and Boroli



Figure 7-21: Land use/cover from Borehole (T3) to Melijo ESR

7.3 Physical Environment Profile

7.3.1 Climate

7.3.1.1 Rainfall and Evapotranspiration

In Adjumani, annual rainfall is predominantly bimodal in distribution, with one distinct rainy season driven by the movement of the Intertropical Convergence Zone (ITCZ). The latter rainfalls are particularly influenced by the El Niño–Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD) (Beck *et al.*, 2018). Long rains (March – May) and short rains (August – November) account for approximately 40 and 25 % of annual rainfall respectively. The rainfall season peaks in May and August and a dry season starting from December to February/March. The lowest rainfall is received in January (13mm) and highest rainfall is received in the months of April (130mm) and October (149mm). The average annual rainfall for Adjumani district is about 887 mm. The annual rainfall has a bimodal pattern that varies between 750 mm to 1500 mm. However, over the past five years parts of the district have experienced unusually long dry spells with low and unpredictable yearly rainfall. This has widely been attributed to cycles in climatic conditions that have also affected the R. Nile water level. The most affected areas are the sub-counties of Adropi, Ciforo and Dzaipi while Ofua and Pakele are wetter and cooler. Figure 7-22

shows the mean monthly rainfall over Adjumani district (NWSC, 2021). On average, the mean monthly evapotranspiration is at its lowest in January (23 mm), and at its highest in May (121 mm) but also that it takes up a bi modal pattern similar to the rainfall variation over the year. During the dry months of December to March, the evapotranspiration is low but in the wet period of April to November, the evapotranspiration is also relatively (Figure 7-22).

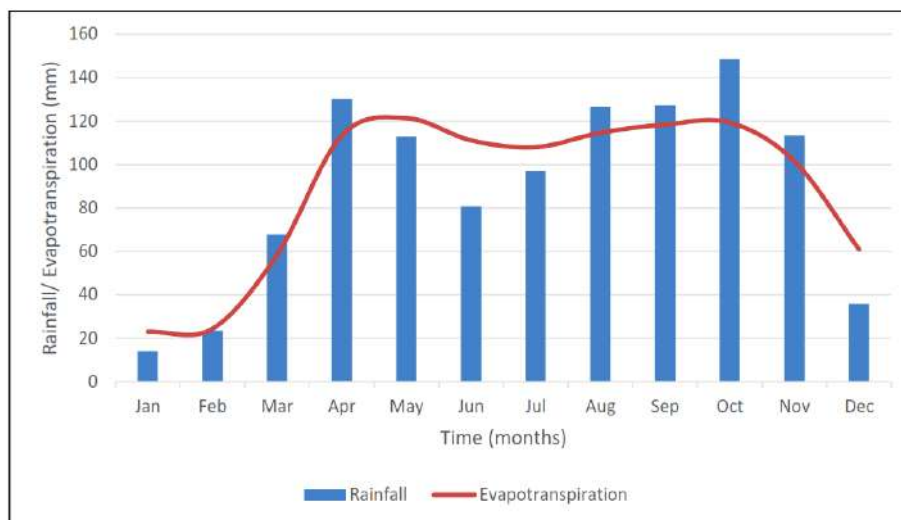


Figure 7-22: Mean monthly rainfall versus evapotranspiration for Adjumani district¹⁰

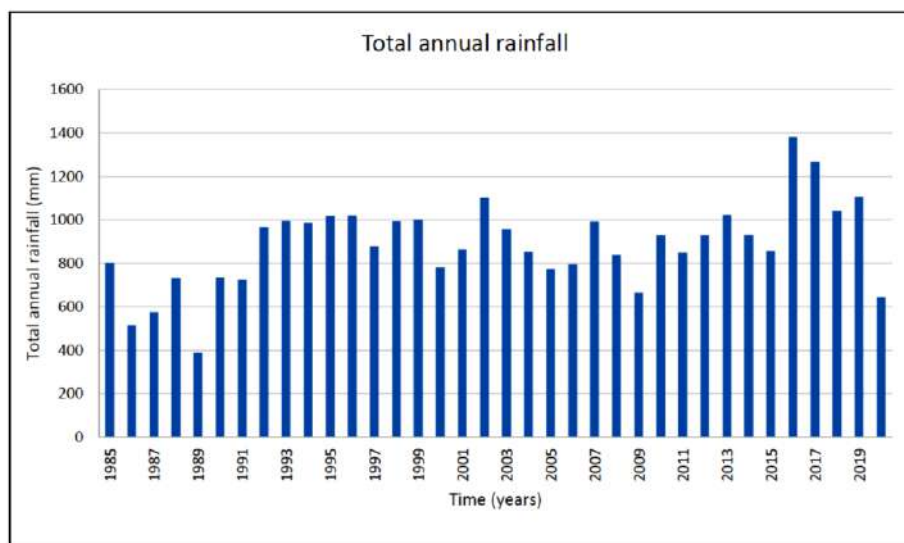


Figure 7-23: Total annual rainfall for Adjumani district

7.3.1.2 Temperature

The minimum and maximum daily temperatures for Adjumani district are averagely 20°C and 32°C consecutively with a daily average of 26°C. The annual mean temperature ranges from 19°C to 36°C. Figure 7-24 and Figure 7-25 show the average monthly temperature for Adjumani district.

¹⁰ NWSC Feasibility Report (Main Design Report) – Adjumani Water Supply and Sanitation Project (2021)

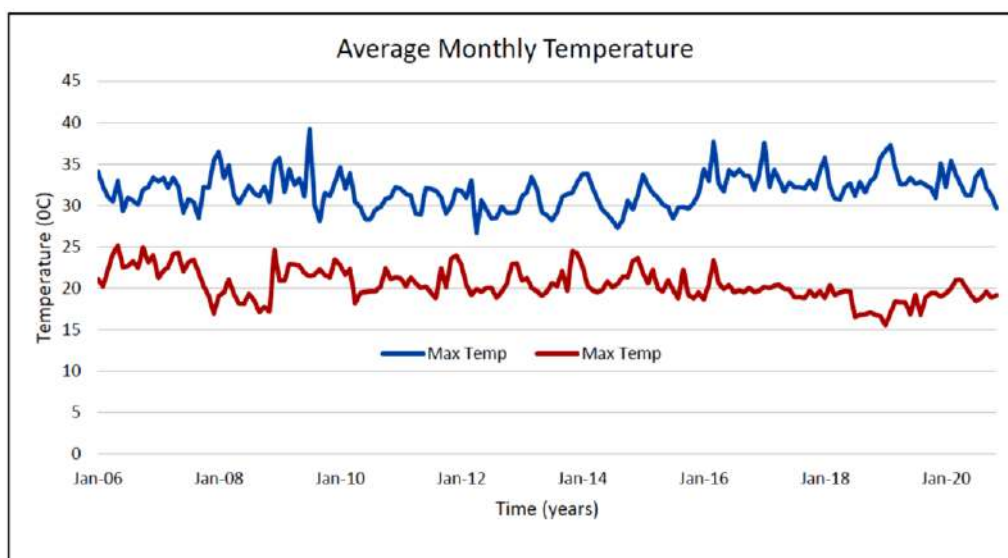


Figure 7-24: Average monthly temperatures from January 2006 to December 2020¹¹

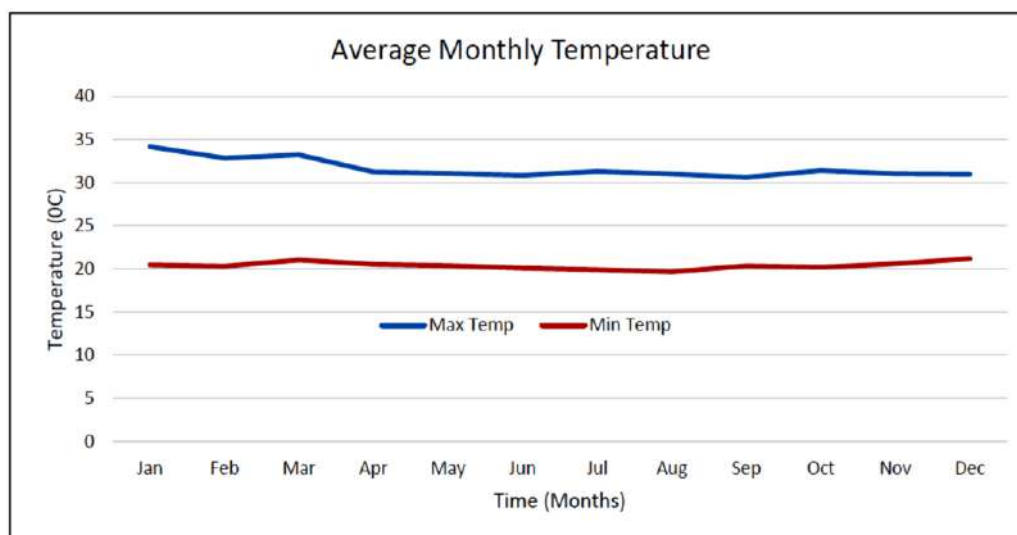


Figure 7-25: Average monthly temperatures

7.3.1.3 Humidity

The minimum relative humidity ranges from 31% to 61% with an average of 50% while the maximum relative humidity ranges from 59% to 87% with an average of 75%. The area has humidity levels of over 80% in most months. This reduces to below 50% during the dry season afternoons especially from December to February. The relative humidity is at its lowest the month of February (59% maximum, 32% minimum), and at its highest in the month of August (86.5% maximum, 60.7% minimum) (ADDP, 2015/16 – 2019/20). Figure 7-26 and Figure 7-27 show the average monthly relative humidity for Adjumani district.

¹¹ NWSC Feasibility Report (Main Design Report) – Adjumani Water Supply and Sanitation Project (2021)

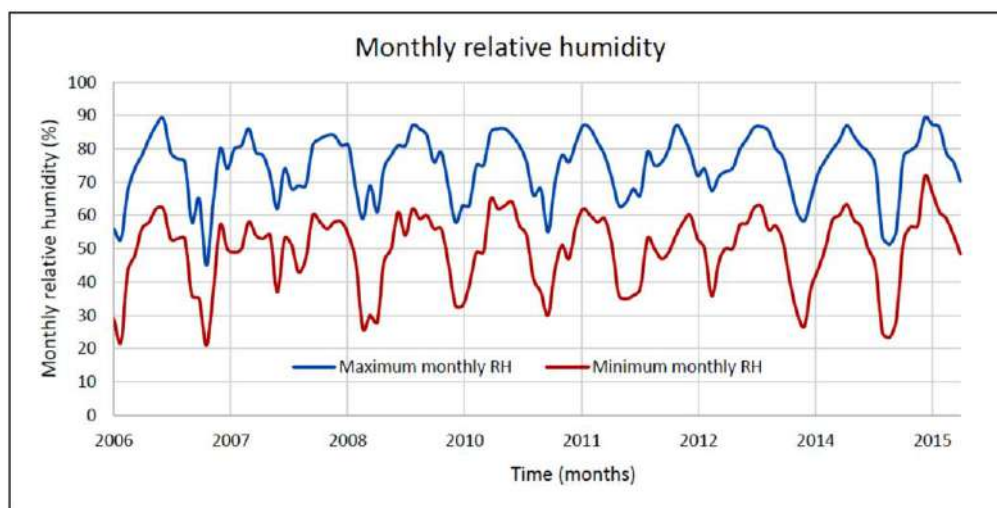


Figure 7-26: Monthly relative humidity from 2006 to 2015¹²

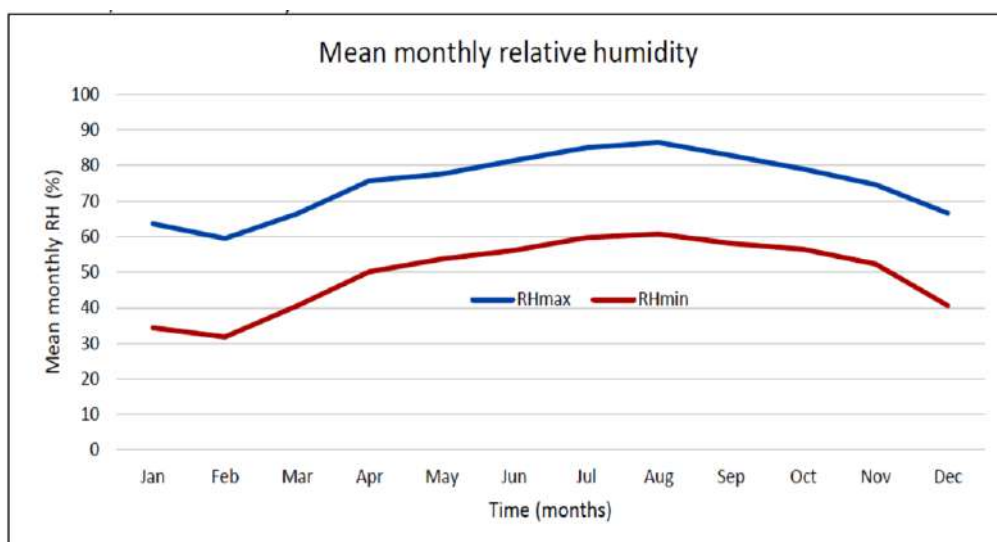


Figure 7-27: Mean monthly relative humidity for Adjumani district

7.3.1.4 Wind Speed

Monthly wind speed for 10 years (2006 - 2015) was extracted from the Wadelai weather station. The mean monthly wind speed in the project area ranges from 4.23 knots (2.18 m/s) to 5.46 knots (2.81 m/s) with an average of 4.88 knots (2.51) while at 3:00 pm, the wind speed varies from 6.79 knots (3.49) to 7.86 knots (4.04 m/s) with an average of 7.25 knots (3.73 m/s) over the year. The wind speed is its lowest in December at 6.8 knots (3.50 m/s) at 3.00 pm and 4.2 knots (2.16 m/s) as 9.00 am. and at its highest in March at 7.8 knots (4.01 m/s) at 3.00 pm. and 4.8 knots (2.47 m/s) at 9.00 am throughout the year (NWSC, 2021) (Figure 7-28).

¹² NWSC Feasibility Report (Main Design Report) – Adjumani Water Supply and Sanitation Project (2021)

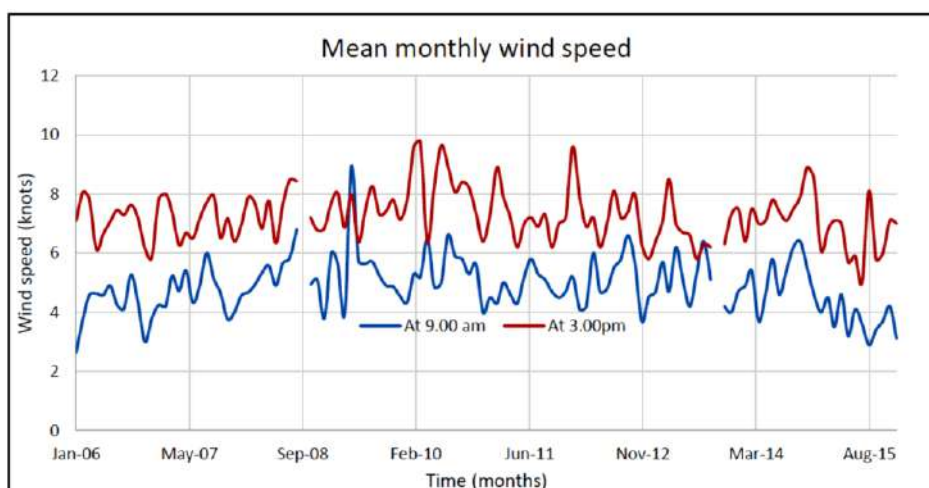


Figure 7-28: Mean monthly wind speed for Adjumani district

Annual average wind speed values were calculated for the 10 years (Figure 7-29). It can be observed that the lowest mean annual wind speed over the entire recorded period was in 2015 (3.7 knots at 9.00 am and 6.5 knots at 3.00 pm) and the highest mean annual wind speed was in 2010 (5.4 knots at 9.00 am and 8.2 knots at 3.00 pm) but on average the wind speed at 9:00 am is 4.9 knots while at 3:00 pm is 7.25 knots with an average of 6 knots.

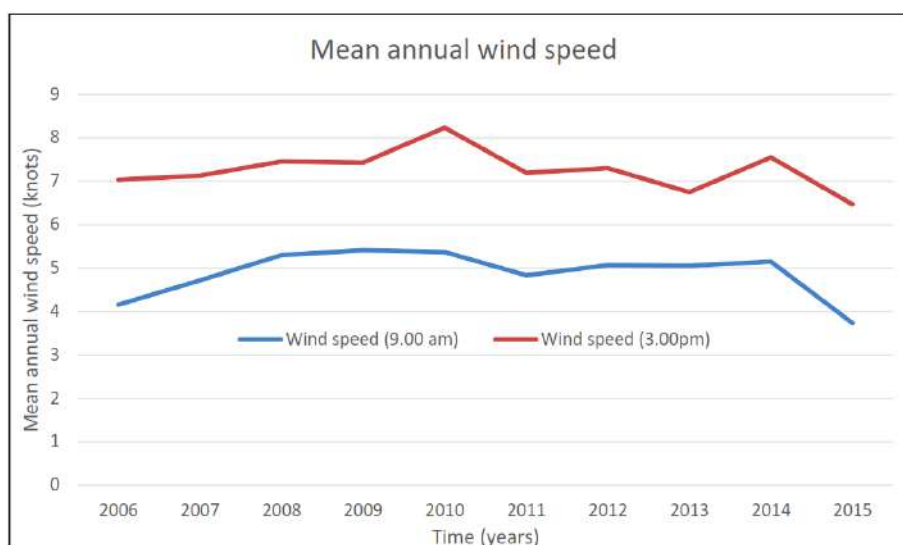


Figure 7-29: Mean annual wind speed for Adjumani district¹³

7.3.2 Topography

Adjumani District lies at an approximate altitude ranging from 600 to 1500 m above sea level. It is principally gentle undulating land. The southern part of the district, especially the area occupied by Ciforo Subcounty comprises of highlands dropping into broad flat-bottomed valleys while the north stands at a low slope gradient towards the Nile (west) and the North (Southern Sudan). The

¹³ NWSC Feasibility Report (Main Design Report) – Adjumani Water Supply and Sanitation Project (2021)

lowest and highest elevations in the project area are 605m and 950 m ASL (Figure 7-30), respectively. The location points and routes of all project components identified are at better and highest elevations especially the ESRs (Figure 7-31 to Figure 7-38). Therefore, distribution pressures and velocities will not be affected. However, the intake location (elevation) at the Nile, being the lowest point and at the bank (at 620m) may be impacted in case of severe floods in the river (Figure 7-31). Therefore, the intake house (surface infrastructure) should atleast be raised 2 to 4m above the existing ground level (EGL) for safety incase of floods in the R.Nile.

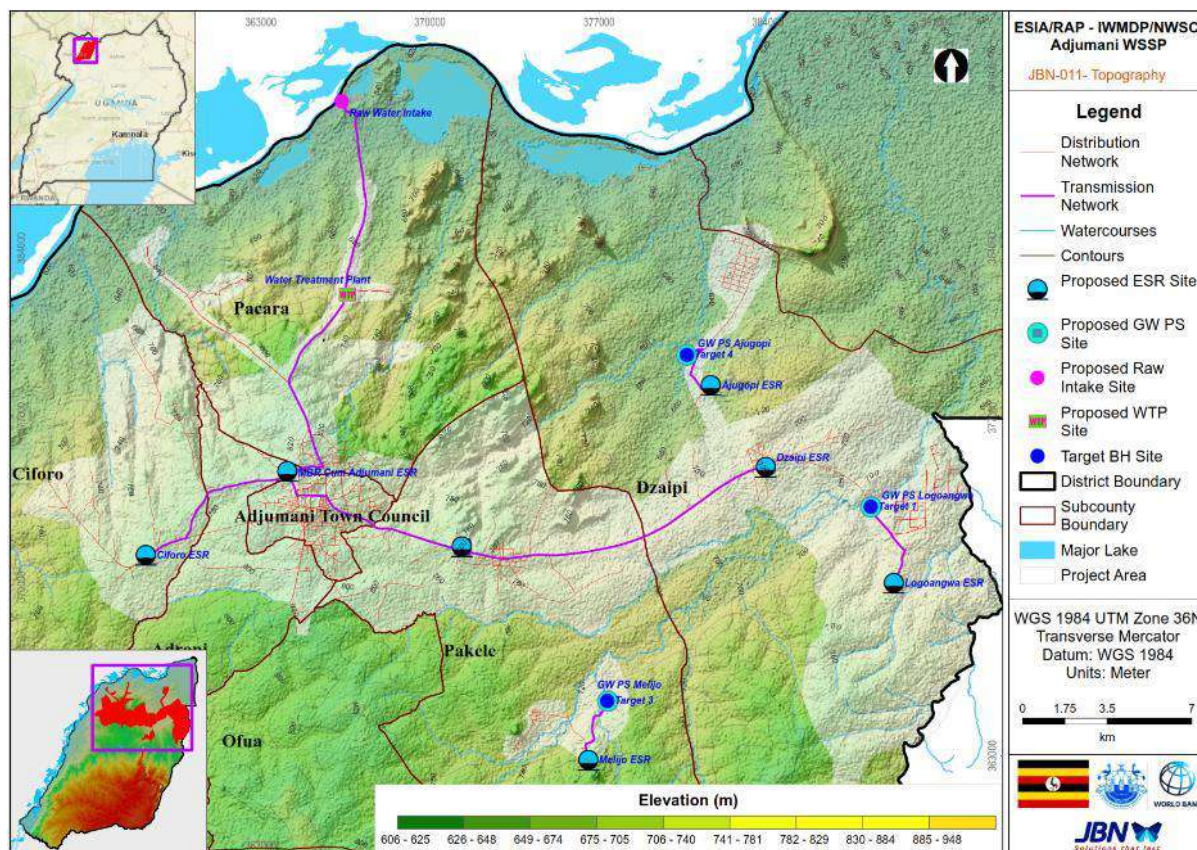


Figure 7-30: Topography of the whole project area



Figure 7-31: Elevation profile between the Intake in Arra West and WTP in Mijare



Figure 7-32: Elevation profile between the WTP and MBR in Adjumani TC



Figure 7-33: Elevation profile between the MBR and Ciforo ESR



Figure 7-34: Elevation profile between the MBR and Pakele ESR

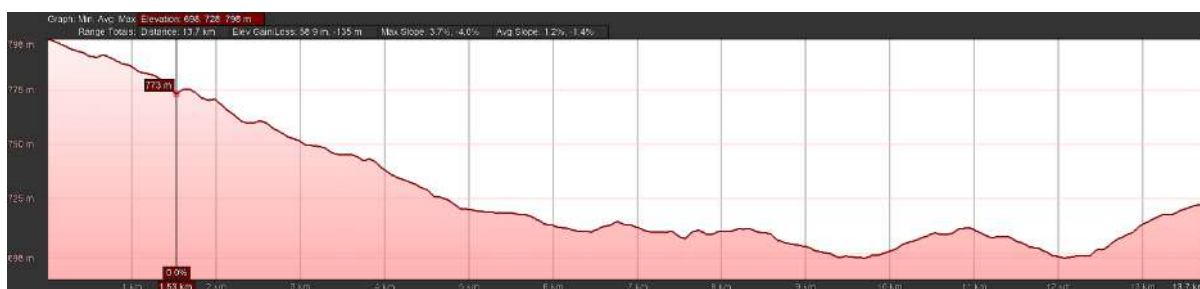


Figure 7-35: Elevation profile between Pakele and Dzaipi ESR



Figure 7-36: Elevation profile between the Borehole (Target, T1) and Logoangwa ESR



Figure 7-37: Elevation profile between the Borehole (Target, T3) and Melijo ESR



Figure 7-38: Elevation profile between the Borehole (Target, T4) and Ajugopi ESR

7.3.3 Geology and Geomorphology

Geology of Uganda is composed predominantly of Archaean basement rocks formed mainly between >3.08 Ga and 2.55 Ga. Approximately 60% of the northern territory of Uganda is underlain by crystalline rocks, formerly attributed to the Archaean Basement Complex. Adjumani lies in the North Uganda Terrane (NUT) separated by a major mid-crustal pre-2.6Ga dislocation from the West Tanzania Terrane (WTT), by the ~1.0 Ga Madi-Igisi Belt from the West Nile Block¹⁴.

The Geology of Adjumani district is predominantly of the Precambrian estimated to be aged 4.0Ga - 541 ma) formally clumped together as being of basement complex. Recent geological mapping activities have enabled more detailed classification/ definition of the geology into different rock types (eons and geological eras). To this effect, the geology of Adjumani district is predominately of Proterozoic eon (2500-541ma) - Neoproterozoic era (541 – 1000ma) and Mesoproterozoic era (1000ma-1600ma), and upper Archaean eon (4000ma-2500ma) - Neorchaean era (2500ma-2800ma)

It is predominately comprised of different geological formation of Neorchaean era (2.59 -2.8 Ga) including gneissic granitoid of the Ugandan neorchaean (2.59Ga-2.65Ga). These are located in the areas of Dzaipi and Adjumani area. These when fractured form the best aquifer in the district - the Biyaya aquifers that feeds that the Adjumani urban water supply are expected to be found in this geological formation. Granites of Adjumani-Midigo (-0.66 Ga) suite comprise rocks of the upper Neoproterozoic era (541ma-1000ma). This is accompanied by thrust faults associated with

¹⁴ GTK. (2014). *Geology and Geodynamic Development of Uganda with Explanation of the 1:1,000,000 - Scale Geological Map* (p. 387). Geological Survey of Finland, Special Paper 55.

the rift system that are predominately parallel to the river Albert Nile and dictate the direction of surface drainage and by inference groundwater flow direction in the area. These account for the outcrops seen in areas of Pakelle, Pachara and Arra.

Granitic and sedimentary gneiss of the Yumbe Complex which is evident in Alere area east of former Ogujebe transit settlement and Amuru group comprising of gneiss amphibolite which is encountered east of Dzaipi around Nyiravur river and along the Pabo-Pakelle shortcut that traverses Amuru district. The rocks of Yumbe complex and Amuru group are both estimated to be of the Neoarchaeon era (2500 Ma-2800Ma). Intermediate Metavolcanic rock (-0.98Ga) as well as the quartzite and Mica Schists all of which belong to Madi Group of upper mesoproterozoic rocks (1000-1600 Ma) age. This geological formation is evident in areas west of Nimule as well as Dufile areas across the Nile in the neighboring Moyo district. These are also found around onigo area towards River Nile in areas of Arra and is accompanied by thrust faults that in part accounts outcrops in Arra area (Figure 7-39).

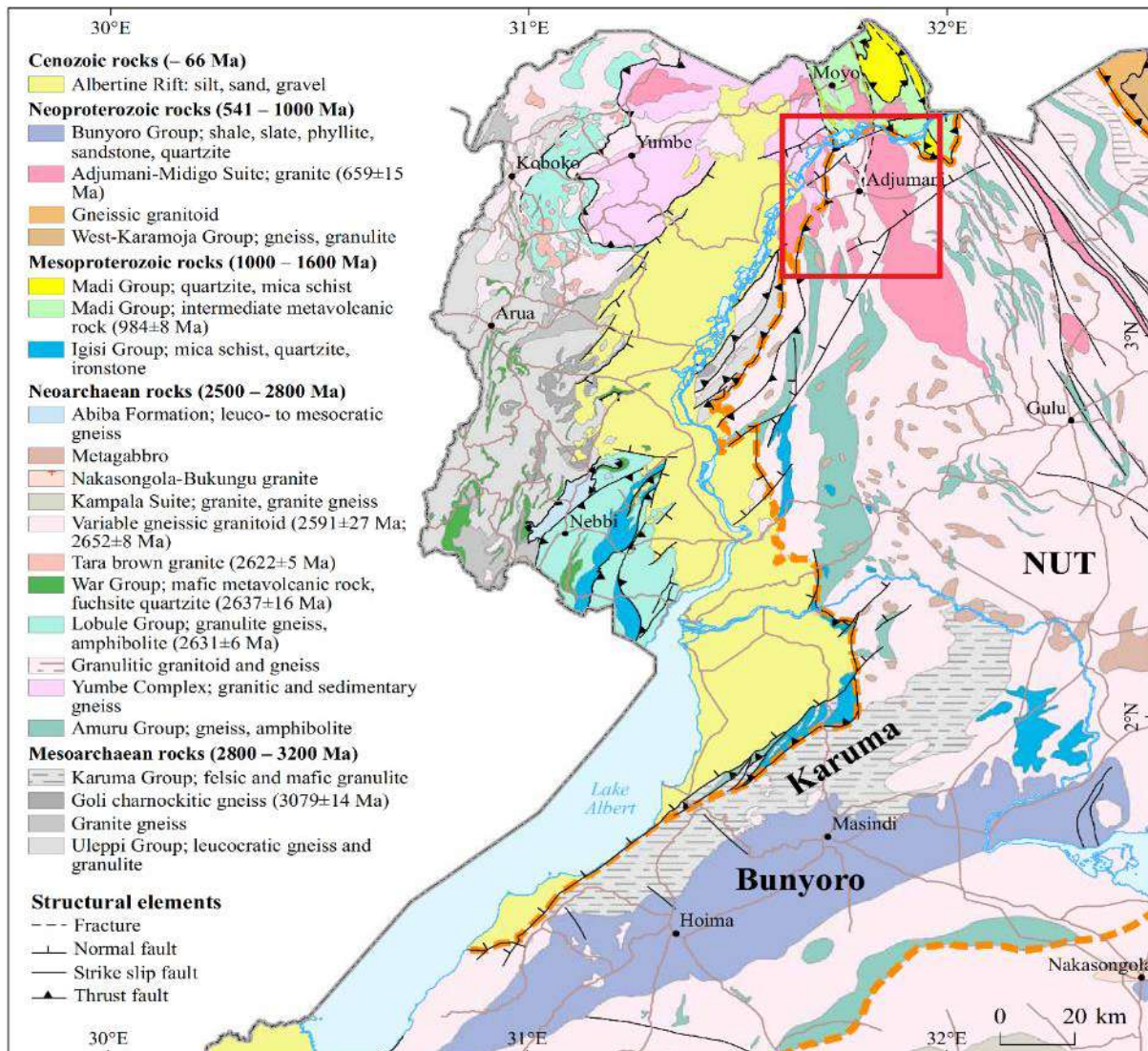


Figure 7-39: Geological outline of the western part of the North Uganda Terrane (NUT) showing the Mesoarchaeon Karuma Group and the discordantly overlying Neoproterozoic Bunyoro Group

The geology of Adjumani district comprises granites and gneisses all the way to the Nile River. It is mainly underlain by a complex formation consisting of highly weathered and exposed hard-core rocks, quartzite sandstones, and clay. These include the Granulite facies rocks including charnokites, enderbites and retrograded derivatives, including the Watian of West Nile; mobilized and intrusive granites; schists, quartzites, marbles and gneisses; and undifferentiated gneisses including elements of P(B) and in the north, granulite facies rocks. Hard-core rock and sand are used in construction work while murram is mined and used for road works. In the Nile (Rift) valley, recent sediments have been deposited on top of the Basement rocks. These generally comprise clay alluvium. North of the Nile, the topography is more broken because of the presence of a north-south trending ridge of resistant, altered sediments and granite (quartzite, marble, schist, gneiss) (Figure 7-40).

The geomorphology of area is majorly formed of the Precambrian (dominantly granulites and gneisses) and Tertiary-Quaternary (unconsolidated sedimentary) rocks.

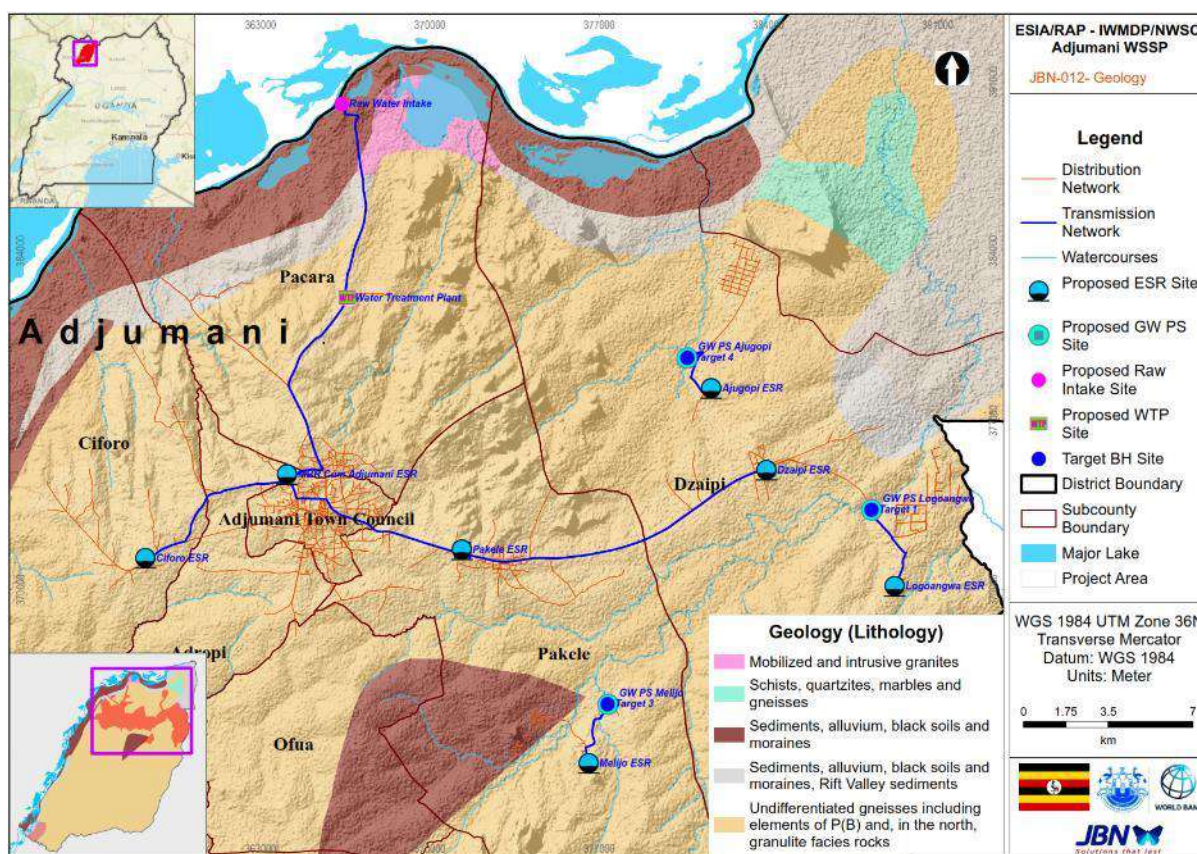


Figure 7-40: Geological formation of Adjumani project area

7.3.4 Hydrogeology

The hydrogeology of Uganda and a large part of the east African region in the tropics is characterized by crystalline bedrocks of the Precambrian era (gneiss granitoids) which usually contain water in fractures and fissures and are able to sustain groundwater supply especially in rural areas. The wells yields are usually less than 1l/s (3.6m³/hr). However, groundwater abstraction in these aquifers provides vital rural and urban water supplies. The weathered regolith overlying the crystalline bedrock is also an important source of aquifer that provides water for

rural communities and has been shown to have better yields than the fractured aquifers. Groundwater accessed from deep fractured or fissured zones can however provide higher yields for large scale water supply.

Groundwater data obtained from the National Groundwater Database (NGD) in Entebbe was used for statistical analysis to understand the hydrogeology and well parameters (of the boreholes) in project area - Adjumani district to inform the insight into its hydrogeology. The average basic parameters of the boreholes drilled in Adjumani district as a whole and the individual subcounty in the district is summarized in the Table 7-1.

Table 7-1: Borehole Parameters at District act and Sub County Level

Sub County	Borehole Hole Depth (m)	Static Water Level -SWL (m)	Test Pump Yield (m3/hr)	Depth to HR (m)	Depth to Aquifer 1 (m)	Depth to Aquifer 2 (m)
Adjumani TC	57.7	11.7	2.6	21.6	22.8	36.9
Adropi	46.1	10.6	3.2	19.7	29.3	36.2
Ciforo	61.2	6.5	3.3	16.4	26.6	34.5
Dzaipi	67.8	18.1	3.3	22.2	34.9	59.3
Itirikwa	45.4	8.2	1.7	26.7	23.0	23.7
Ukusijoni	40.9	5.1	1.6	26.2	23.0	34.3
Ofua	56.8	10.3	3.4	25.1	31.5	42.3
Pacara	77.0	16.9	1.8	18.3	18.0	40.6
Pakele	66.9	13.5	3.6	21.7	34.3	45.7
District	61.0	13.6	2.8	20.9	28.1	40.5

The parameters of production boreholes drilled at three (3) locations under project i.e. two (2) in Dzaipi subcounty at Ajugopi¹⁵ and Logoangwa¹⁶ and one (1) in Pakele sub county at Merijo¹⁷ are shown in the Table 7-2.

Table 7-2: Parameters of boreholes drilled under the Adjumani project

Drilled Borehole	Depth (m)	Yield ¹⁸ M3/hr	Host Community	Refugee Settlements	2040 Projected Population			2040 Water Demand
					Refugees ²⁰	Host	Total	

¹⁵ This is to serve host community in the area and refugees in Nyumanzi refugee settlement.

¹⁶ This is to serve host community in the area and refugees in Pagirinya, Ayilo1 and Ayilo 2 settlements.

¹⁷ This is to serve host community in the area and refugees in Olua 1, Olua 2, Boroli 1 and Boroli2 settlements

¹⁸ As contained in the feasibility report – test pumping report was not seen

²⁰ Proportion of these who will be served by piped water schemes is not known.

								MLD ¹⁹
T4- Ajugopi	65	25	Ajugopi	Nyumanzi	50,413	2,318 ²¹	52,731	0.079
T3 - Melijo	62	74	Melijo and Boroli	Olua1, Olua2, Boroli1, Boroli2,	27,930	3,149 ²²	31,079	0.109
T1 - Logoangwa	55	100	Logoangwa	Pagirinya, Ayilo 1, Ayilo 2	83,608	3,840 ²³	87,448	0.131

The analysis of the National Groundwater Database for the project area shows that:

- The depth to the bedrock varies from 16.4 mbgl in Ciforo Subcounty to 26.7 mbgl in Itirikwa Sub County with an average of 20.9 m across the district.
- The overlying layer above the rock is a weathered regolith consisting of mainly laterite and clays and sands.
- The depth of the first water strike varies from 18 mbgl in Pacara Subcounty to 34.9 mbgl in Dzaipi with an average of 28.1m. This implies that groundwater in Pacara is within the weathered regolith while in Adjumani it is close to the upper fissured or fractured bedrock zone. Hence, aquifers in the project area can be in the overburden or bedrock aquifers.
- The depth to static water level varies from 5.1 mbgl in Ukusijoni Sub County to 18.1 mbgl in Dzaipa Sub County with an average of 13.6 m, so that most static water levels in the drilled wells occur with the weathered zone. The implication of this is that if not well constructed (through casing off) the water in the borehole would be prone to contamination.
- The constant discharge in the project area varies from 1.6 m³/hr to 3.6 m³/hr. The average constant discharge is about 2.7 m³/hr which is good for both rural and motorized boreholes.

Groundwater data obtained from the National groundwater database in Entebbe was used to reconstruct the hydrogeology of the project area (see Figure 1-3, Figure 1-4 and Figure 1-5).

¹⁹ These are the proportions of the respective host communities to be supplied by the piped water schemes.

²¹ Only 1,159 of these will be supplied by the piped water scheme.

²² These include 2,190 from Melijo and 959 from Boroli. Of these, 1,575 (1,095 from Melijo and 480 from Boroli) will be supplied by the piped water scheme

²³ Only 1,920 of these will be supplied by the piped water scheme.

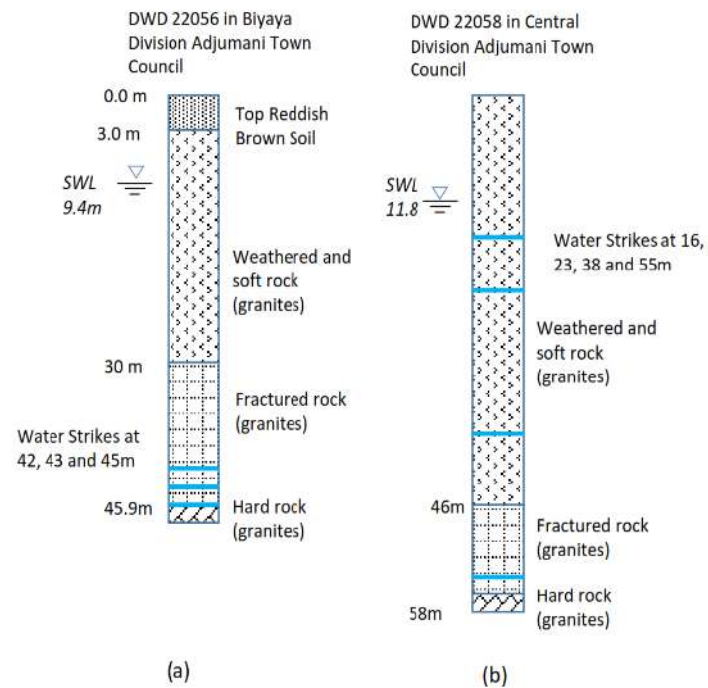


Figure 7-41: Lithology of the Adjumani Town Council (a) Biyaya Division (b) Central Division

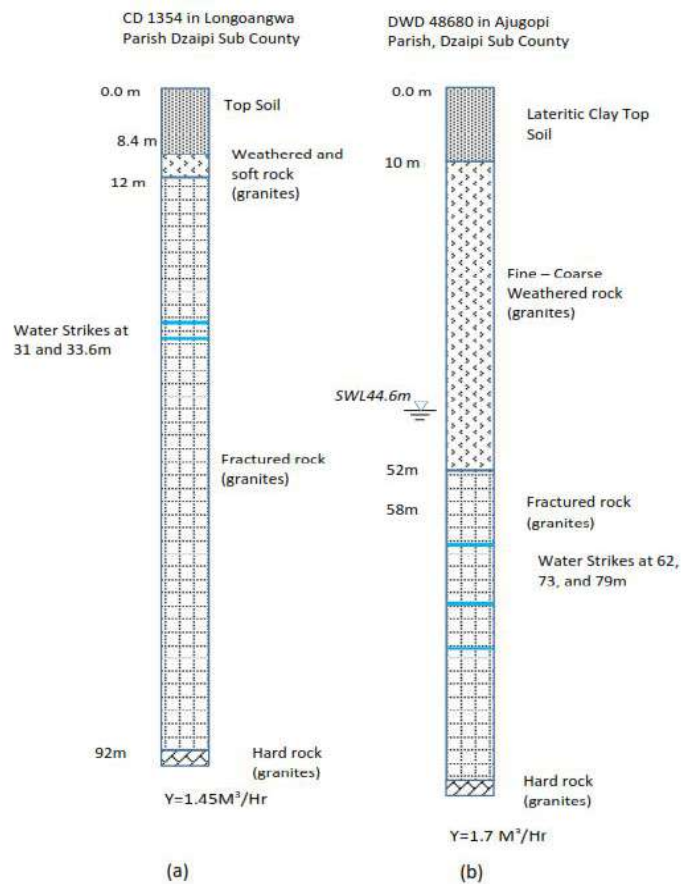


Figure 7-42 Lithology of Dzaipi Sub county (a) Logoangwa Parish (b) Ajugopi Parish

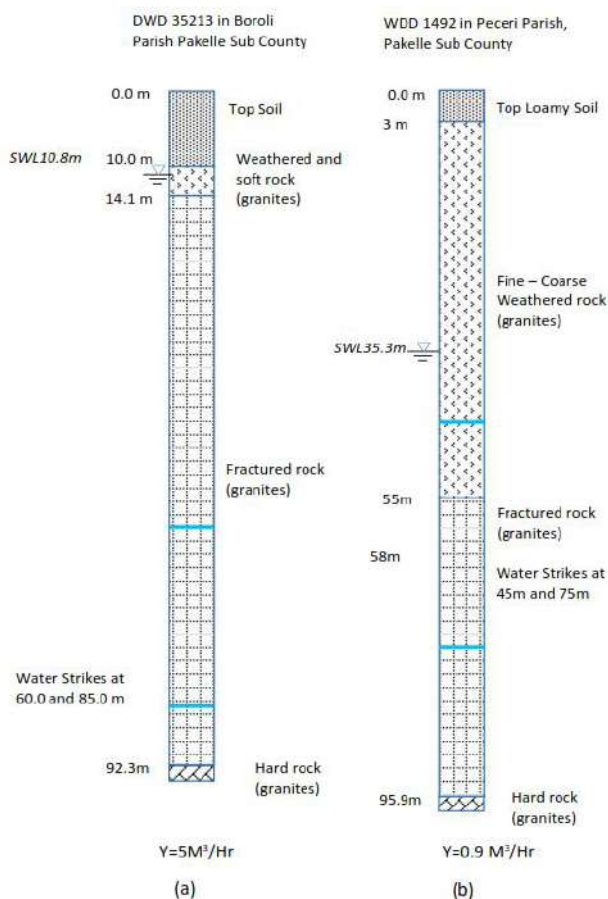


Figure 7-43 Lithology of Pakele Subcounty (a) Boroli Parish (b) Paceri Parish

With the foregoing geo-statistical analysis of well parameters at a broad level with sub county representative parameters as scale of analysis, this is an overalls representation of the groundwater situation. There are however other hydrogeological occurrences within the district which are missed out at that level of analysis. Besides, while the average well yield in the district is $2.7 \text{ m}^3/\text{hr}$ as shown above. Boreholes beyond this yield have also been registered as evidenced by the ones drilled under this project which are shown in the Table 7-2 above. This could imply that since most of the data in the NGD is of old boreholes drilled when exploration technology was not as advances hand pumps was the abstraction technology of choice, it is likely that more data from highly yielding will be captured to affect this result of such analysis.

7.3.5 Groundwater Flow Analysis

The groundwater flow direction mimics the surface hydrology which Adjumani District is influenced by the Albert Nile which forms the western²⁴ and northern²⁵ boundary of the district. The groundwater flow direction in the project area is thus northwards and westward towards Albert Nile.

²⁴ Separating the Adjumani district from Arua and Obongi District in the West.

²⁵ Separating Adjumani Distict from Moyo District and South Sudan in the North.

7.3.6 Soils

Adjumani soils were formed as a result of geological and weathering processes (Figure 7-44). They are mainly hydromorphic soils characterised by undifferentiated river alluvium dominated by shallow brown sandy loams over old alluvial of Palabek Complex (Leptosols) - Basement complex gneisses; shallow brown sandy loams over rock or laterite of Anaka Complex (Acric Ferralsols) - Basement complex quartzites and granites; brown sandy clays mottled below and brown sandy loams of Pakele Complex (Vertisols) - Basement complex gneiss and alluvium; grey-brown sandy over brown sands of Laropi Series (Arenosols) – recent river alluvial sand; red and brown sandy loams over murram and ironstone and shallow skeletal loams often on steep slopes of Metu Complex (Leptosols) - Quartzites sandstones and relic laterite.

The soils are considered fertile and of medium to high productivity, with Ofua sub-county in Adjumani reported to have the richest soils represented by the Mulembo Series. Figure 7-45 shows the spatial distribution of soil type within the Adjumani district.

The Adjumani WSSP will be implemented in areas covered by the shallow brown sandy loams over old alluvial (Leptosols) of Palabek Complex - Basement complex gneisses and brown sandy clays mottled below and brown sandy loams (Vertisols) of Pakelek Complex - Basement complex gneiss and alluvium (Table 7-3).



Figure 7-44: Some of the soil formations in the project area catchment

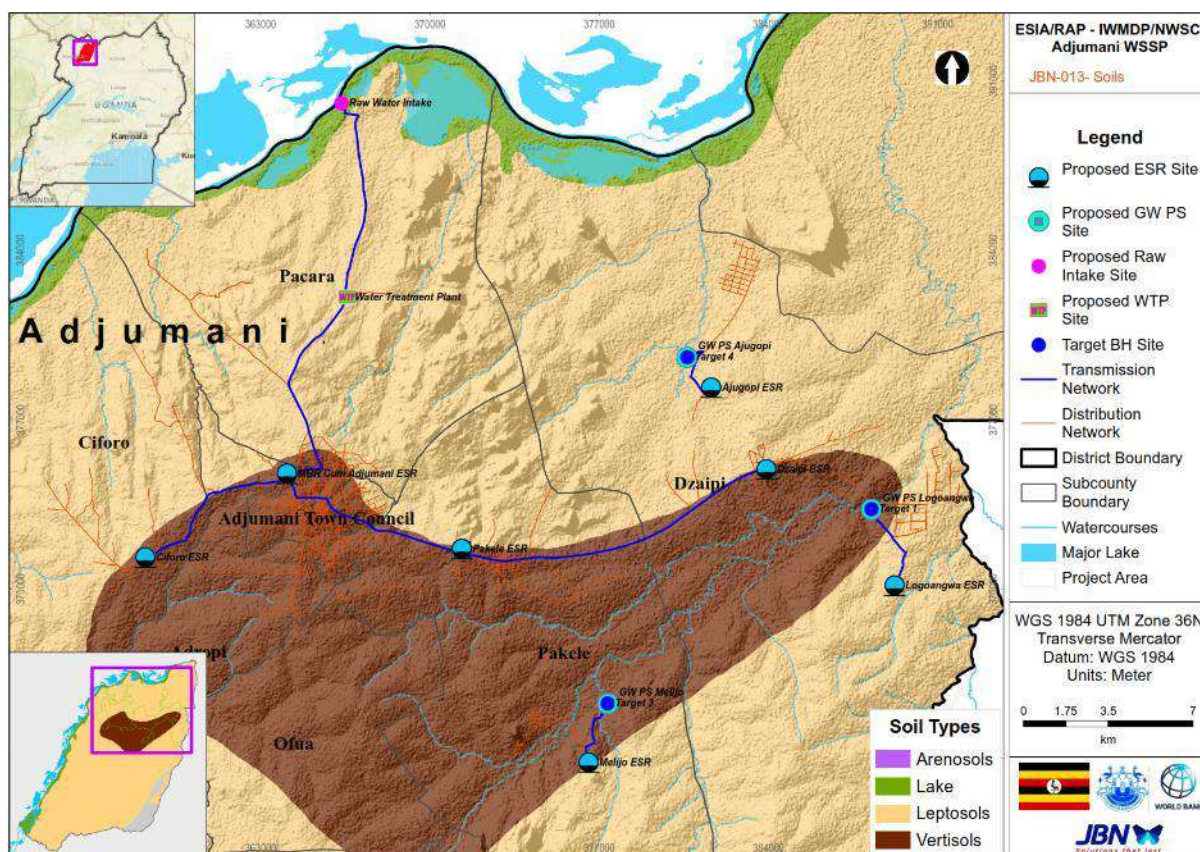


Figure 7-45: Soil formation of the project area

Table 7-3: Soil types and coverage in the Adjumani WSSP area catchment

Soil Type (FAO)	Description and Composition	Parent Rock	Mapping Unit	Area (Ha)	% Area
Leptosols	Shallow brown sandy loams over old alluvial	Basement complex gneisses	Palabek Complex	23561.11	63.55
Vertisols	Brown sandy clays mottled below and brown sandy loams	Basement complex gneiss and alluvium	Pakelek Complex	13512.78	36.45
Total				37073.88	100

Source: JBN (GIS) 2022

Intake: The site at Arra village predominantly consisted of ROCK which was encountered at 2.0mbgl. The layer at 0.6-2.0m consisted of residual clayey Gravel with boulders. The ground water table at Arra was was encountered at 0.3m at Arra village. The Geotechnical report (SPT test) indicates that the soils have Allowable Bearing Capacities ranging from 57.5KPa to >400KPa while the Allowable Bearing capacity of 103- 186KPa based on the Direct shear test.

WTP: There was no ground water encountered at the Water Treatment Plant. The subsurface layers consisted of dense Clayey SAND and stiff Sandy lean CLAY soils up to 2m depth where ROCK was encountered. Strong ROCK was encountered by 4mbgl and 2.8mbgl at TB 2 and TB 4

respectively while it was weak up to 10mbgl at TB3. The soils also had Allowable Bearing Capacities ranging between 263.8 - >500KPa based on the SPT test.

ESRs: There was no ground water encountered at any of the proposed Elevated Service Reservoir locations. The investigated points at the Elevated Service Reservoir locations were bored to a maximum depth of 5m, and the subsurface layers were found to predominantly consist of sandy CLAY top layers underlain by SANDs which existed as Clayey SANDs, SANDs with clay and SANDs with silt with highly weathered Rock was also encountered below the SAND layers in some locations. From the USCS, the soils exhibited medium plasticity with NMC values below the PL. The soils at the ESR locations had Allowable Bearing Capacities ranging between 137.4 - >500KPa based on the SPT test.

MBR: There was no ground water encountered at the MBR location. The subsurface layers at the site predominantly consisted of medium dense micaceous silty SANDs overlain by clayey SAND and silty CLAY layers of 1.3m and 1.m thick respectively. The MBR consisted of soils with Allowable Bearing Capacities ranging between 68.3 – 266.6Kpa based on the SPT test while the Allowable Bearing capacity based on the Direct shear test ranged between 163-247KPa. The soils also exhibited low permeability indicating poor drainage soils; they were found to have a medium rate of consolidation and medium volume compressibility.

Tls and DLs: The pipeline routes that were investigated predominantly consisted of SANDs, GRAVELs and CLAYs which predominantly exhibited medium to high plasticity with a few None plastic soils. The insitu moisture was predominantly below the Plastic limit (PL). The soils along the main pipe also had medium to high resistivities indicating moderate to mild corrosivity potential. The Allowable Bearing capacity based on the Direct shear test at this site also ranged between 88-61KPa.

Therefore, all the at tested sites, the Allowable soil bearing capacity. The allowable bearing capacity of soil is the amount of load the soil can take without experiencing shear failure or exceeding the allowable amount of settlement. Hence the sites in Adjumani are safe.

7.3.7 Tectonics and Seismology

Uganda is situated between two seismically active branches of the East African Rift System; the Western Rift (stretching from Aswa Fault Zone in the north to Lake Tanganyika in the south), and the Eastern Rift (stretching from Lake Turkana in the north to Lake Eyasi in the south (Twesigomwe, 1997). Within Uganda, there are 3 regions and seismic hazards (risk levels) i.e., the high, medium and low/none risk levels (**Figure 7-46**).

Adjumani district is largely located on a fairly stable geological unit with medium seismic hazard (risk levels) along the Albertine environment (western rift valley). Although, numerous faults exist within the country and tremors due to earthquakes that do occur, the project area is located within the shield area, along the western rift and about 20 km south of the Aswa Fault Zone. The sites are located in Zone 2 of the Seismic Zoning of Uganda, implying a medium risk (**Figure 7-46**). It is therefore susceptible to the medium potential effect of major tectonic features of regional scale. According to (UNBS, 2003), the US 319:2003 Uganda Standard for Seismic code of practice for structural designs, the region has seismic zoning structural design factor of 0.8 (Zmax).

Therefore, appropriate design of seismic acceleration values consistent with Contract Technical Specifications and National standards should be adopted during structural designs due to the medium likelihood of earthquake occurrence in the area.

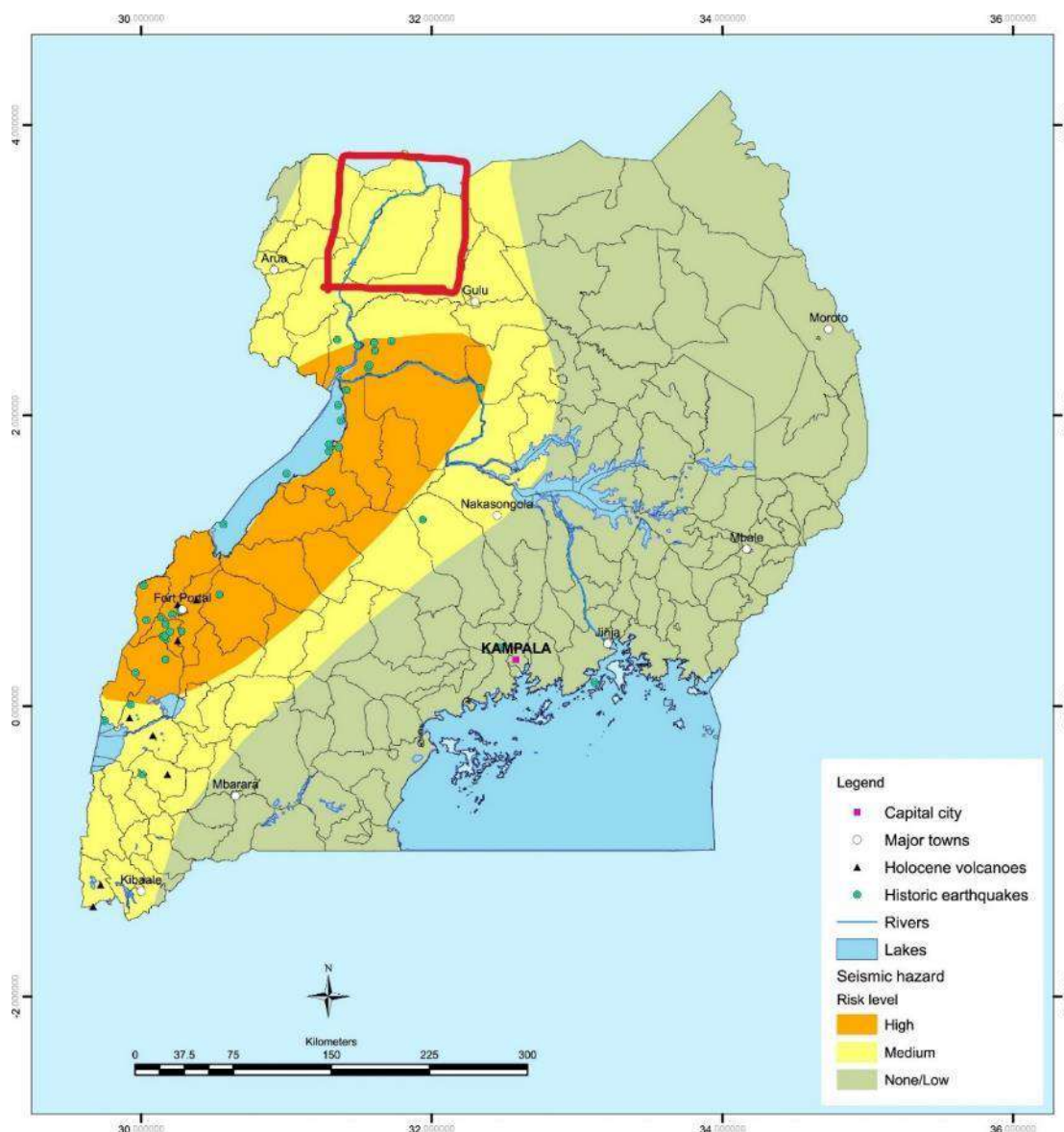


Figure 7-46: Seismic hazard zonation map of Uganda²⁶

7.3.8 Hydrology and Water Resources

Uganda has four (4) main Water Management Zones (WMZs) (Upper Nile, Kyoga, Victoria and Albert) and eight (8) river basins (Albert Nile, Aswa, Kidepo, L. Kyoga, L. Victoria, L. Edward, L. Albert and Victoria Nile). Adjumani district has both surface and ground water resources.

Open water bodies comprise 2.5% of total land area with River Nile (Albert Nile) being the main feature of the district. It forms a natural boundary of the district on the southwest, west and north. Albert Nile starts at the outlet of Lake Albert and runs through the northern part of Uganda

²⁶ https://apps.rcmr.org/atlas/igad/countrylevel/uganda/uganda_seismic_volcanic.html

up to the South Sudan border. It drains an area of 21,234km² from West Nile and Northern Uganda, covering 11 districts about 11 primary sub-catchments and 22 secondary sub-catchments which are shared among various districts. Other prominent rivers include Itirikwa, Esia, Ayugi, Tete, Adidi and Zoka. In Adropi sub-county there are prominent seasonal streams like Assisi, Adropi, Robidire, Olijj, Ariwa, Minia, Surumu, Uraeyi that drain into river Nile. These flood during the rainy season but dry out during the peak of the dry season (January - March). For the surface water under the Adjumani WSSP, the intake will be in Laropi sub-catchment which covers about 1,149 km² along River Nile in Arra West Village.

The Upper Nile Basin is underlain primarily by deeply weathered crystalline rock aquifer systems that have evolved through long-term, tectonically driven cycles of deep weathering and erosion. Groundwater occurs within unconsolidated regoliths or “saprolite” and, below this, in fractured bedrock, known as “saprock”. The district is also endowed with a hot spring, located at Amuru in Pakele sub-county. According to the geotechnical investigations report, groundwater resource is potentially good, particularly for well development. Borehole yields are fairly good and can provide safe drinking water. However, in some areas it is very difficult to drill boreholes, e.g., Itoasi village and Ibibiaworo village in Dzaipi and Pakele sub counties respectively (NWSC 2021).

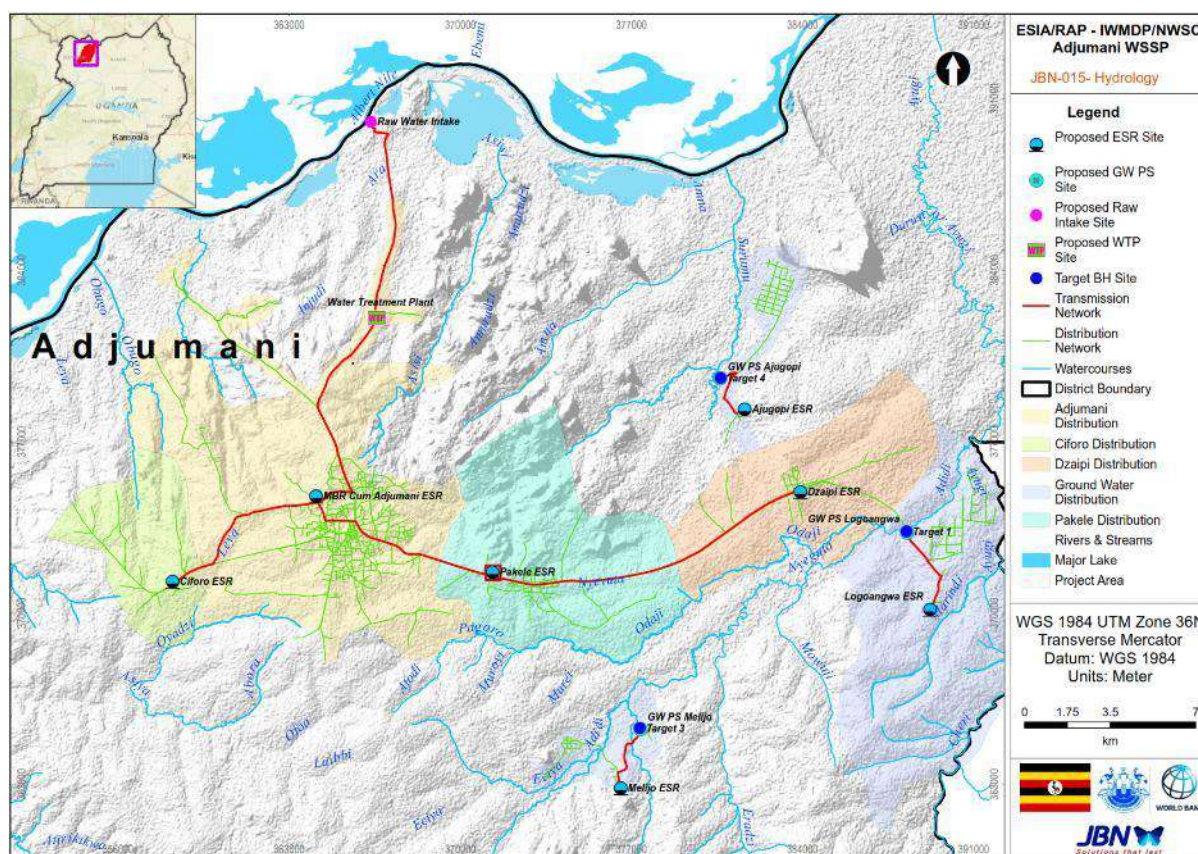


Figure 7-47: Surface water river networks in the project area



River Nile at the Intake in Arra West



Tributary to R. Adidi between Olua I and Olua II camps



River Adidi – near T3



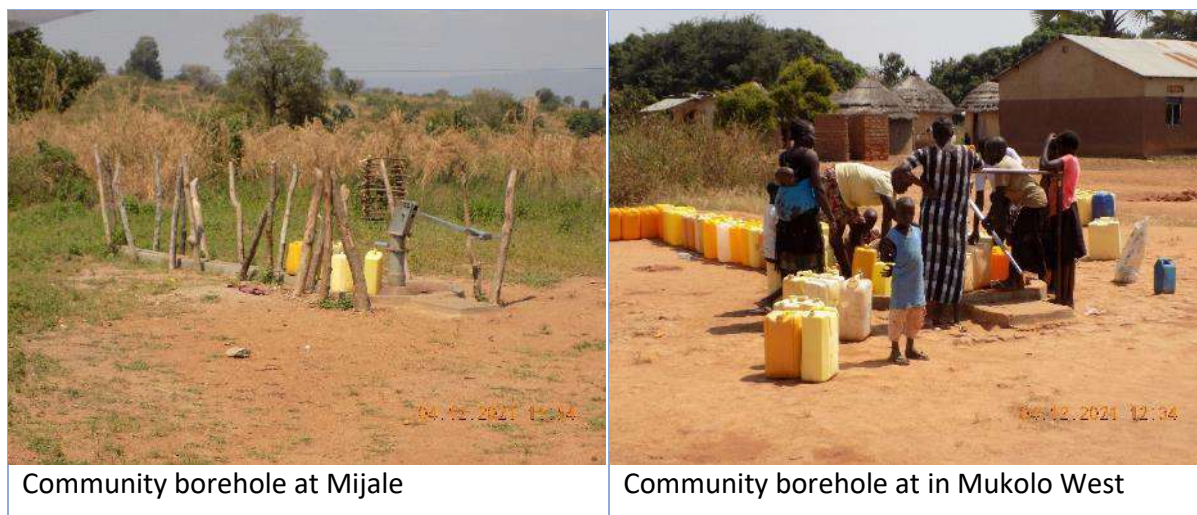
River Nyegai – near T1



River Icuku – near T4



Flood plains along the transmission line



Community borehole at Mijale

Community borehole at in Mukolo West

Figure 7-48: Surface and ground water resources in Adjumani district project area

7.3.9 Environmental Flow (e-flow) Assessment

Environmental flows (e-flows) describe the quantity, timing, and quality of freshwater flows and levels necessary to sustain aquatic ecosystems which, in turn, support human cultures, economies, sustainable livelihoods, and well-being” as guided by (The Brisbane Declaration 2007).

Minimum flow is a general term used to describe a flow required to maintain some feature of a river ecosystem. However, due to the complexity of the interaction between water as a habitat and the other communities (both plants and animals) in the system, no simple figure can be given for the environmental flow requirement of a river. It is related to a number of factors such as hydrologic and biotic character of critical reaches, perceived sensitivity, desired state of the river and the uses to which river flow is put. A river that is habitat to sensitive e.g., red list or endangered species, and one with other multiple users will definitely present a bigger challenge to estimate the EF for it. E-flow in rivers is generally needed for various purposes such as to:

- a) Maintain river flow conditions like flow velocity, water depth and acceptable turbidity levels, making it possible for the river to purify itself through a dilution effect of effluents and waste water input into the system.
- b) Maintain low flow which support livelihood of the people, who use the river for various purposes including drinking, washing, bathing, fishing, recreation and tourism, etc
- c) Sustain both terrestrial and aquatic ecosystem. For example, low flow provides water to wild animals; maintain soil-moisture in the banks, etc. Small floods stimulate spawning in fish and allow passage for migratory fish and germination of seeds on river banks. Large floods deposits nutrients on the banks and distribute seeds.
- d) Further, large floods flush sediments and natural obstructions in the river course and maintain a sufficient deep channel for navigation.

In order to assess and estimated the e-flow at the intake (Figure 7-47), two methods i.e., the Flow Duration Curve (FDC) analysis (Q_{90}) and Modified Tennant or Tessmann (17 methods under the hydrologic Index methodology were applied. Both methods primarily use hydrological data (historical monthly or daily flow records) for analysis. Therefore, acquisition of R. Nile flow data

from stations near the intake and analysis of these flows was vital before estimating and recommending e-flow.

7.3.9.1 Flow Data

The proposed water source (intake) is located on the main Nile River in Arra West. Panyango/Pakwach station (No. 87222) has missing data of over 20 years between 1970s and 2000 which is a long trane of missing values. However, for the period of 2000 - 2015 (for the new Panyango station), all the missing data have short time missing data values, hence used for flow analysis.

Panyango started operating or recording daily flow data in 2000 replacing the no longer operational Pakwach station (Figure 7-49). The gauging station is located close to the outflow from Lake Albert, whereas the station of Laropi is close to the point where the Albert Nile flows into South Sudan. The National Water Resources Assessment (NWRA) indicates the same flow values for both stations with a very small difference in the flow (almost negligible). This is because the Nile catchment area increases only by 3% between Pakwach and Laropi. The large wetland areas in the Albert Nile valley experience substantial evaporation losses and only partly compensated by the inflow from the tributaries though the difference is very small compared to the uncertainty regarding the rating curve and the variability of the outflow from Lakes Victoria and Albert (NWSC, 2021). This is why the Pakwach/Panyango flow dataset was sufficient to analyse Albert Nile flows at the intake.



Figure 7-49: Location of Panyango flow measuring Station along R. Nile

7.3.9.2 Flows of River Nile at the Intake

Satisfactory discharge data of River Nile gauging station (at Panyango) were plotted as indicated in the Figure 7-50 below. The average annual flows show that in 2015, the flow was lowest ($607\text{m}^3/\text{s}$) while in 2004, the flow was at its maximum ($1715\text{m}^3/\text{s}$). The overall mean flow for Albert Nile was $1201\text{m}^3/\text{s}$.

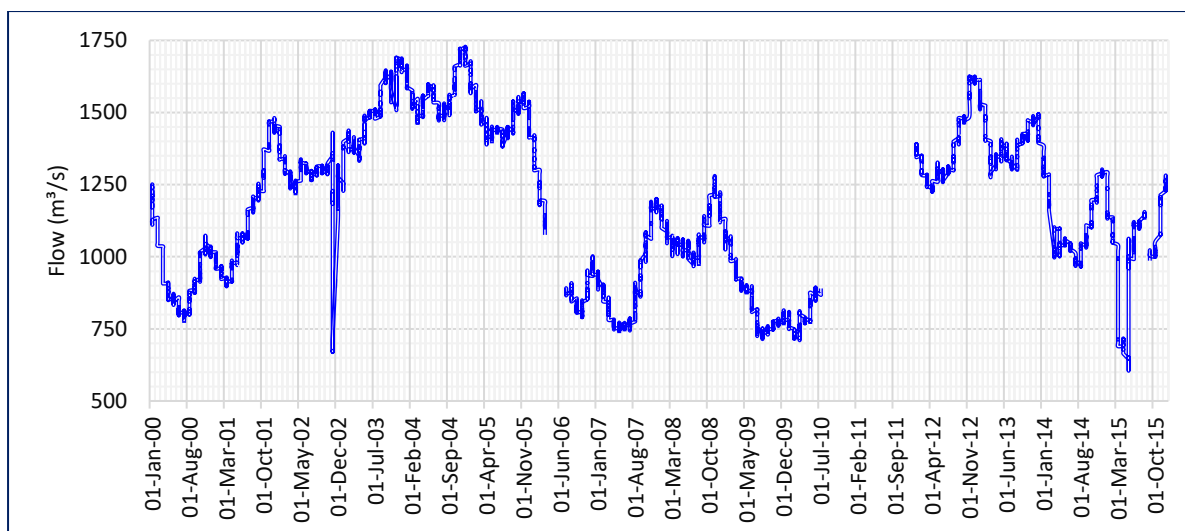


Figure 7-50: Daily flow data for Panyango flow station

7.3.9.3 Flow Duration Analysis (FDC)

The FDC (flow data) of 90 % dependable was taken for calculation of e-flow as it indicates that 90% of the times the river flow will be available for releasing e-flow in the downstream. Figure 7-51 is a graph of the flow duration curve (FDC) for the data at the Panyango. This shows the discharge versus percent of time that a particular discharge is equalled or exceeded a specified value of interest.

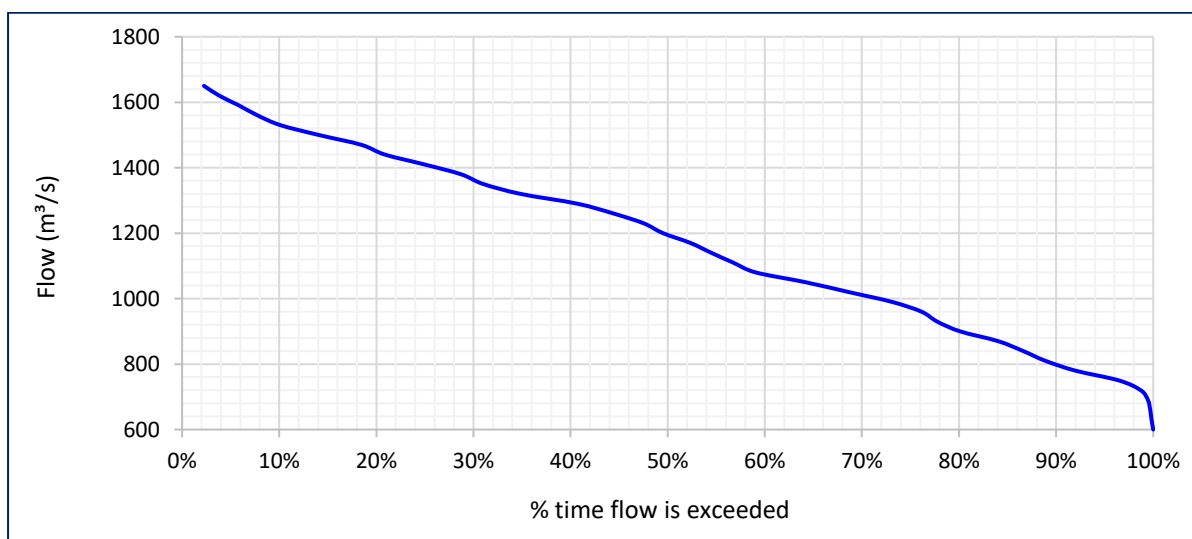


Figure 7-51: Flow duration curve of the Panyango Hydrological Station data

Therefore, Table 7-4 below shows important values derived from the FDC that a particular discharge was equalled or exceeded in River Nile at Panyango. The flow that is exceeded 90% of the time is approximately 810 m³/s.

Table 7-4: Important particular discharge equaled or exceeded

Percentage Time	99%	90%	50%	25%	15%	10%	5%
Flow Rate (m³/s)	690	810	1200	1410	1500	1530	1590

7.3.9.4 Modified Tennant or Tessmann Method

The Tennant method was developed in the USA and Designed to be applicable to all stream/watercourse sizes and to warm and cold climates (Tennant, 1976). Tennant used empirical hydraulic data from cross-channel transects combined with subjective assessments of habitat quality to define relationships between flow and aquatic habitat suitability. The method assumes that a proportion of the mean flow is needed to maintain a healthy stream environment. River flow regime determines the hydraulic and geomorphologic characteristics of the river (distribution of velocities and depths, bank form, bed width, bed substrate types, sediment transport), which in turn determines both the abiotic structure and the biotic composition of the river systems.

The method identifies a critical flow rate (minimum flow required to sustain the aquatic environment) for dry and rainy months expressed as a percentage of the Mean Annual Flow (MAF) at a specific site. This discharge method is based on historical flow records at the river section (in this regard Panyango hydrological station or gauge).

Tennant observed that average stream width, water velocity and depth increased from no flow to 10% of the mean flow and decreased thereafter considering only suitability of the physical habitat that was related to the flow. For dry periods, Tennant proposed ratios of 10% for poor to fair quality (survival); 20% for good habitat; and 30% for excellent habitat. While for the wet period, the corresponding ratios are 30%, 40% and 50% respectively. The aim for making e-flow recommendations is to maintain river health at a designated level.

Therefore, based on Tessman rule or guidelines of recommended minimum flow, the flow for each month was determined by considering the following rule:

- 1) MMF if $MMF < 40\% MAF$
- 2) 40% of MAF, if $40\% MAF < MMF < 100\% MAF$; and,
- 3) 40% of MMF, if $MMF > MAF$.

MAF - Mean Annual Flow and MMF - Mean Monthly Flow. Additionally, a 14-day period of 200% MAF is required during the month of highest flow for channel maintenance.

Table 7-5: Recommended e-flow levels for R. Nile at the proposed intake

Month of Year	MMF [m ³ /s]	MAF [m ³ /s]	40%MMF [m ³ /s]	40%MAF [m ³ /s]	Recommended e-flow [m ³ /s]
1	1254.02	1183.7	501.6	473.5	473.48
2	1192.98	1183.7	477.2	473.5	473.48
3	1115.18	1183.7	446.1	473.5	473.48
4	1085.67	1183.7	434.3	473.5	473.48
5	1120.25	1183.7	448.1	473.5	473.48
6	1139.66	1183.7	455.9	473.5	473.48
7	1139.94	1183.7	456.0	473.5	473.48
8	1152.61	1183.7	461.0	473.5	473.48

9	1197.27	1183.7	478.9	473.5	473.48
10	1222.98	1183.7	489.2	473.5	473.48
11	1284.56	1183.7	513.8	473.5	473.48
12	1306.80	1183.7	522.7	473.5	473.48

According to Table 7-5 above, it can be concluded that there is sufficient water from the proposed source to supply the proposed demand of 12 MLD in comparison with the e-flow of 473 m³/s and the lowest recorded flow of about 600 m³/s.

7.3.10 Water Quality

7.3.10.1 Intake (R. Nile)

The water quality of River Nile, where the water will be abstracted (intake) is presented in Table 7-6. All tested water quality parameters were within national standards for untreated water, except *E. coli*, faecal coliforms and total suspended solids (TSS). Nevertheless, the water will be first treated to ensure that it meets the recommended national standards for drinking water quality before being supplied to consumers. Further, all tested parameters were within national baseline values for river water quality monitoring. The water quality analysis certificate is presented in Annex 3.

Table 7-6: Baseline water quality of the intake (R. Nile)

Parameter (Unit)	Test results		National Standards for Untreated Water	National Baseline Extreme Values for River Water Quality Monitoring (NBI, 2005)
	Upstream	Downstream		
Total Alkalinity (mg/L)	120	120	500	330
<i>E. coli</i> (CFU/100 ml)	4	3	0	Not specified
Faecal coliforms (CFU/100 mL)	114	5	0	Not specified
Bicarbonate (mg/L)	146.4	146.4	500	Not specified
Calcium (mg/L)	8	9.6	150	Not specified
Chloride (mg/L)	23	21	250	Not specified
Color (PtCo)	5	11	50	580
Electrical conductivity (µS/cm)	233	234	2500	580
Total Hardness (mg/L)	64	44	600	190
Iron (mg/L)	0.087	0.183	0.3	14.97
pH (Units)	7.56	7.54	5.5-9.5	8.7
Sulphate (mg/L)	0.681	0.648	400	60
Total dissolved solids (mg/L)	149.12	149.76	1500	371
Total suspended solids (mg/L)	4	5	0	310
Turbidity (NTU)	1.19	0.88	25	138

Values in bold (orange shade) exceed National standards for untreated water

7.3.10.2 Stream downstream the water treatment plant

The water quality of the stream located downstream of the water treatment plant, where the effluent from the water treatment plant will be channelled is presented in Table 7-7, and the laboratory certificate of analysis in Annex 3. Generally, all the tested water quality parameters are within the national standards for untreated water, except *E. coli*, faecal coliforms, colour and total suspended solids. Nevertheless, the water in the stream is not to be used for human consumption. Further, the water quality in the stream is within the national baseline values for river water quality monitoring.

Table 7-7: Baseline water quality of the stream located downstream of the water treatment plant

Parameter (unit)	Test results		National standards for untreated water	National baseline extreme values for river water quality monitoring (NBI, 2005)
	Upstream	Downstream		
Total Alkalinity (mg/L)	88	100	500	330
<i>E. coli</i> (CFU/100 mL)	10	2	0	Not specified
Faecal coliforms (CFU/100 mL)	15	3	0	Not specified
Bicarbonate (mg/L)	107.36	122	500	Not specified
Calcium (mg/L)	11.2	9.6	150	Not specified
Chloride (mg/L)	13	13	250	Not specified
Colour (PtCo)	214	117	50	580
Electrical conductivity (µS/cm)	146.7	163.3	2500	580
Total Hardness (mg/L)	64	32	600	190
Iron (mg/L)	0.174	0.217	0.3	14.97
pH (Units)	7.52	7.68	5.5-9.5	8.7
Sulphate (mg/L)	8.432	9.447	400	60
Total dissolved solids (mg/L)	93.89	104.51	1500	371
Total suspended solids (mg/L)	12	4	0	310
Turbidity (NTU)	23.65	9.49	25	138

Values in bold (orange shade) exceed National standards for untreated water

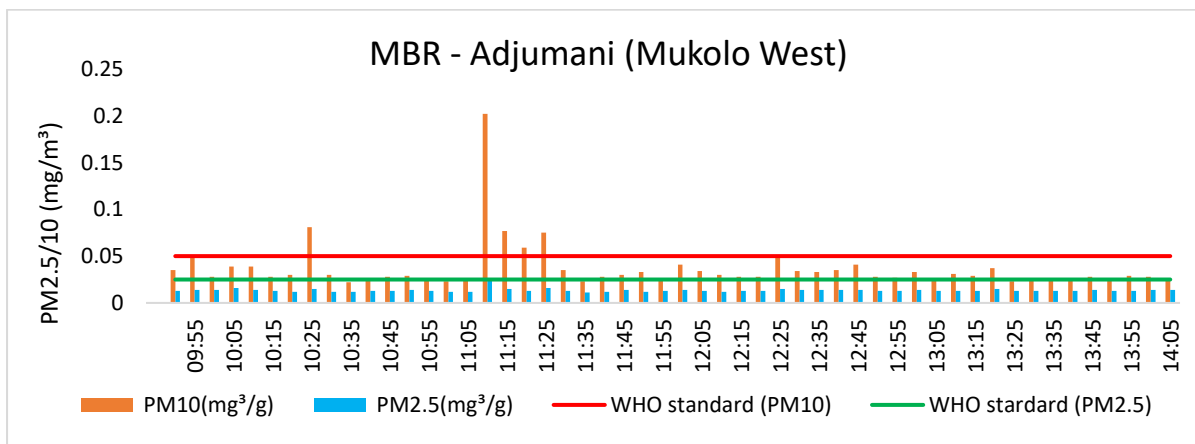
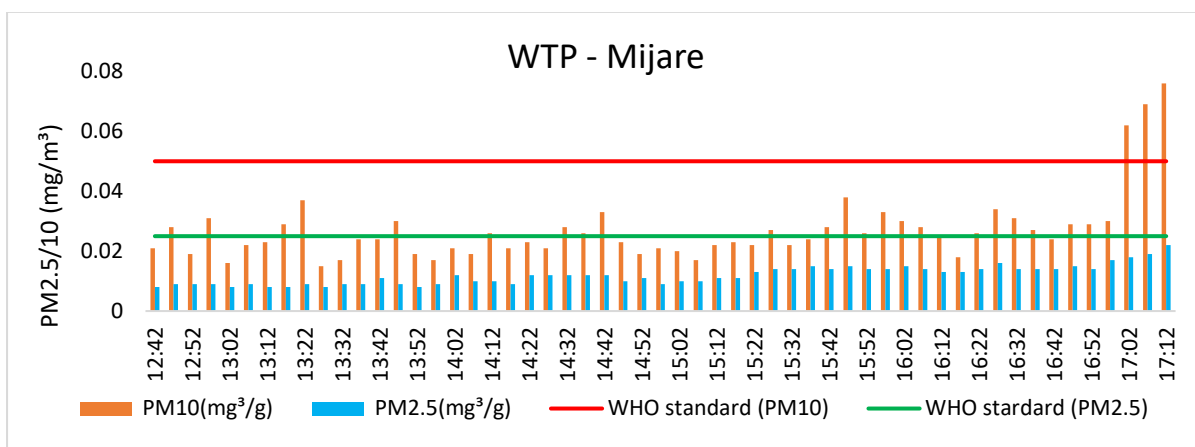
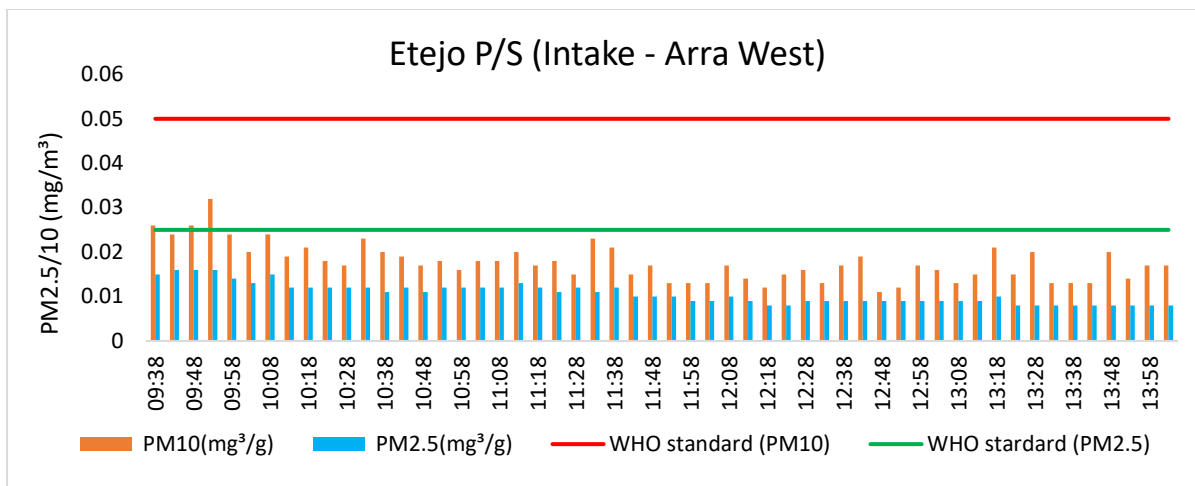
7.3.11 Air Quality

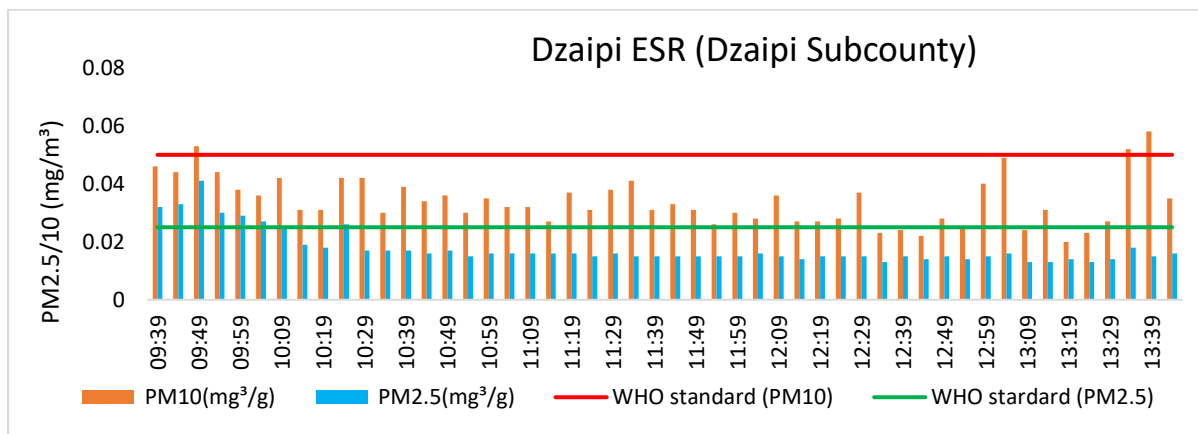
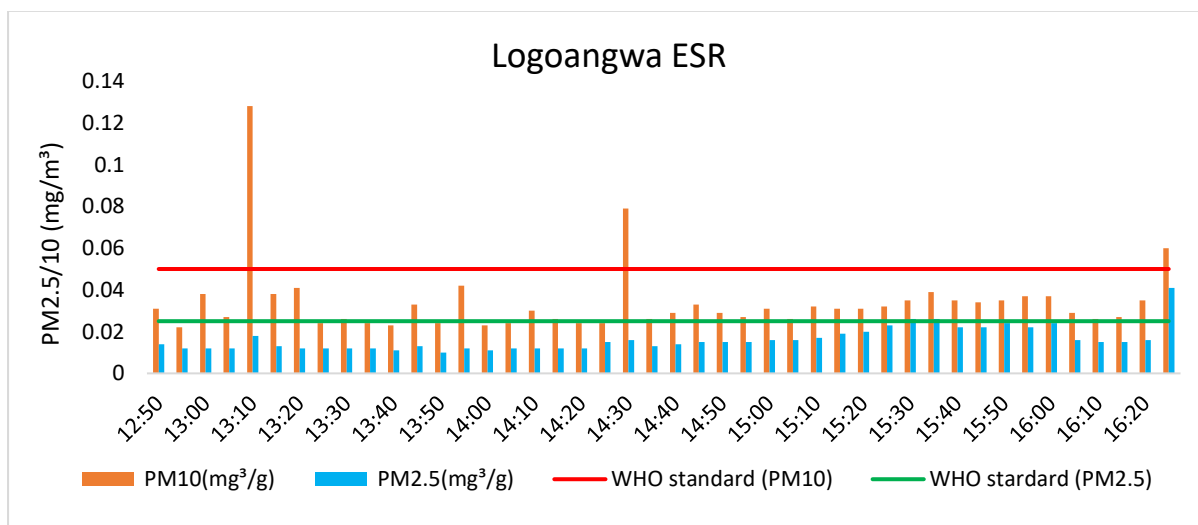
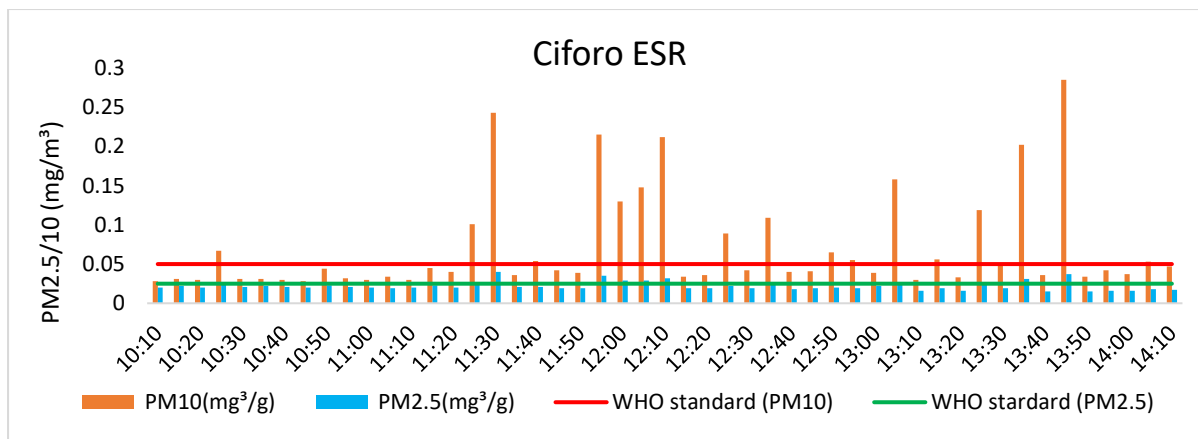
7.3.11.1 Particulate Matter

The results for the air quality monitoring are summarized in the **Table 7-8** and **Figure 7-52** below. In absence of Uganda air quality permissible limits for particulate matter, the air quality results were compared with the World Health Organization (WHO) Air Quality Guidelines (AQG) for particulate matter (PM). The WHO-AQG guidelines recommends a permissible PM limit based on a 24-hr average reading.

Table 7-8: Summary of particulate matter readings at different sensitive receptors of selected project sites

Location	Date and time	PM2.5			PM10		
		Min	Ave	Max	Min	Ave	Max
Etejo P/S (Intake – ArraWest)	30/11/2021 Start time: 09:38 am End time: 14:03pm	0.008	0.011	0.016	0.011	0.018	0.032
WTP (Mijale)	01/12/2021 Start time: 12:42pm End time: 17:12pm	0.008	0.012	0.022	0.015	0.027	0.076
MBR – Adjumani (Mukolo West)	02/12/2021 Start time: 09:50am End time: 14:05pm	0.011	0.014	0.026	0.022	0.037	0.202
Ciforo ESR	04/12/2021 Start time: 10:10am End time: 14:10pm	0.015	0.022	0.040	0.028	0.071	0.285
Logoangwa ESR	05/12/2021 Start time: 12:50pm End time: 16:25pm	0.01	0.016	0.022	0.022	0.034	0.076
Dzaipi ESR (Dzaipi Subcounty)	06/12/2021 Start time: 09:39am End time: 13:44pm	0.008	0.018	0.041	0.020	0.034	0.058
Melijo ESR (Olua Church School)	09/12/2021 Start time: 12:29pm End time: 15:24pm	0.023	0.030	0.039	0.031	0.050	0.135
WHO AQG - Maximum allowable limit	24-hour limit	0.025			0.050		





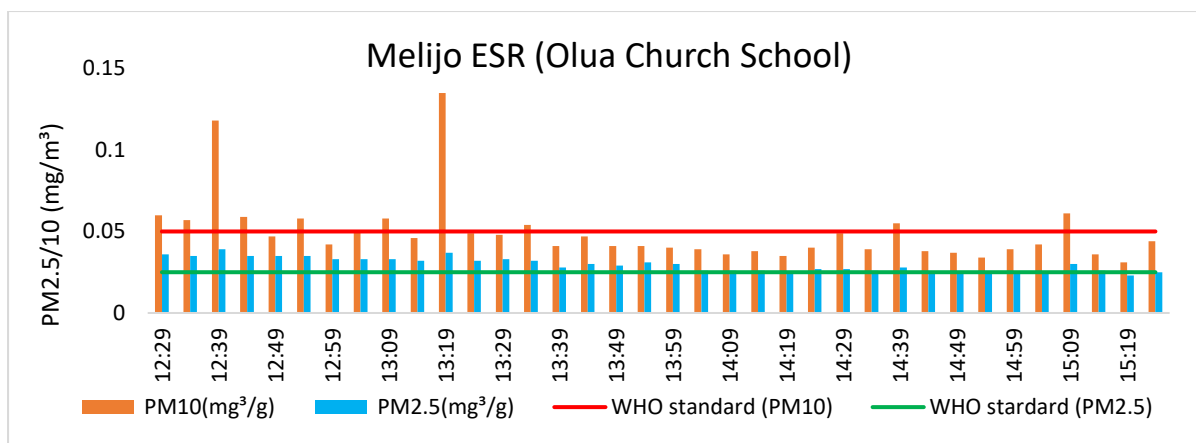


Figure 7-52: Variation of PM_{2.5} and PM₁₀ levels with time of the day against WHO- AQG at selected project sites

The average PM_{2.5} levels ranged from 0.018mg/m³ at Etejo P/S (near Intake) – Arra West to 0.03mg/m³ at Olua Church School (Melijo ESR) in Olua refugee settlement. The maximum PM_{2.5} readings at all sites were within the WHO air quality guidelines set at 0.025mg/m³ (Table 7-8 and Figure 7-52), only average PM_{2.5} readings at Melijo ESR (**0.03mg/m³**) exceeded 0.025mg/m³. Average PM₁₀ levels ranged between 0.018mg/m³ at Etejo P/S – Arra West Village to 0.071mg/m³ of measurements taken at Ciforo ESR (Catholic church). The average PM₁₀ levels were within the permissible WHO limits for PM except for measurements at Ciforo ESR (**0.071mg/m³**) and Melijo ESR (**0.05mg/m³**) where levels were slightly above **0.05mg/m³** for PM₁₀.

High levels of PM_{2.5} and PM₁₀ at Melijo ESR (Olua Church School) can be attributed to smoke from kitchens in the refugee camp and dust and exhausts fumes emitted from vehicles occasional traversing the access road to and from the refugee camp. The high levels of PM₁₀ at Ciforo ESR were attributed to the busy traffic along the access road to the landing site and smoke from burning of waste near the site of measurement (Figure 7-53).



Vehicles raising dust along an access road in Ciforo trading centre



Dust along the Atiak - Adjumani highway in Dziapi due to ongoing road construction

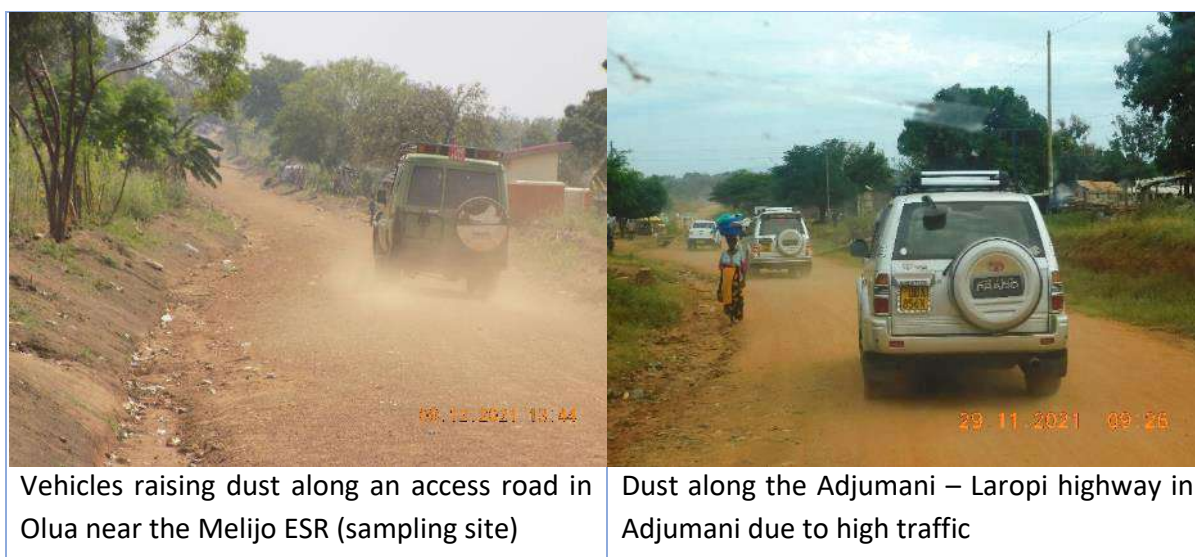


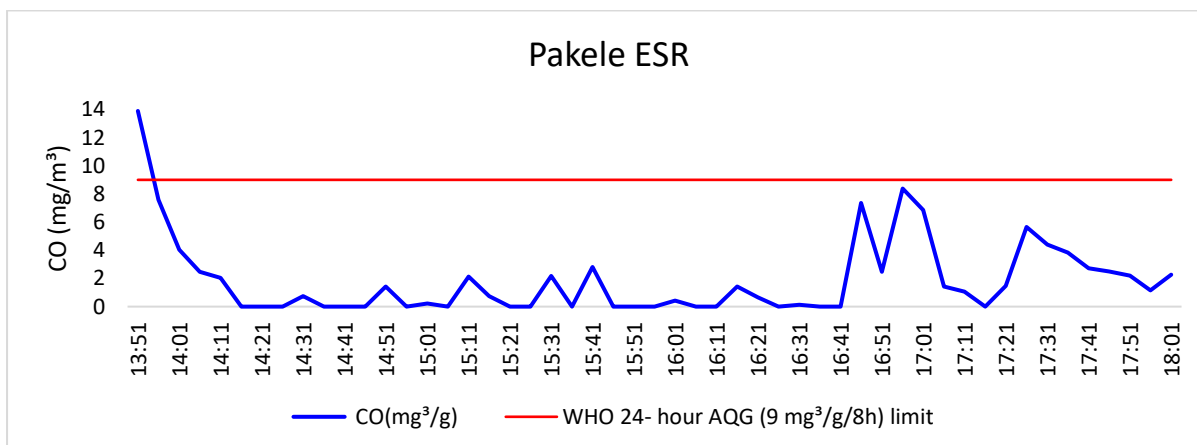
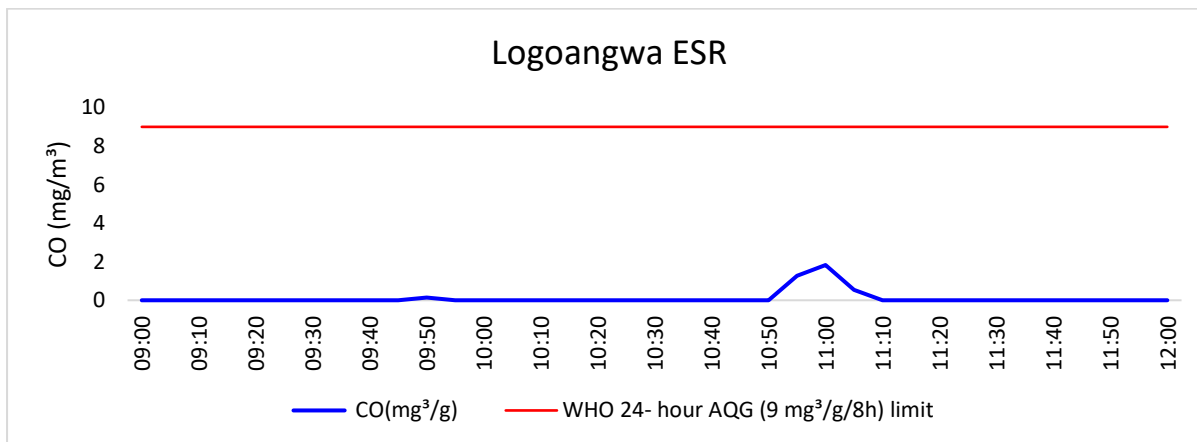
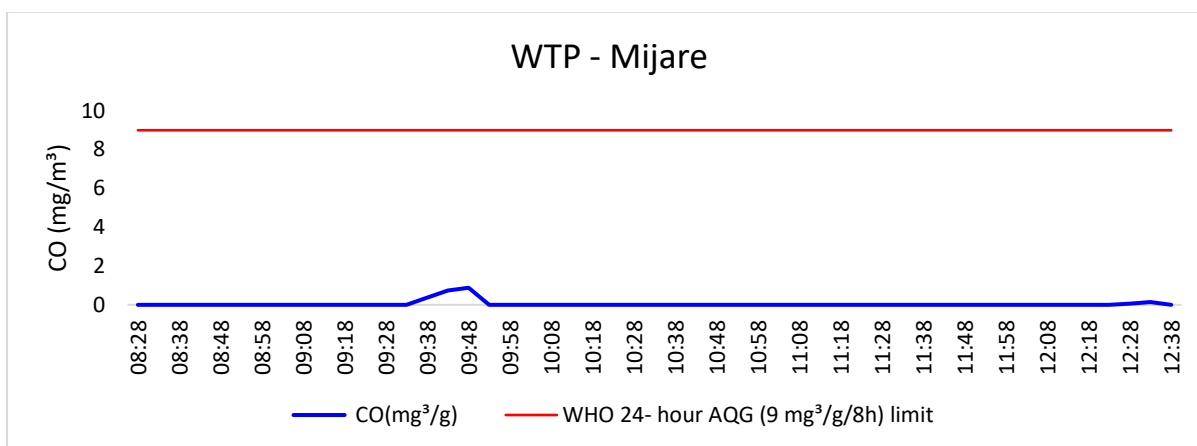
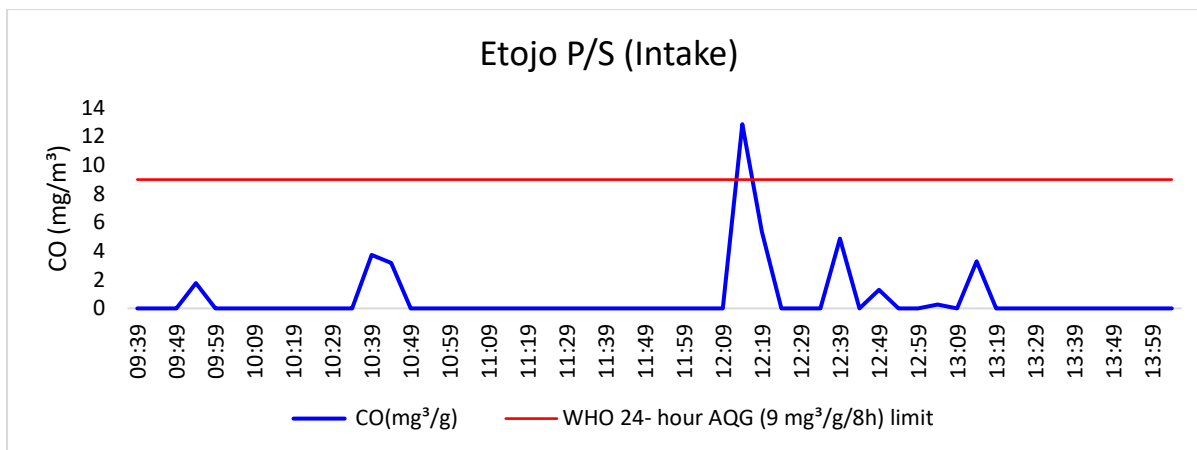
Figure 7-53: Vehicles raising dust along access roads in Adjumani project area

7.3.11.2 Carbonmonoxide

During air quality monitoring, the pollutant gases of focus were Nitrogendioxide, Carbonmonoxide, Sulphurdioxide and Volatile Organic Compounds (VOC). Results of Carbon Monoxide measurements are presented in Table 7-9 and Figure 7-54 below.

Table 7-9: Concentration of CO at sensitive receptors

Location	Date/ Time	CO (mg/m ³)		
		Min	Ave	Max
Etejo P/S (Intake – Aru West)	Date: 30/11/2021 Start time: 09:39 am End time: 14:04pm	0	0.68	12.87
WTP (Mijale)	Date: 01/12/2021 Start time: 08:28am End time: 12:38pm	0	0.043	0.88
MBR – Adjumani (Mukolo West)	Date: 03/12/2021 Start time: 09:01am End time: 13:06pm	0	0.36	5.94
Ciforo ESR	Date: 06/12/2021 Start time: 13:51pm End time: 18:01pm	0	1.89	13.89
Logoangwa ESR	Date: 09/12/2021 Start time: 13:08pm End time: 15:23pm	0	1.40	9.03
WHO AQG - Maximum allowable limit	9h-hour	9 mg/m ³ /8h		



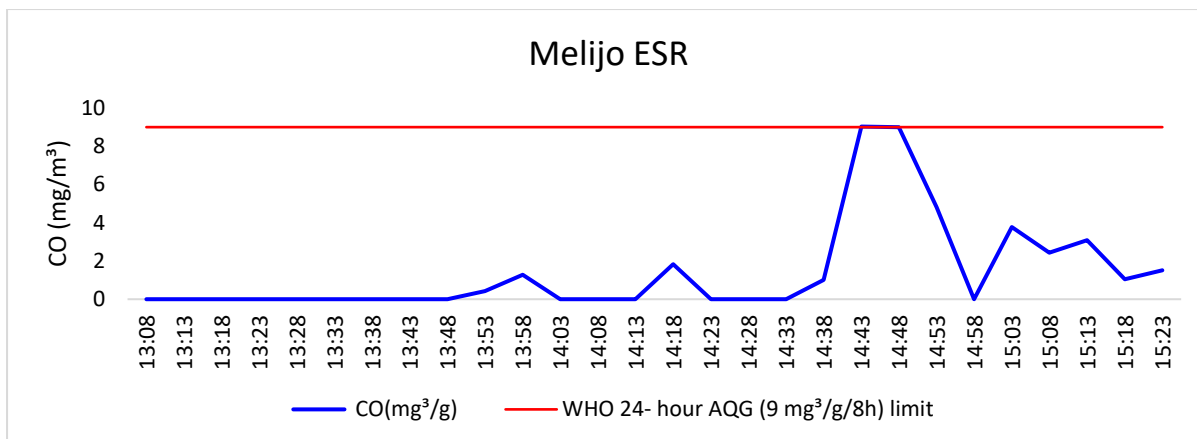


Figure 7-54: Variation of CO levels with time of the day against WHO – AQG at selected sensitive receptors to project sites

The concentration of CO at the sampled sites were within the WHO air quality guidelines. The average CO readings ranged from 0.043 mg/m³ at households in WTP (Mijale) to 1.89 mg/m³ for measurements undertaken at Ciforo ESR. The major sources of CO pollution included exhaust fumes from traffic along the access roads, smoke from domestic kitchens, and operation of mini diesel operated dry mills in trading centres and heavy trucks (Figure 7-55).

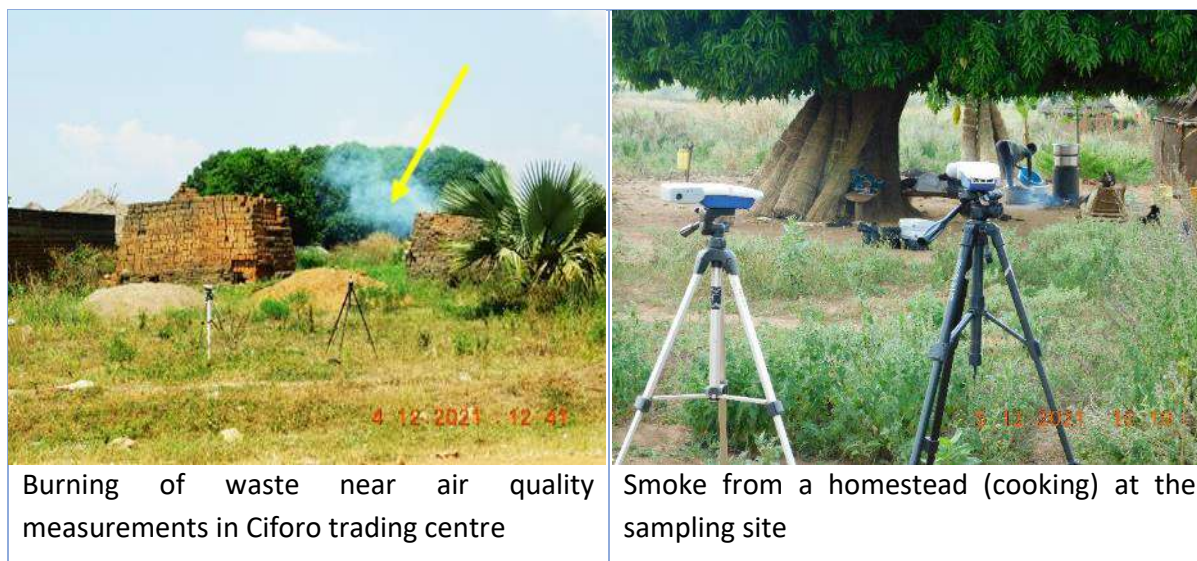


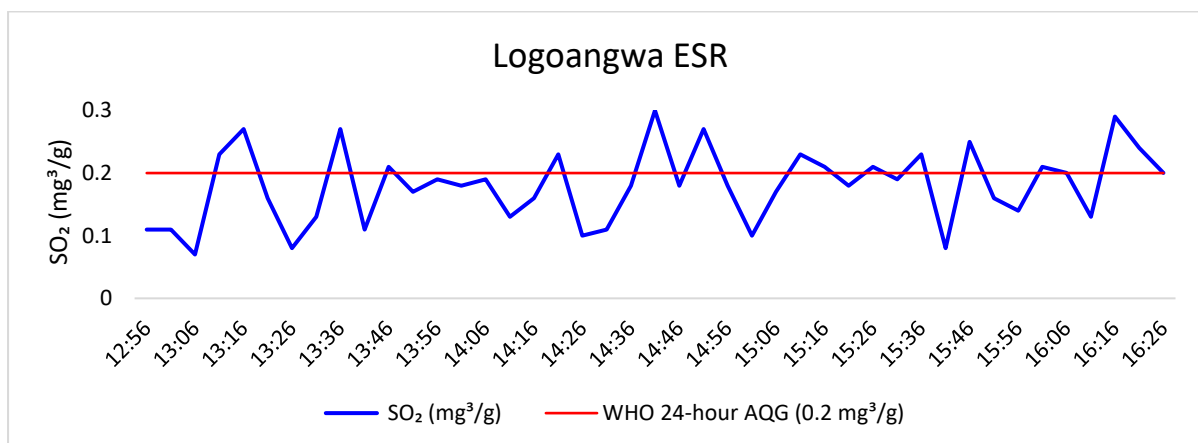
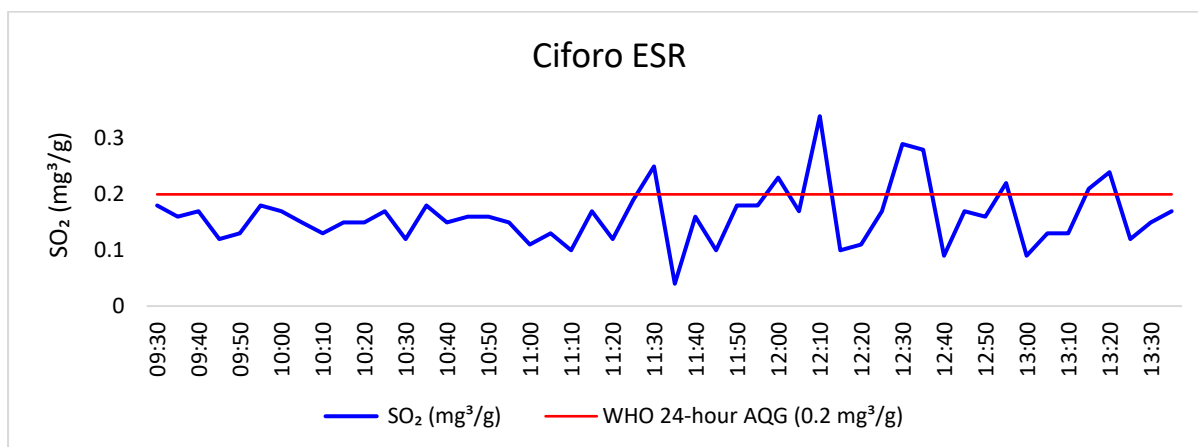
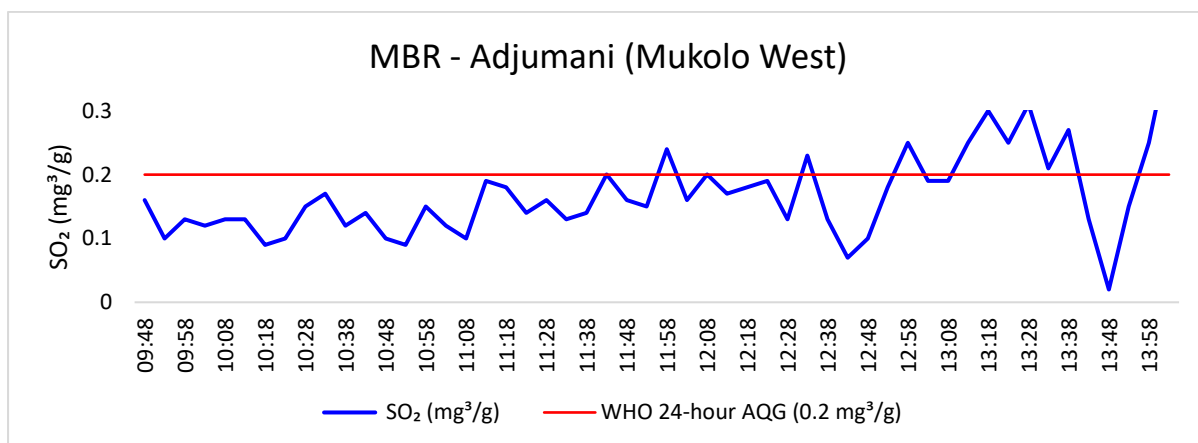
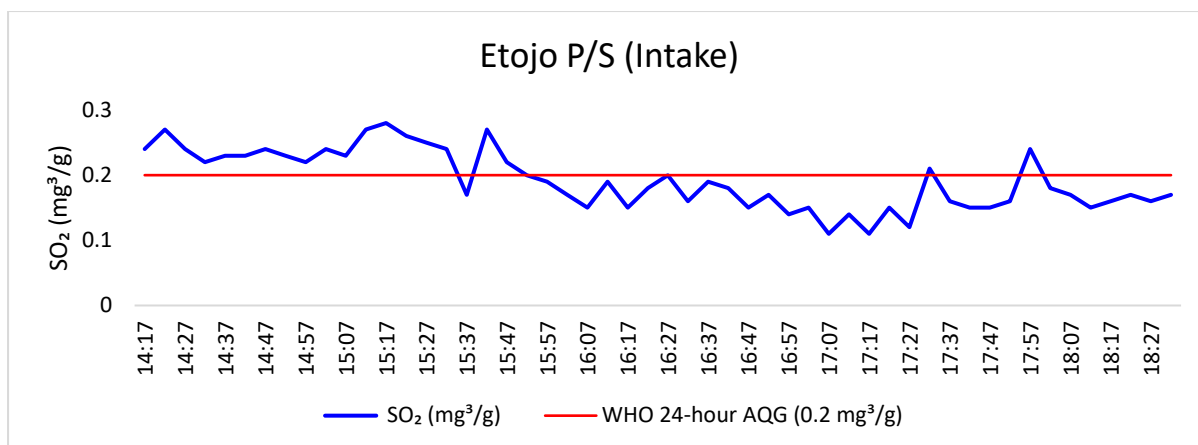
Figure 7-55: Smoke from open burning waste at Ciforo trading centre

7.3.11.3 Sulphurdioxide

Sulphur dioxide measurements were undertaken for over 4 hours at selected sensitive receptors to project sites. Results of SO₂ recordings are presented in Table 7-10 and Figure 7-56 below. Average Sulphurdioxide recordings ranged from 0.02mg/m³ at Olua Church school to 0.22mg/m³ at Dzaipi ESR (Dzaipi Subcounty). SO₂ average measurements were above the WHO – AQG maximum permissible limit at Dzaipi ESR site of measurements. This was attributed to heavy traffic of heavy trucks (construction purposes) and small cars on the road to and from Atiak.

Table 7-10: SO₂ baseline measurements at selected sensitive receptors to project sites

Location	Date/ Time	SO ₂ (mg/m ³)		
		Min	Ave	Max
Etejo P/S (Intake – Arra West)	Date: 30/11/2021 Start time: 14:17pm End time: 18:32pm	0.11	0.192	0.280
MBR – Adjumani (Mukolo West)	Date: 02/12/2021 Start time: 09:48pm End time: 14:03pm	0.02	0.167	0.4
Ciforo ESR	Date: 04/12/2021 Start time: 09:30pm End time: 13:35pm	0.04	0.162	0.34
Pagirinya ESR	Date: 05/12/2021 Start time: 12:56pm End time: 16:26pm	0.07	0.182	0.02
Pekele ESR (Catholic Church)	Date: 06/12/2021 Start time: 09:37pm End time: 13:37pm	0.05	0.145	0.29
Dzaipi ESR (Dzaipi Subcounty)	Date: 07/12/2021 Start time: 13:53pm End time: 17:58pm	0.00	0.220	0.42
Melijo ESR (Olua Church School)	Date: 09/12/2021 Start time: 15:35pm End time: 18:10pm	0.02	0.20	0.20
WHO AQG - Maximum allowable limit	(24-hour averaging)	0.2 mg/m ³ or 0.008mg/m ³		



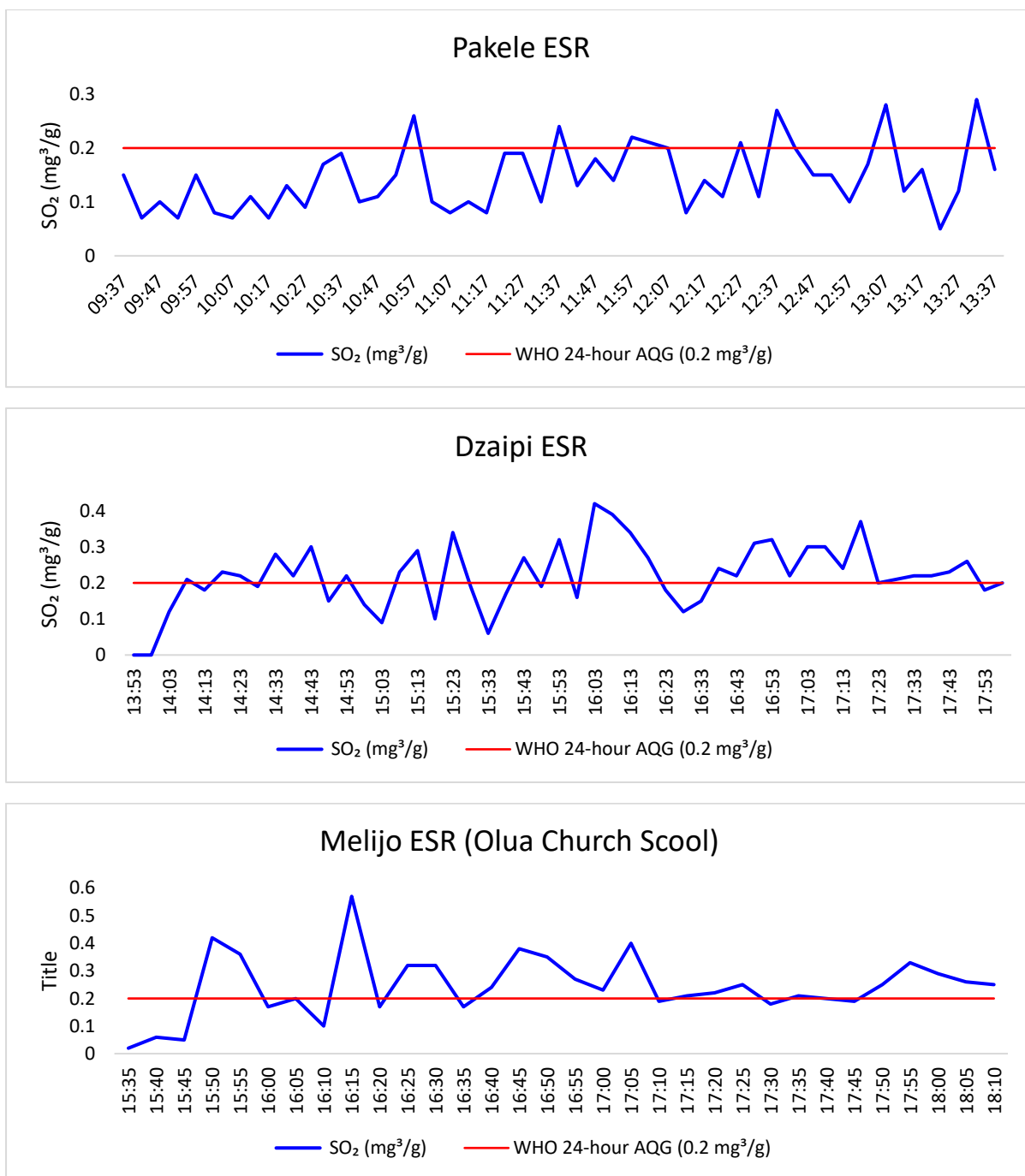


Figure 7-56: Variation of SO₂ levels with time of the day against WHO – AQG at selected sensitive receptors to project sites



Figure 7-57: Fumes from vehicles on the the Atiak – Adjumani road

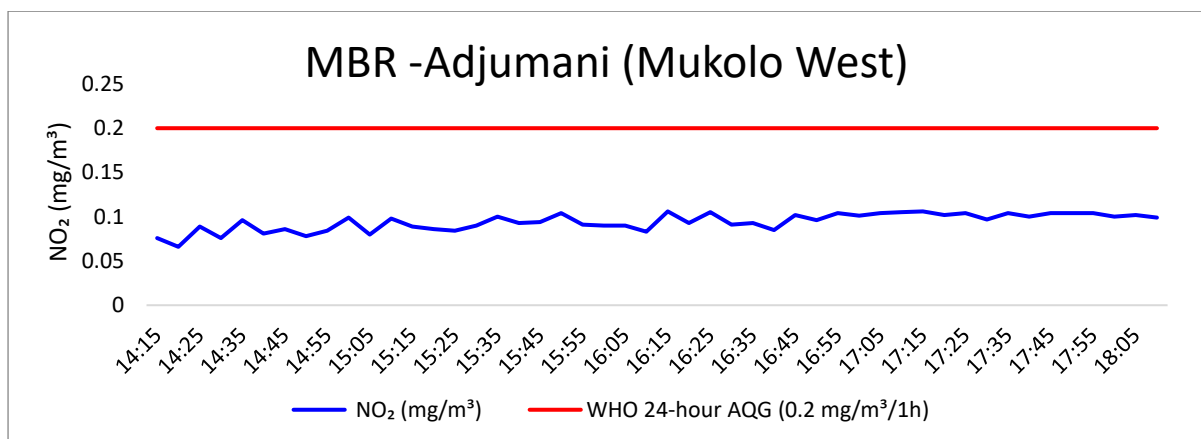
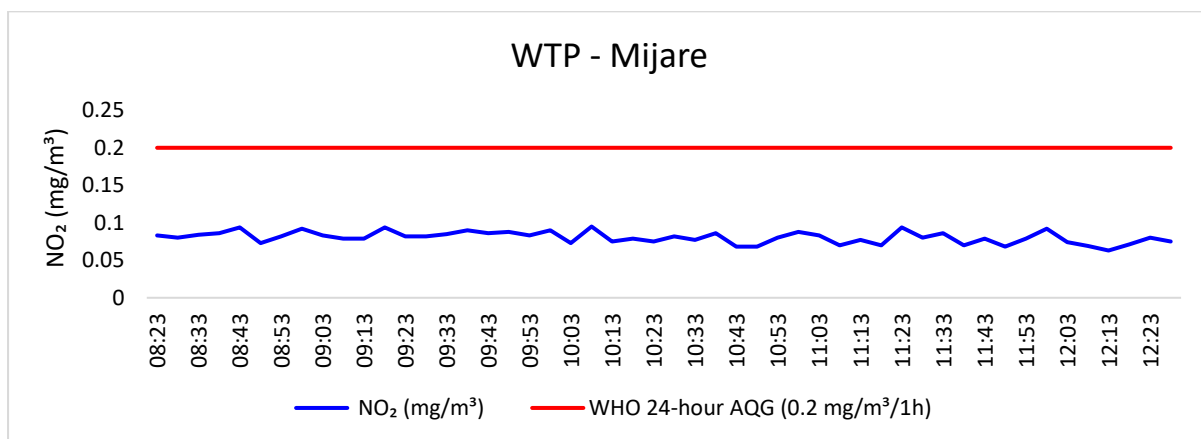
7.3.11.4 Nitrogendioxide

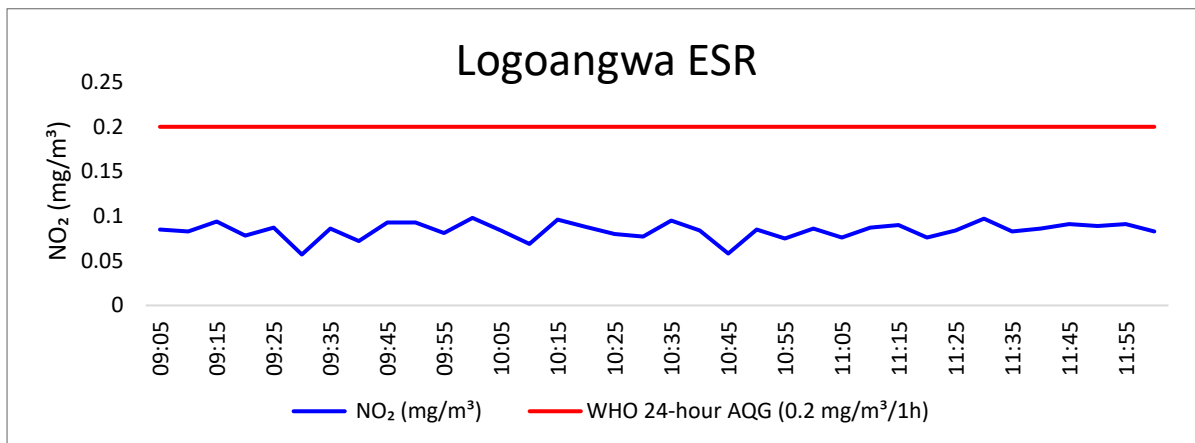
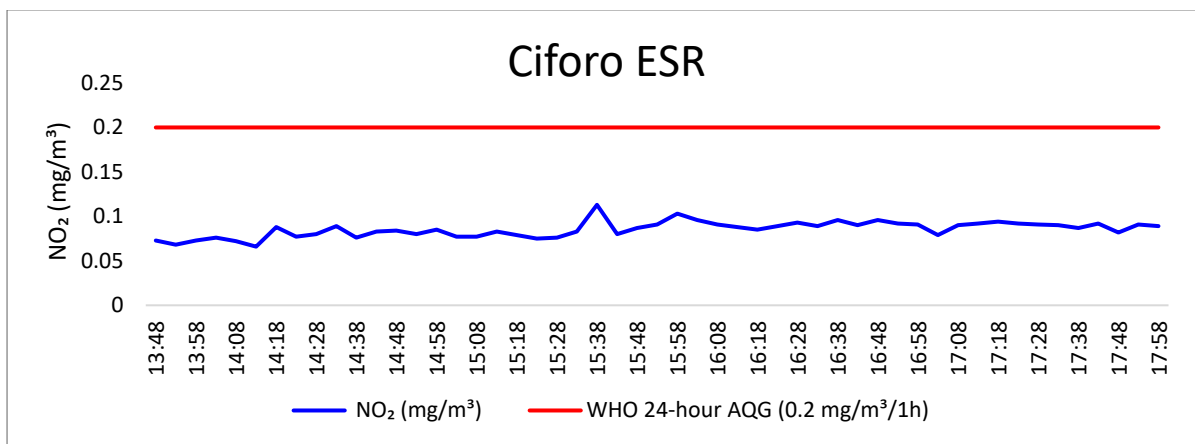
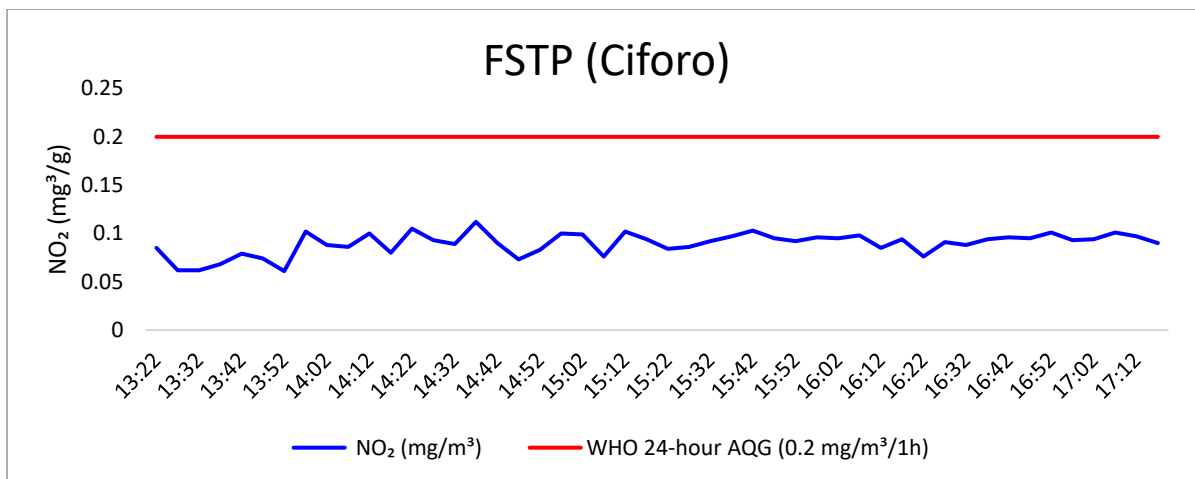
Nitrogendioxide measurements were undertaken for over 4 hours at selected sensitive receptors to project sites. Results of NO₂ recordings are presented in Table 7-11 and Figure 7-58 below. Average NO₂ recordings ranged from 0.08mg/m³ at Etejo P/S to 0.108mg/m³ at Melijo ESR. All the NO₂ average measurements were below the WHO – AQG maximum permissible limit (0.2mg/m³/hr) at all the sites of measurements.

Table 7-11: NO₂ baseline measurements

Location	Date/ Time	NO ₂ (mg/m ³)		
		Min	Ave	Max
Water Treatment Plant (Mijare)	Date: 01/12/2021 Start time: 08:23am End time: 12:28pm	0.063	0.080	0.095
MBR – Adjumani (Mukolo West)	Date: 02/12/2021 Start time: 14:15 pm End time: 18:10 pm	0.066	0.094	0.106
Ciforo ESR	Date: 04/12/2021 Start time: 13:48pm End time: 17:58pm	0.066	0.085	0.113
Logoangwa ESR	Date: 05/12/2021 Start time: 09:05am End time: 12:00 noon	0.057	0.084	0.098

Location	Date/ Time	NO ₂ (mg/m ³)		
		Min	Ave	Max
Pekele ESR (Catholic Church)	Date: 06/12/2021 Start time: 13:45 pm End time: 18:00 pm	0.056	0.088	0.115
Dzaipi ESR (Dzaipi Subcounty)	Date: 07/12/2021 Start time: 14:00 pm End time: 18:00 pm	0.064	0.084	0.097
Melijo ESR (Olua Church School)	Date: 09/12/2021 Start time: 15:33 pm End time: 18:03 pm	0.089	0.108	0.120
WHO AQG	(1-hour averaging)	0.200 mg/m ³		





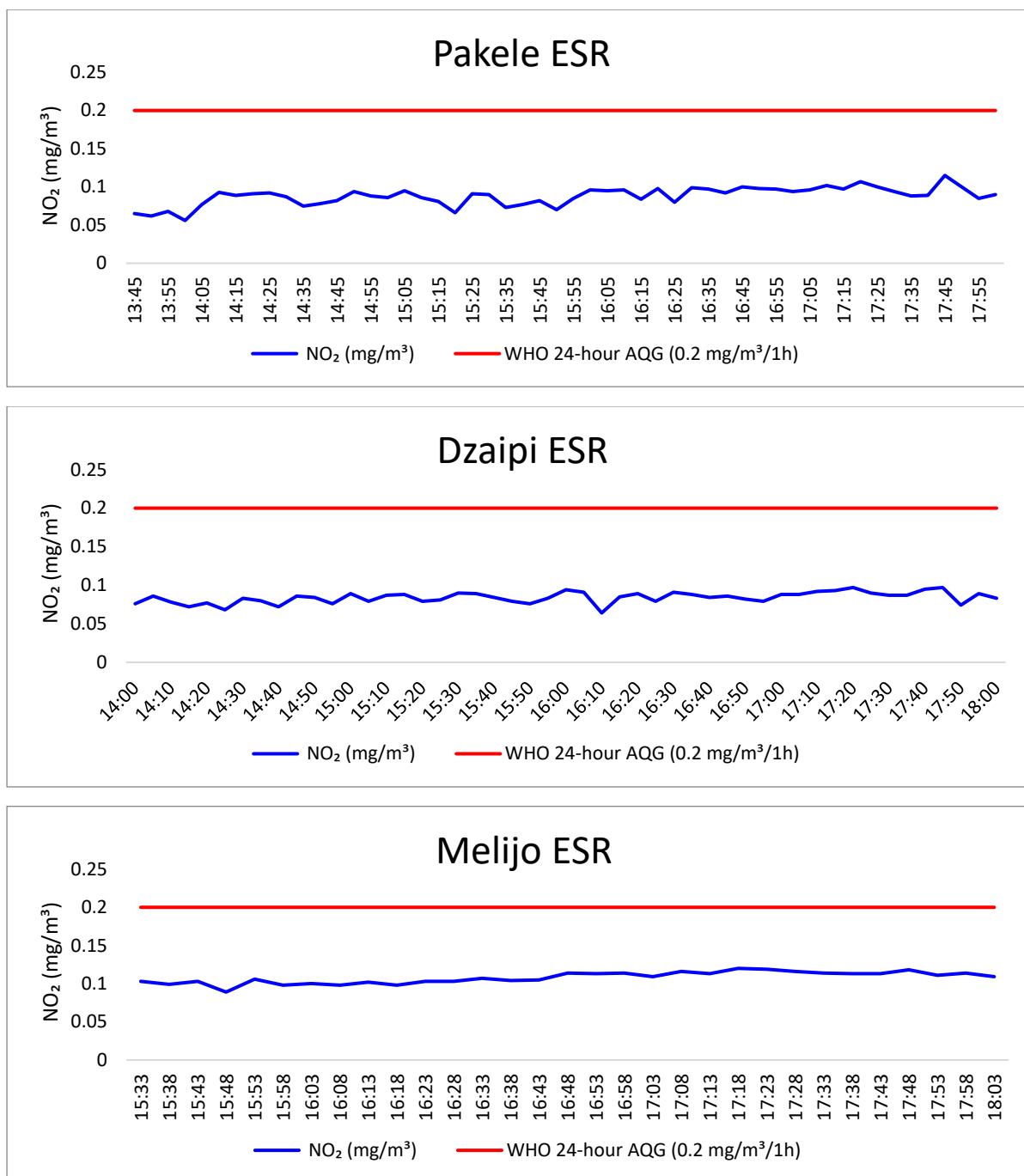


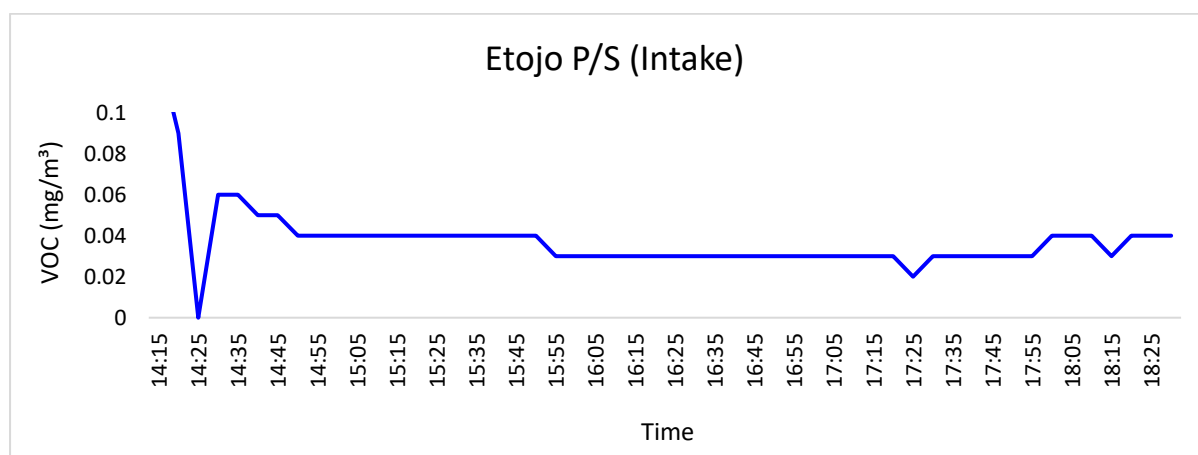
Figure 7-58: Variation of NO₂ levels with time of the day against WHO – AQG at selected sensitive receptors to project sites

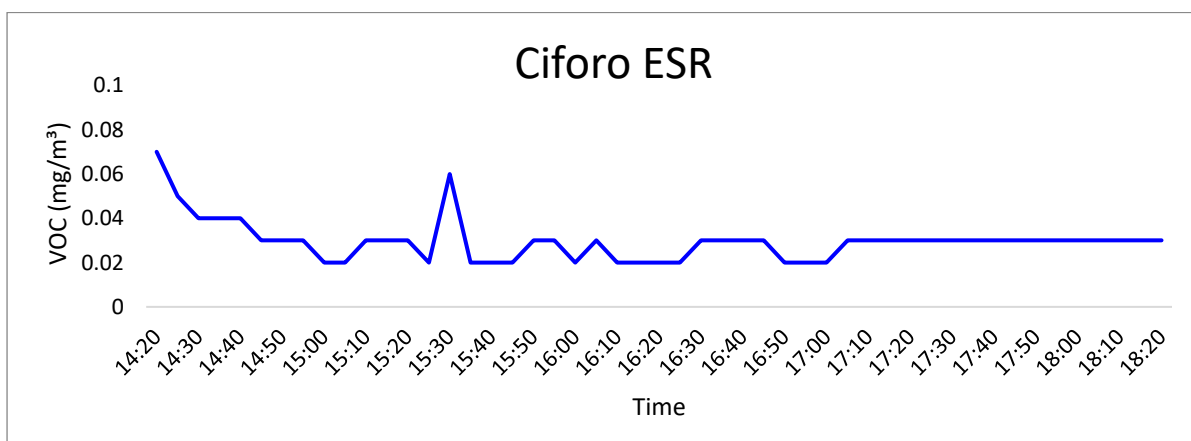
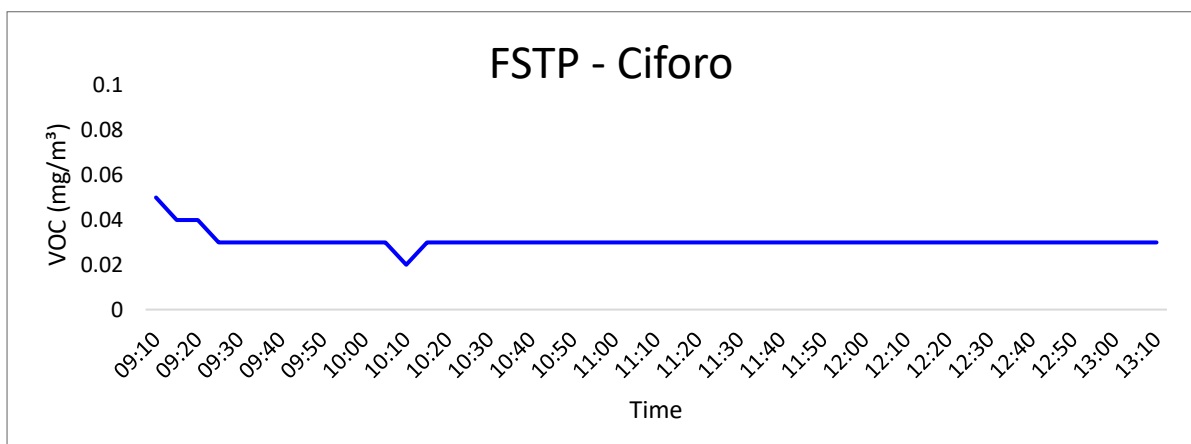
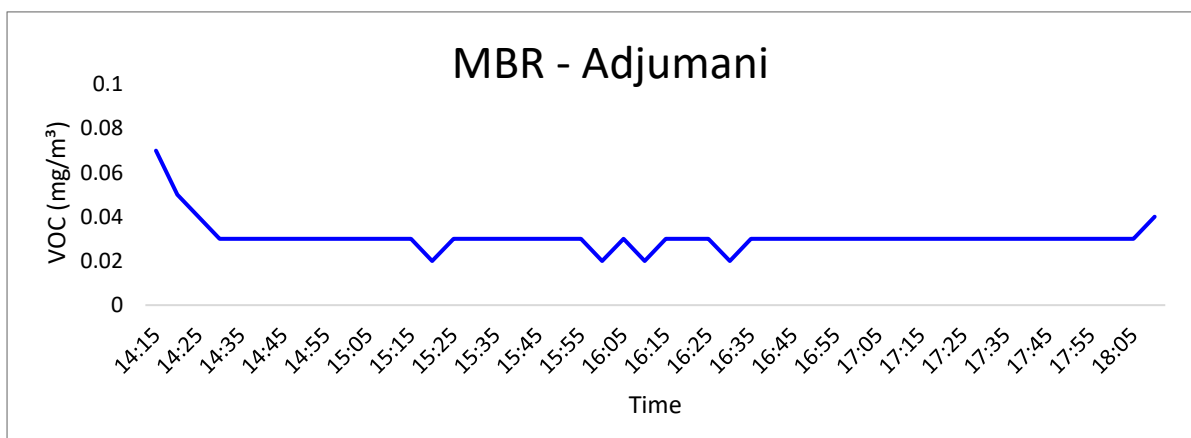
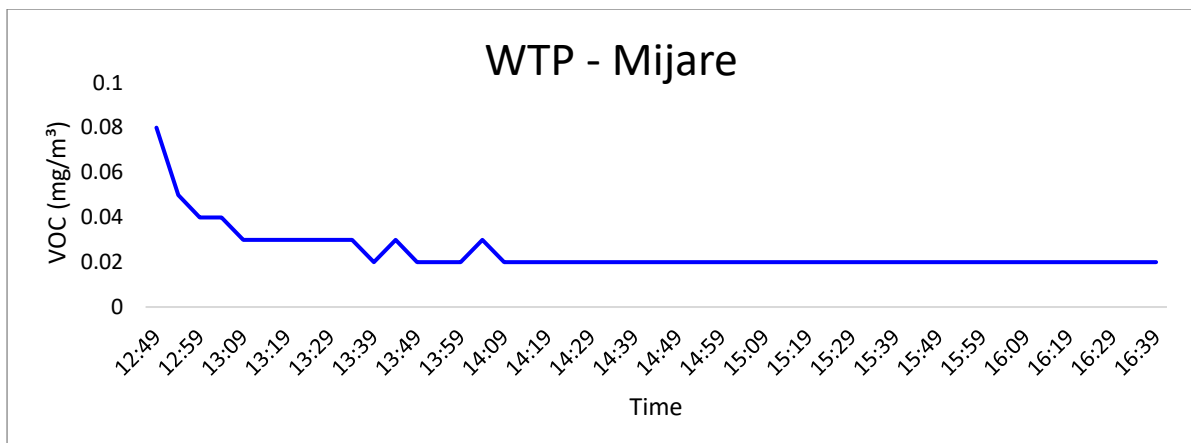
7.3.11.5 Volatile Organic Compounds (VOCs)

Measurements of VOCs were undertaken for over 4 hours at selected sensitive receptors to project sites. Results of VOCs recordings are presented in Table 7-12 and Figure 7-59 below. There are no set maximum permissible limits for VOCs under the WHO – AQG, therefore the measurements were not weighed against any set standards but values ranged between 0 to 0.130 mg/m³. Average VOCs measurements ranged from 0.021mg/m³ at Dzaipi ESR (Subcounty), the location for the third equilibrium balancing tank to 0.038mg/m³ at Etejo P/S near the Intake in Arra West Village.

Table 7-12: VOCs measurements

Location	Date/ Time	VOCs (mg/m ³)		
		Min	Ave	Max
Etejo P/S (Intake – Arra West)	Date: 30/11/2021 Start time: 14:15pm End time: 18:30 pm	0	0.038	0.130
Water Treatment Plant (Mijare)	Date: 01/12/2021 Start time: 12:49 pm End time: 16:39 pm	0.02	0.024	0.080
MBR – Adjumani (Mukolo West)	Date: 02/12/2021 Start time: 14:15pm End time: 18:10 pm	0.02	0.031	0.070
Ciforo ESR	Date: 04/12/2021 Start time: 14:20 pm End time: 18:20 pm	0.02	0.030	0.070
Pekele ESR (Catholic Church)	Date: 06/12/2021 Start time: 09:32 am End time: 13:32 pm	0.02	0.029	0.070
Dzaipi ESR (Dzaipi Subcounty)	Date: 07/12/2021 Start time: 09:44 am End time: 13:49 pm	0.01	0.021	0.050





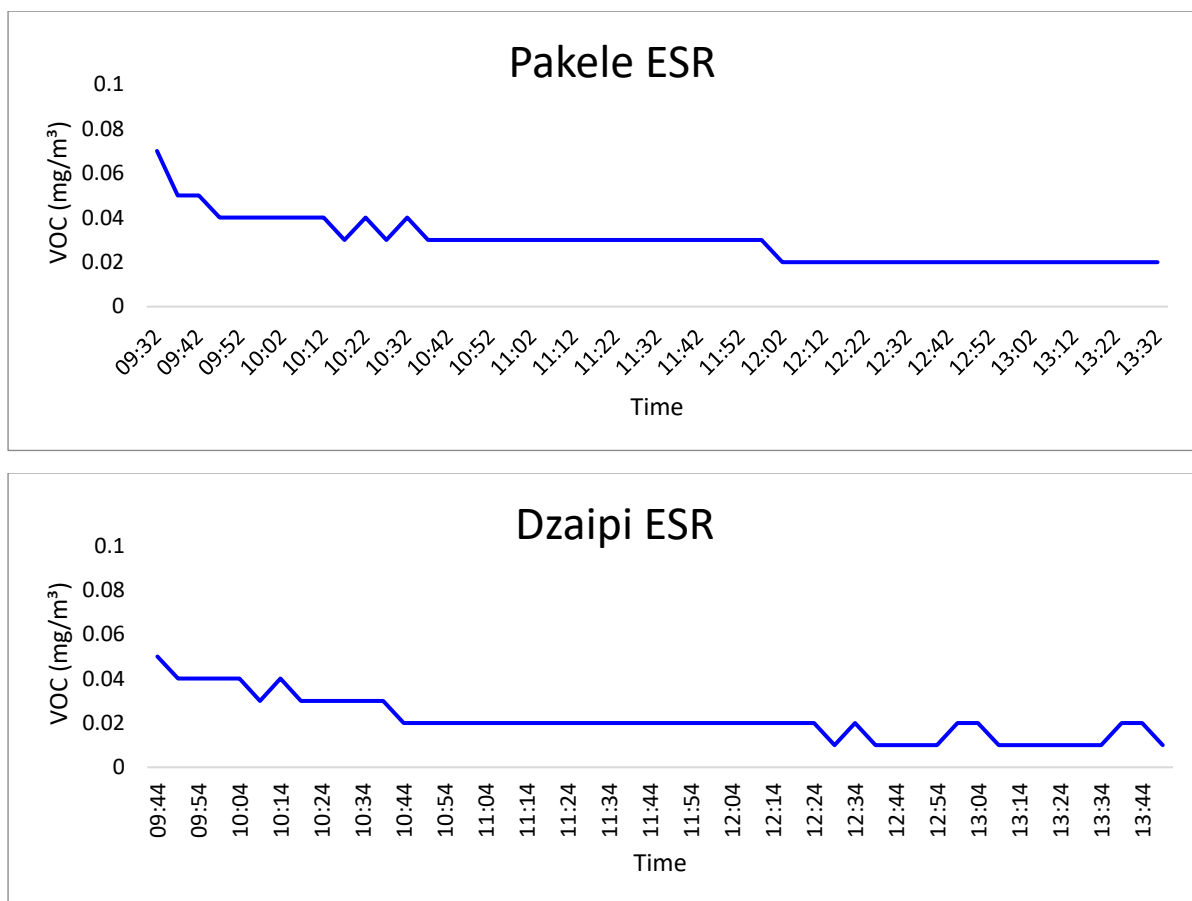


Figure 7-59: Variation of VOCs levels with time of the day at selected sensitive receptors to project sites

7.3.12 Noise Levels

Baseline noise measurements were undertaken for 5-7 hours at ten (10) locations of sensitive receptors in respect to project sites likely to generate noise during the project construction phase. Noise measurements were then compared to the Regulation 6(1) (Maximum Permissible Noise Levels for General Environment) and Regulation 6(5) for of the National Environment (Noise standard and Control) Regulations, 2003 as indicated in the Table 7-13.

Table 7-13: Maximum Permissible Noise Levels for General Environment

Noise Control Zone	Sound (Noise) Level dB (A) (Leq)	
	Day	Night
Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes of higher learning, conference rooms, public library, environmental or recreational sites.	45	35
Residential buildings	50	35
Mixed residential (with some commercial and entertainment).	55	45

Residential + industry or small-scale production + commerce.	60	50
Industrial	70	60

Time Frame: use duration (taking into consideration human activity)

Day - 6.00 a.m. - 10.00p.m

Night - 10.00 p.m. - 6.00a.m

Ambient noise levels from the project area ranged between 43.1d BA at Miaciku Village (Ajugopi ESR) to 53.3 dBA at the Ciforo ESR. Baseline noise measurements undertaken at WTP, MBR, Pekele ESR and Melijo ESR slightly exceeded the day time maximum permissible limits for their categories of land use, namely; residential area (50 dBA) and school/institutions of learning (45 dBA). According to field measurements (Figure 7-60), the high noise levels at MBR, Pekele ESR and Melijo ESR could be attributed to:

- Traffic of vehicles (trucks/cars) using the Atiak - Adjumani – Laropi Road (going to the ferry) and along other access roads with in the project area.
- Children playing at Pakele Catholic Church, and
- Children playing at the Olua refugee settlement

The detailed noise tables and graphs generated by the Casella meter are included in Annex 7 of this report.

Table 7-14: Summary of Noise Results at Sampled Sites

Location	Date & Run time	Duration (Hrs)	LAeq (dBA)	NEMA day-time limit (dBA) for general environment (dBA)	LCpeak	LAFmax	LAFmin	LZeq	LCeq
Etejo P/S (Intake – Arra West)	Date: 30/11/2021 Start Time: 9:22:12am End Time: 3:22:23pm	06:00:11	44.0	45	100.1	74.5	26.9	70.2	56.2
Water Treatment Plant (Mijare)	Date: 01/12/2021 Start Time: 08:13am End Time: 15:10pm	06:57:00	51.7	50	106.0	94.4	24.5	72.9	59.3
MBR - Adjumani (Mukolo West)	Date: 02/12/2021 Start Time: 09:36am End Time: 16:59pm	07:23:00	50.4	50	110.9	81.4	30.2	67.5	55.6
Ciforo ESR	Date: 04/12/2021 Start Time: 09:19am End Time: 16:35pm	07:16:00	53.3	55	95.7	84.9	32.2	68.1	63.0
Logoangwa ESR	Date: 05/12/2021 Start Time: 08:58am End Time: 11:59pm	03:01:00	45.0	50	93.1	81.0	32.3	74.8	60.3
Ajugopi ESR	Date: 05/12/2021 Start Time: 12:01pm End Time: 15:43pm	03:42:00	43.1	50	92.6	71.3	28.4	73.9	59.1
Pekele ESR (Catholic Church)	Date: 06/12/2021 Start Time: 09:23am End Time: 16:39pm	07:16:00	50.2	45	95.3	85.4	30.7	67.2	56.4

Location	Date & Run time	Duration (Hrs)	LAeq (dBA)	NEMA day-time limit (dBA) for general environment (dBA)	LCpeak	LAFmax	LAFmin	LZeq	LCeq
Dzaipi ESR (Dzaipi Subcounty)	Date: 07/12/2021 Start Time: 09:38am End Time: 17:18pm	07:40:00	45.3	55	96.5	78.0	34.6	70.1	61.4
Melijo ESR (Olua Church School)	Date: 09/12/2021 Start Time: 12:27pm End Time: 18:07pm	05:40:00	49.7	45	96.2	79.8	30.5	66.2	56.8



Figure 7-60: Noise sources in the project area during the time of measurements

7.3.13 Ground Vibrations

Ground vibration is measured in terms of Peak Particle Velocity (PPV) measured in mm/s which refers to the movement within the ground of molecular particles and not surface movement. The displacement value in mm refers to the movement of particles at the surface (surface movement). The human body can detect PPV of about 0.2 mm/s with clearly perceptible levels of detection at 1.0 mm/s and to cause cosmetic or structural damage to ordinary buildings, PPV must be in the range of 5.0 to 50.0 mm/s.

However, due to absence of Uganda standards for vibrations, the ground vibrations standards were adopted from Ireland, ISO 10137 of 1992 and British Standards BS7385 1993. The threshold level for cosmetic damage to residential construction ranges between 12.0 - 50.0 mm/s and frequency dependent. The human response and annoyance to blast vibrations can be aggravated by secondary noises such as walls and furniture rattling.

Table 7-15: Guidelines for the treatment of noise and vibration in national road schemes for Ireland, ISO 10137 of 1992 and BS7385 1993²⁷

Allowable Vibration Velocity (Peak Particle Velocity) at the Closest Part of Any Sensitive Property to the Source of Vibration, at a Frequency of		
Less than 10Hz	10 to 50Hz	50 to 100Hz (and above)
8 mm/s	12.5 mm/s	20 mm/s

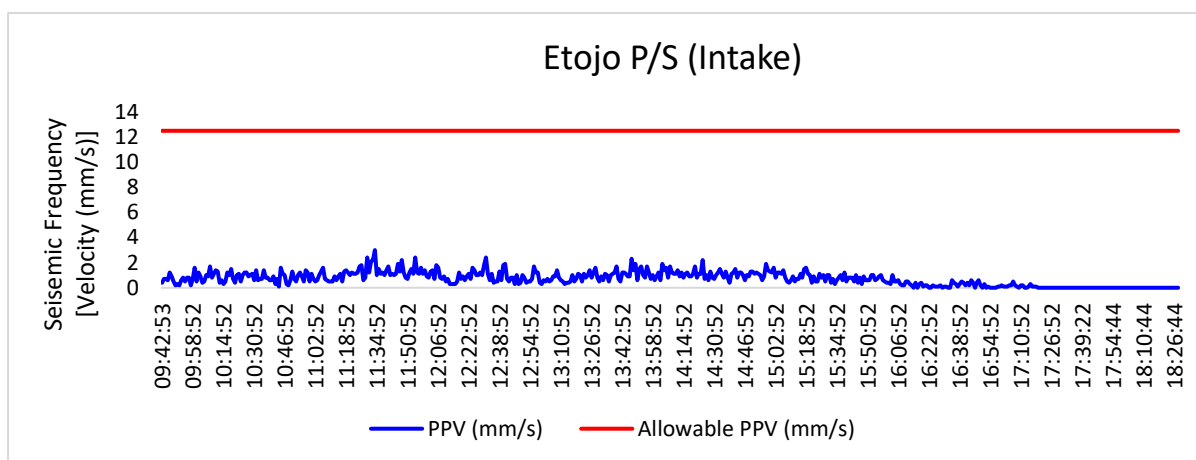
Typical vibration from transportation and construction sources falls in the range of 10-30 Hz and usually centres around 15 Hz. Therefore, the limit of 12.5 mm/s for construction equipment was adopted.

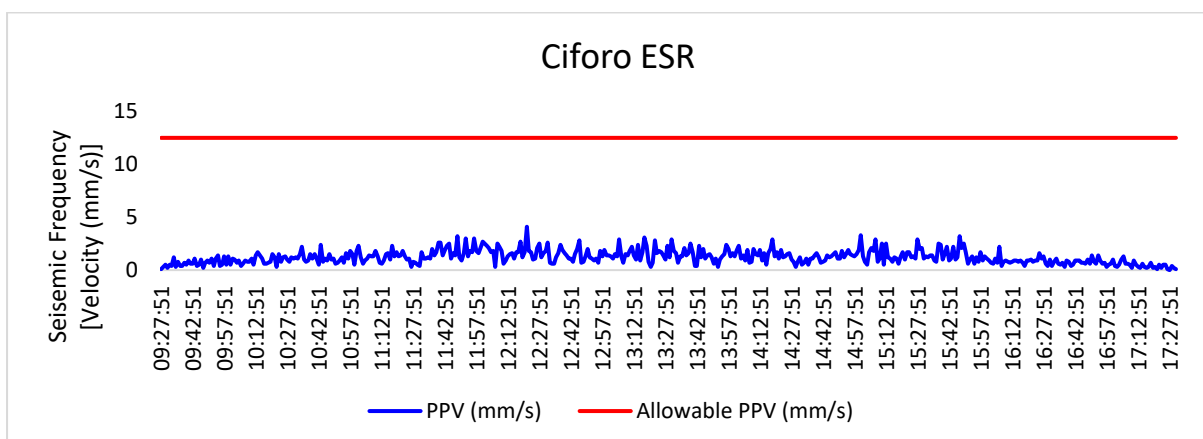
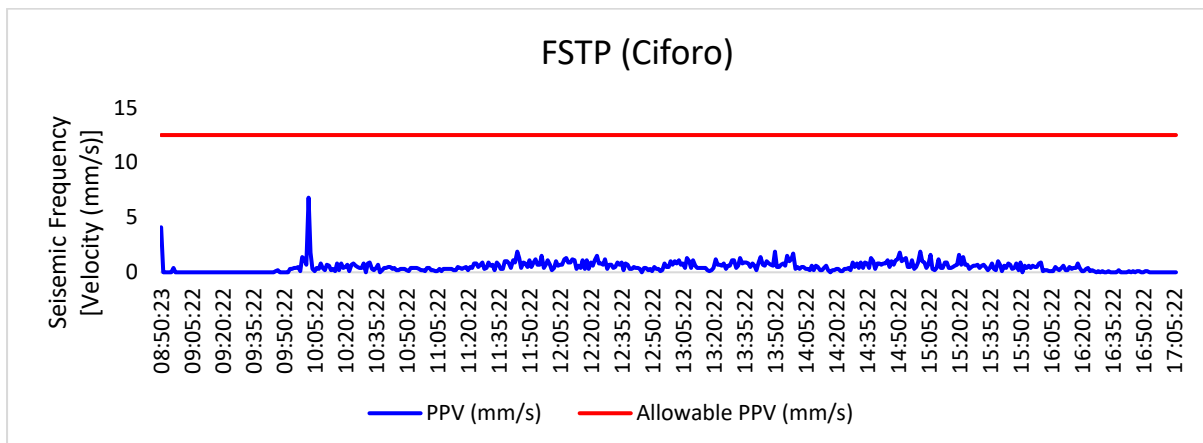
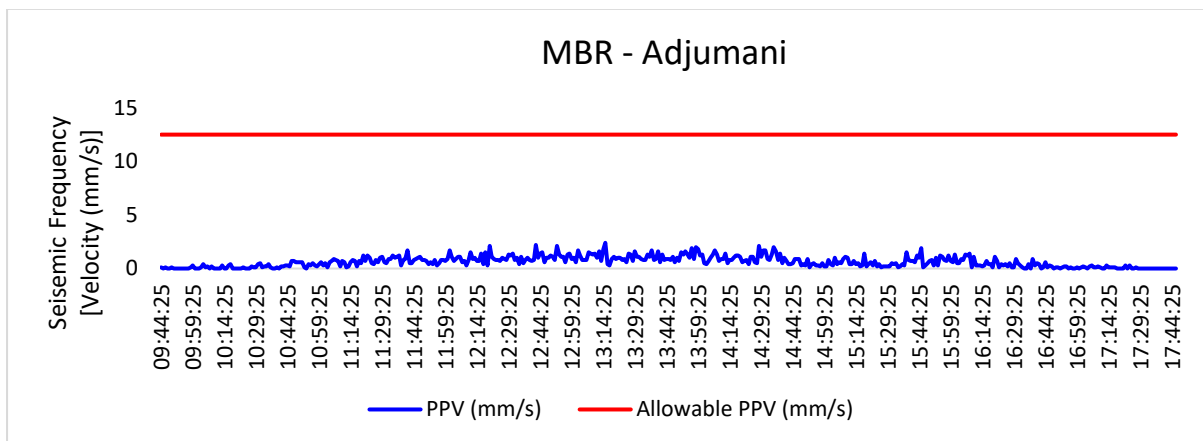
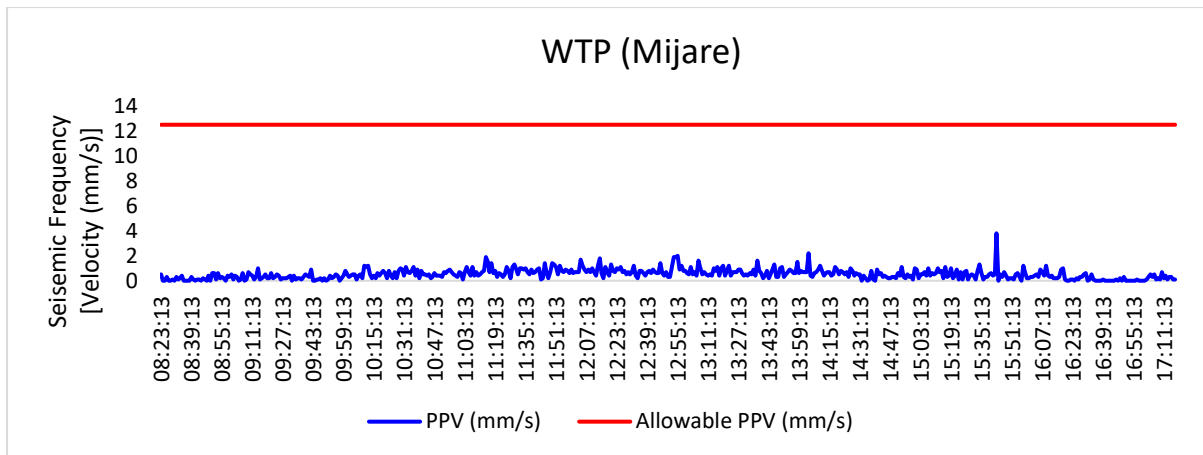
Table 7-16: Summary of vibration results of the project area

Location	Date/ Time	Vibration		
		Min	Ave	Max
Etejo P/S (Arra West)	Date: 30/11/2021 Start time: 09:42am End time: 18:28pm	0	0.714	3.000
Water Treatment Plant (Mijare)	Date: 01/12/2021 Start time: 08:23am End time: 17:17pm	0	0.521	3.800
MBR Adjumani – (Mukolo West)	Date: 02/12/2021 Start time: 09:44am	0	0.613	2.400

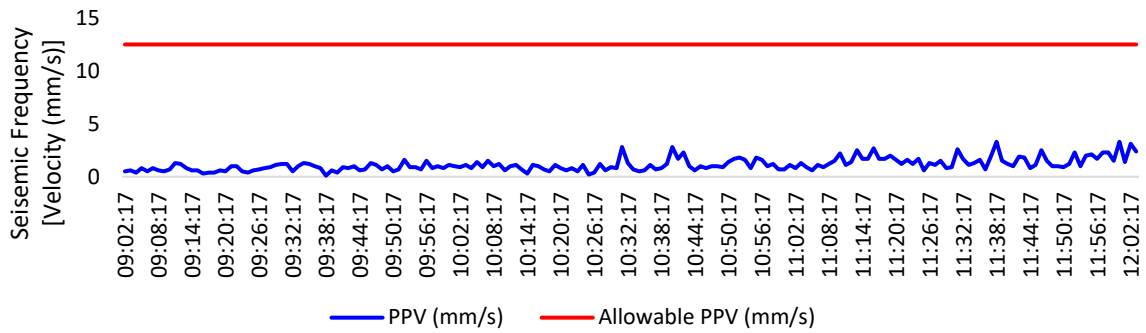
²⁷ [https://www.tii.ie/technicalservices/environment/planning/Guidelines for the Treatment of Noise and vibration in National Road Schemes.pdf](https://www.tii.ie/technicalservices/environment/planning/Guidelines%20for%20the%20Treatment%20of%20Noise%20and%20vibration%20in%20National%20Road%20Schemes.pdf)

Location	Date/ Time	Vibration		
		Min	Ave	Max
	End time: 17:46pm			
Ciforo ESR	Date: 04/12/2021 Start time: 09:27 am End time: 17:30pm	0	1.219	4.100
Logoangwa ESR	Date: 05/12/2021 Start time: 09:02am End time: 12:03:17	0.1	1.146	3.300
Ajugopi ESR	Date: 05/12/2021 Start time: 12:42pm End time: 16:29pm	0	0.781	2.900
Pekele ESR (Catholic Church)	Date: 06/12/2021 Start time: 09:37am End time: 17:52pm	0	0.781	2.900
Dzaipi ESR (Dzaipi Subcounty)	Date: 07/12/2021 Start time: 09:45am End time: 18:01pm	0	0.680	2.600
Melijo ESR (Olua Church School)	Date: 09/12/2021 Start time: 12:30pm End time: 23:59pm	0	0.376	2.800

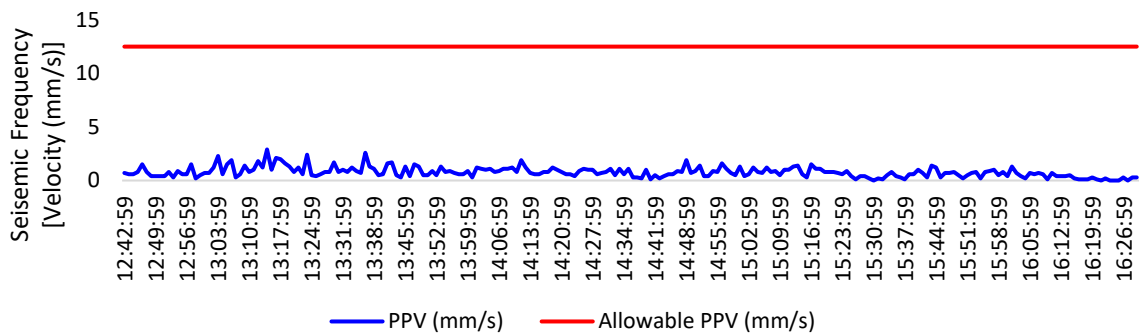




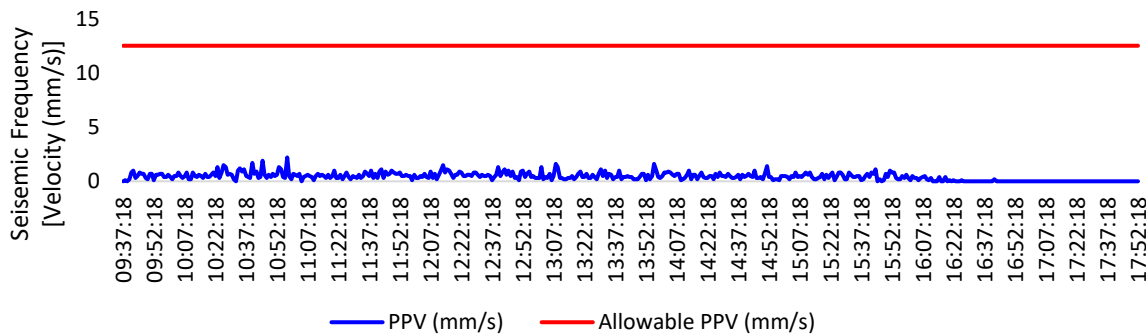
Logoangwa ESR



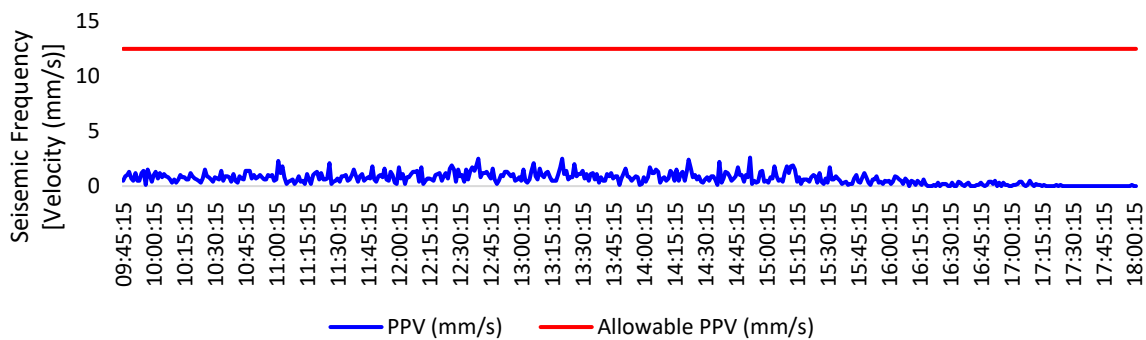
Ajugopi ESR



Pakele ESR



Dzaipi ESR



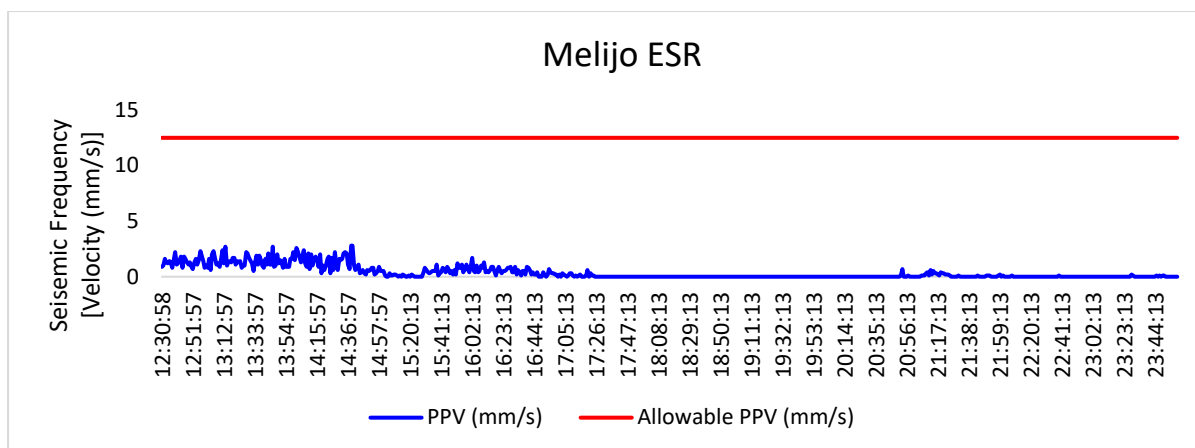


Figure 7-61: Variation of Peak Particle velocity with time of the day at selected sensitive receptors to project sites

Average PPV for the sampled sites along the road project ranged from 0.376mm/s at Melijo ESR (Olua Church School) to 1.219mm/s at Ciforo ESR (Ciforo trading centre). All the vibration readings were within the limits for structures basing on the adopted standards for ground vibrations.

7.4 Biological Environment

7.4.1 Aquatics (Fisheries)

7.4.1.1 Aquatic Vegetative cover

Although the Upper Nile River aquatic ecosystem in Adjumani consists of diverse vegetation types, edges of the intake area were found to be characterised by mainly tall and dense papyrus stands on both sides of the river. There were also some spotty thickets of bushes largely made of shrubs with a few spotty trees. The river edge vegetation is composed of a mosaic of emergent plant communities including (i) homogenous stands forming a floating mat of sedge *Cyperus papyrus* mixed with different species of aquatic plants, short floating meadows of smaller cyperaceae, and communities of rooted, floating leaved and free floating euhydrophytes including *Nymphaea* spp and *Utricularia* spp. The suggested intake point had swampy and flooded edges. These wetlands are known to harbour the infamous Nile crocodile but none was spotted during this survey. No other large animals were reported, although historically hippopotamus and bushbucks were common in the area. Of common presence were fixed stands and masses of floating plants and pieces of the water hyacinth (*Eichornia crassipes*). However, it was not as dominant. The floating masses of water hyacinth pose significant challenges to the water intake system, and the design needs to devise a boon to direct these pieces of water hyacinth away from the intake area and infrastructure.



7.4.1.2 Fisheries and Other Aquatic Animals in Project Area

The Upper Nile River is rich in fisheries biodiversity, and is part of generally high biodiversity Albertine Region of eastern Africa. During field surveys at Arra West village, fish species were observed at the proposed water intake site covering and were caught with support and assistance from local fishermen. Most common and ecologically dominant fishes in Madi region of the Upper Nile River or Albert Nile, were found to be the tilapia fishes especially the Nile tilapia (*Oreochromis niloticus*), and African butter fish (*Schilbe mystus*) (Figure 7-62).



Figure 7-62: A catch from experimental fishing

A catch from experimental fishing showing a days catch (13 hours using passive set gill nets of 1.5 to 2.5 inches mesh size set 0.5 upstream and 0.5 km downstream of the uptake point). African butter fish dominated the catch followed by mixture of tilapia species.

In this survey these were affirmed and recorded in most of the fishermen catches with the tilapias comprising over 95% of the catches for most part. This is more to do with the fact that most fishermen do fishing in shallow waters, a preferred habitat for fisheries species, and the fact that predominantly poor fishermen use typically dugout canoes that restricted to shallow waters and cannot manage the moving open Nile waters where other species are commonly found, and or in swampy heavily vegetated areas that are laborious to access.



Figure 7-63: A catch from a day's catch from a fisherman (Tilapia fishes dominated the catch set inshore 0.5 km upstream of uptake point)

Other commonly caught species found in the catches of fishermen are African butter fish (*Shilbe mystus*), African sharp tooth catfish (*Clarias gariepinus*), the marble Lungfish (*Protopterus aethiopicus*), the Vundu catfish (*Heterobranchus longifilis*), Redbelly tilapia (*Coptodon zilli*), Albert tilapia (*Oreochromis leucostictus*), St. Peter's tilapia (*Sarotherodon galilaeus*), the Black Nile catfishes (*Bagrus bayad* and *Bagrus docmac*) and Nile perch (*Lates niloticus niloticus*).

Others reported to occur but rarely caught or targeted by fisherfolk are Giraffe catfish (*Auchenoglanis occidentalis*), Electric catfish (*Malapterus electricus*), Cornish jackfish (*Mormyrops anguilloides*), Elephant snout fish (*Mormyrus kannume*), the Bichir (*Polypterus Senegalus*, *P. birchir*, & *P. endicheri*), Elephant fish (*Petrocephalus bane*), Nile puffer (*Tetraodon fahak*), African obscure snakehead fish (*Ophiocephalus obscurus*), the Climbing perch (*Anabas petherici*, *A. muriei* or *A. testudineus*), Kamuduli in Alur (*Synodontis schall*), Nile labeo (*Labeo niloticus*), Assuan labeo (*Labeo niloticus*), Niger barb (*Barbus bynni*), Ngasia (*Hydrocyon forskalii*), the Nile distichodus (*Distichodus niloticus*), Aporo in Alur (*Citharinus citharus*), Angara in Alur (*Alestes*

baremoze). Details of ecological and conservation status of Madi Region Upper Nile River fish species are in Annex 17.

7.4.2 Land Use and Cover

The project area is composed of Croplands (Commercial and Subsistence); Bushland (Closed and Open); Grassland (Closed and Open); Woodland (Sparse, Moderate and Dense); Natural Forests (Sparse, Moderate, Dense); Settlements/Built-up Areas; Water Body and Wetlands ().

The spatial analysis of the land use/cover shows that open water bodies occupy 2.5% and dry takes 97.5% of total land area with River Nile (Albert Nile) being the major feature of the district. The water bodies include both seasonal and perennial rivers and wetlands. Permanent wetlands with a variety of vegetation particularly papyrus occupy the banks of River Nile (Albert Nile) and seasonal swamps also occupy a sizeable area of the district. The Arawa highlands and the equatorial forest of Zoka (in Ofua sub-county), dominate the southern part of the district whereas other areas are predominantly savannah woodland and grassland with grasses ranging from 0.5-2.0 m high.

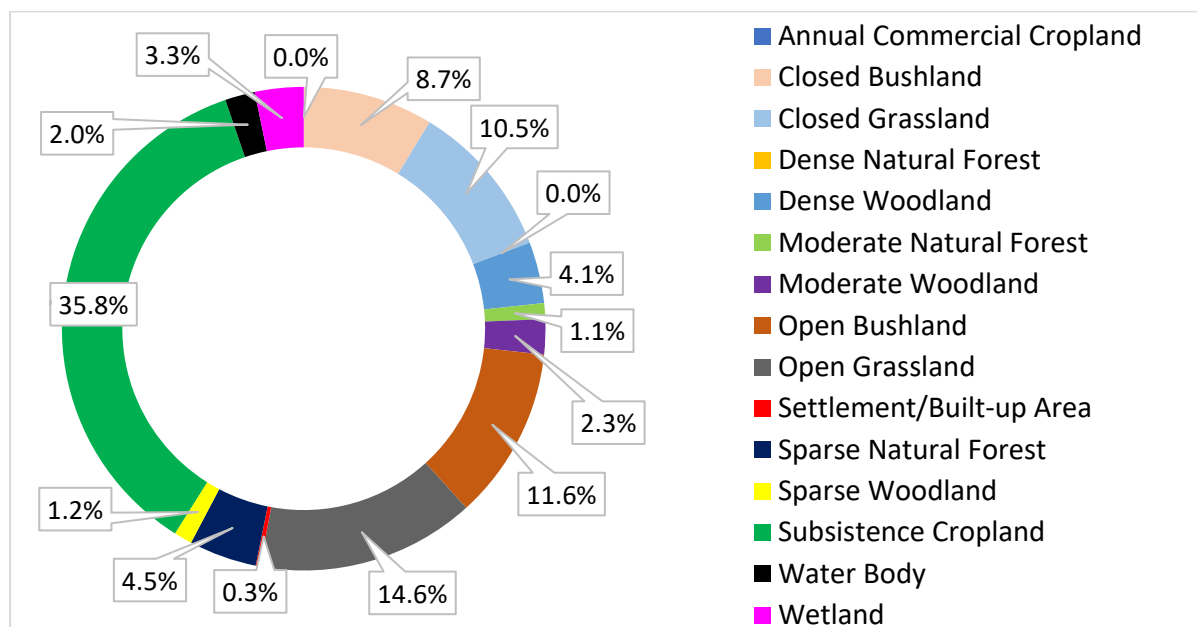


Figure 7-64: Land use/cover and extent of coverage in Adjumani

The proposed transmission line corridor, water treatment, the reservoir and borehole sites are located within some areas that have undergone several land transformations, but still provide several ecosystem services to the communities, ranging from indirect utilization such as sand mining, water for domestic and livestock consumption, land for agriculture practices, firewood, and grazing among others. Within the project area, the key land use is settlements, agriculture of perennial crop growing and exotic tree plantations (tick trees) ().

There are also utility agencies and companies that have utilized the road reserve. Such utilities can be damaged if not handled well. However, with the construction of the Atiak – Adjumani – Laropi Road, most of all these utilities have been catered for during acquisition of road reserve by the GoU through UNRA.

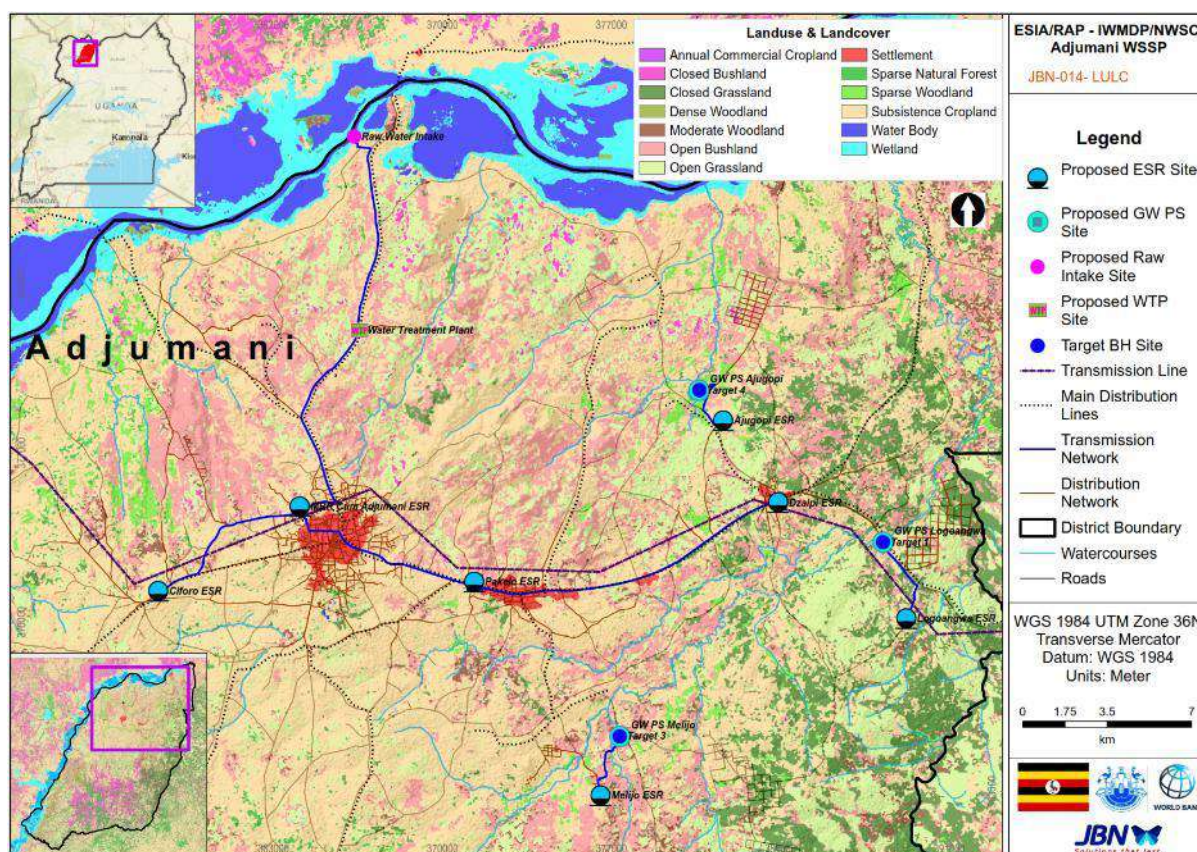


Figure 7-65: Land use/cover map of Adjumani project area

7.4.3 Vegetation, Habitat and Flora

7.4.3.1 Habitat and Flora Description

Three (3) principal natural terrestrial habitats were identified within sites and along the routes for Adjumani WSSP. i.e., the permanent wetlands along the Nile bank (intake and pumping station) and along the small rivers (borehole sites); scrubland/woodland and grassland (all sites) and agricultural land associated by open fallow with remnant trees at all reservoir sites and along transmission and distribution lines.

7.4.3.1.1 Critical Habitat

The global conservation status of each species was obtained from the published IUCN red list of threatened species (IUCN 2021). The national red list of Uganda's threatened species (Wildlife Conservation Society 2016) was used for identification of species that are nationally threatened. All terrestrial habitat types for Critical Habitat were converted into agricultural-or grazing land.

All the proposed borehole sites and the intake are located within the NEMA jurisdiction zones under wetland management guide lines. Therefore, these are areas of conservation importance at all levels and are considered to be priority or critical habitat types for any project. The floristic composition of each of these habitat types are discussed in more detail below:


7.4.3.1.1.1 Wetland Habitat for the Intake and Pumping Station Site

The site is composed of two (2) floristic regions, i.e., aquatic and terrestrial regions.

Aquatic Region: This was characterised by floating *rhizomatous* mat dominated by *Cyperus papyrus* (35%) in deeper waters, followed by *Voscia cuspidate* 40% growing into shallow water region, and *Eichhornia crassipes* (water hyacinth), *Typha domingensis*, *Ipomoea aquatic*, *Cyperus dives*, *Phragmites corniculatus*, *Cyperus denudatus* and *Panicum repens* covering 25% in shallow water region towards the terrestrial area.

Terrestrial Region: This was characterised by short grasses due to grazing and cultivation around the nominated site for the intake. Terrestrial region was dominated by *Hyparrhenia figariana* (80%), *Hypertheria dissolute*, *Hyparrhenia filipendula*, *Heteropogon contortus*, and *Sporobolus pyramidalis* associated with remnant such as *Ficus sycomus*, *Acacia polyacantha* and *Borassus aethiopicum*.

Table 7-17: Species in the aquatic region at the Intake site

Location	Description	Photograph
Intake site E366314, N390085 Elev. 603m	1 - Floating mat of <i>Cyperus papyrus</i> . 2 - <i>Voscia cuspidate</i> . 3 - <i>Eichhornia crassipes</i>	

7.4.3.2 Vegetation Description

7.4.3.2.1 Borehole Sites (T1, T3 & T4)

The proposed or nominated sites for the boreholes are located within the refugee settlement zones which have been affected by the presence of high human populations. These ecosystem areas provide the building materials, fuelwood, charcoal, wood for bricks making which has therefore turned them into severely degraded sites characterised by short shrubs, tall grasses with remnant trees. Most of the plant species were determined in the scrubland and uncultivated agricultural lands which are located along the riverine areas. Besides with the effect of proximity of the areas to the rivers, species peculiar to seasonal swampy areas were also recorded. The proposed site for T1 is located along River Nyegai (about 4km before Dzaipi TC from Atiaka), T3 along River Adidi and T4 along River Icuku



Borehole (T1) Site – River Nyegai: The area comprises of scrubland on rocky soils with patches of grasses. The proposed site is degraded with no tall trees, only short scrubs ranging between 1.5 to 3.0m in height were recorded. These were dominated by shrubs such as., *Combretum adenogonium*, *Pseudocedra kotschyii*, *Grewia mollis*, *Harrisonia abyssinica*, *Prosopis africana* and


Ficus conraui associated with medium grasses dominated by *Hyparrhenia figariana*, *Cynodon nlemfuensis*, *Urena lobate* and *Andropogon gayana* (Table 7-18).

Borehole (T3) Site – River Adidi: This was formerly a dumping site during the bridge construction characterised by herbaceous plant species mixed with shrubs associated with *Ficus sycomorus* *Acacia polyacantha* and *Acacia sieberiana* trees (Table 7-18).

Borehole (T4) Site – River Icuku: The riverine was described as scrubland, characterised by open short shrubs mixed with patches of grasses and trees and it is best used as cattle grazing area. *Ficus sycomorus*, *Vitex doniana* and *Acacia sieberiana* dominated the upper strata, well as *Acacia hockii* and *Piliostigma thonningii* dominated the middle stratum, and *Imperata cylindrical*, *Eleusine indica*, *Paspalum scrobiculatum*, *Brachiaria brizantha*, *Hyparrhenia collinum* and *Echinochloa pyramidalis* dominated the ground cover (Table 7-18).

Table 7-18: Vegetation classification at Borehole sites (T1, T3 and T4)


Location	Description	Photograph
Borehole (T1) Site E-388252, N-373358	Site vegetation structure characterized by short shrubs	
Borehole (T3) Site E377023, N366755	Formerly soil dumping site characterized by shrubs and remnant trees	




<p>Borehole (T4) Site</p> <p>E-380442, N-378910.</p>	<p>River Icuku (T4). The site is characterised by thickets of <i>Acacia hockii</i> and <i>Piliostigma thonningii</i></p>	
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7.4.3.2.2 Open Fallow Vegetation with Crops

These include all the proposed reservoir sites of Master Balancing Reservoir (MBR), Elevated Storage Reservoirs (ESRs) and Water Treatment Plant (WTP). The open fallows areas were uniform in terms of plant species composition, 92% dominated by herbaceous plant species such as; *Hyparrhenia figariana* (65%), followed by *Hyptis suaveolens* (15%), *Pennisetum polystachion* (10%), *Brachiaria brizantha* (3%), *Panicum maximum* (5%), *Brachiaria comate* (2%) (Table 7-19).

Table 7-19: Vegetation classification at ESR and WTP sites

Location	Description	Photograph
<p>WTP Site</p> <p>E366523, N382134</p>	<p>Fallow with large <i>Kigelia africana</i> tree</p>	

<p>MBR Site E364131, N374752 Alt. 813m</p>	<p>Fallow dominated by <i>Hyptis suaveolens</i> (40%), <i>Ageratum conyzoides</i> (20%), <i>Gutierrezia eylesii</i> (20%)</p>	
<p>Ciforo ESR Site E358312, N371219 Alt. 780m</p>	<p>The site enclosed with frequently maintained short grasses and mango tree</p>	
<p>Pakele ESR Site E371292, N371689 Alt. 797m</p>	<p>The site is surrounded by 6 large mango trees, 6 <i>Sclerocarya birrea</i> and 4 small <i>Tectona grandis</i></p>	


<p>Dzaipi E383904, N375032 Alt. 771m</p>	<p>The tower tank site is basically fallow 100% herbaceous species such as; <i>Hyptis suaveolens</i>, <i>Acanthospermum hispidum</i>, <i>Digitaria velutina</i> among others.</p>	
<p>Logoangwa ESR Site E389201, N370159</p>	<p>Fallow dominated by herbaceous plants such as; <i>Pennisetum polystachion</i> (40%), <i>Hyparrhenia figariana</i> (30%), <i>Brachiaria comate</i> (15%)</p>	
<p>Melijo ESR Site E376553, N362861</p>	<p>Open fallow with tall and short herbaceous plants</p>	

<p>Ajugopi ESR Site. E381673, N378304</p>	<p>Open fallow with one <i>Tamaridus indica</i> tree.</p>	
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7.4.3.2.3 Transmission and Distribution Routes

The project distribution and transmission lines will traverse through road reserve areas, of which most are covered by agricultural lands, patches of partially afforested areas, scrubland and floodplain areas. Most of the plant species were determined in the unploughed and uncultivated agricultural lands (open fallow) and scrubland areas. Besides the proximity effect of the road, species peculiar to anthropogenic influence (activities) were also recorded. *Milicia excelsa* land mark trees, crops and some of the invasive plant species were among the human influenced species (Table 7-20).

Table 7-20: Vegetation classification along the transmission and distribution routes

Location	Description	Photograph
<p>Adjumani TC E365882 N373434</p>	<p>Land marker Mvule trees (<i>Milicia excelsa</i>) i.e., 4 live trees and 3 dead trees. The trees range between 60 - 98 cm in diameter</p>	

Transmission route to Dzaipi (at the prison farmland). E377420, N371582	Flood plain used as prison farmland	
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7.4.3.3 Floristic Composition, Distribution, Density and Diversity for Adjumani Water System

A total of three hundred, sixty-seven (367) individual species recorded at all the surveyed sites were from sixty-three (63) families. Only one (1) species of orchidaceous was registered from all the study sites. Herbs or grasses recorded the highest individuals with two hundred, thirty-seven (237) contributing 65%, followed by trees/shrubs with eighty-nine (89) representing 24%, and liana with forty-one (41) species contributing only 11% of the species composition. All the study sites were not rich in terms of plant species diversity. The number of species recorded in any geographical location depends more on time factor and sample size before other factors such as; ecological and anthropogenic factors. All the proposed sites for the Adjumani WSSP differed in area size, a factor which determined the number sampling units. The proposed sites T1 had 6 sample quadrants accumulating to 0.1884 Ha while T3 and T4 had 5 each accumulating to 0.157 Ha, respectively.

7.4.3.3.1 Species Richness and Intensity

Figure 7-66 below shows sampling intensity and species richness in plots from all the study sites and routes for Adjumani water project. It reveals low species richness accumulatively from the sampled sites. The low relative species diversity could be as a result of edge effect and agricultural activities along the transmission and distribution lines and at the treatment site and reservoirs. Others sites for the boreholes are located in refugee settlement areas with high level vegetation degradation.

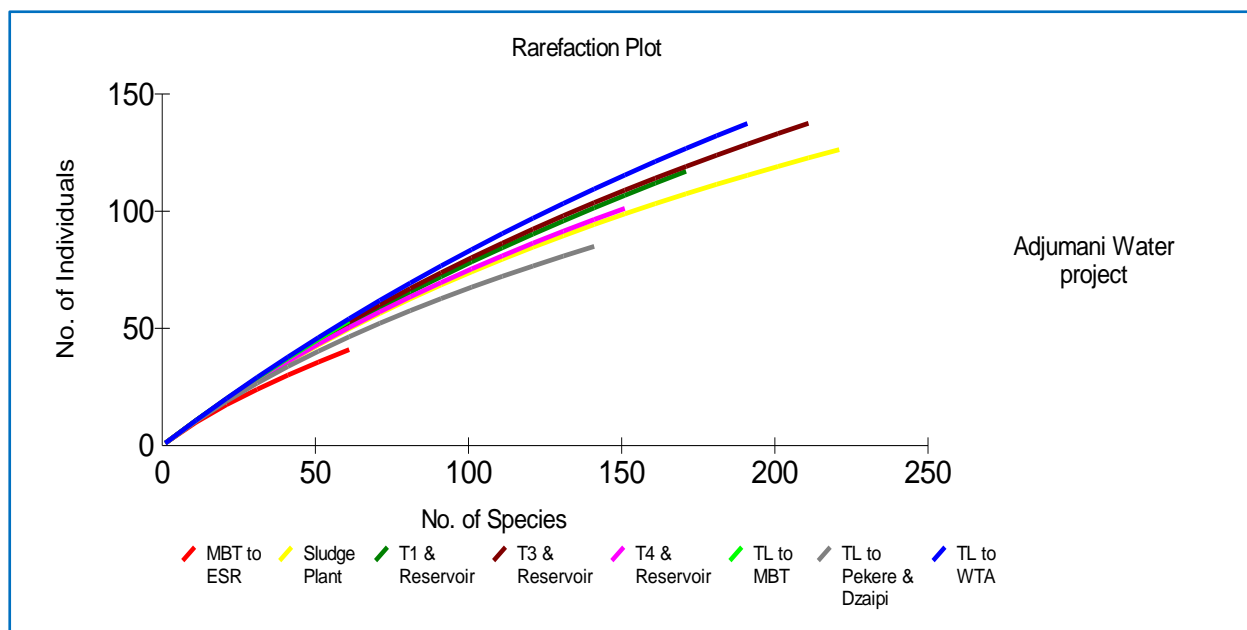


Figure 7-66: Rarefaction curve

7.4.3.3.2 Tree Distribution

Figure 7-67 reveal tree stem diameter classes. Dbh class $\leq 2.5\text{cm}$ recorded the highest stem abundance in most proposed sites. According to the data, shrubs or saplings recorded the highest number of stem density. The T1 and T4 sites recorded the highest number of individual shrubs, TL to MBR. Large trees were very rare from all sites. The transmission line from intake to WTP and MBR recorded the highest number of large trees, and these were predominantly *Milicia excelsa*, *Gmelina arborea* and *Acacia senegal* planted along the road to Laropi landing. The second site to recorded large trees was the transmission line from the MBR to ESRs. The most dominant indigenous tree species were *Milicia excelsa*, *Lannea schweinfurthii*, *Ficus sycomorus*, *Ficus glumosa* and *Tamarindus indica*. *Mangifera indica* (mango tree), *Gmelina arborea* and *Tectona grandis* were the most dominant exotic tree species.

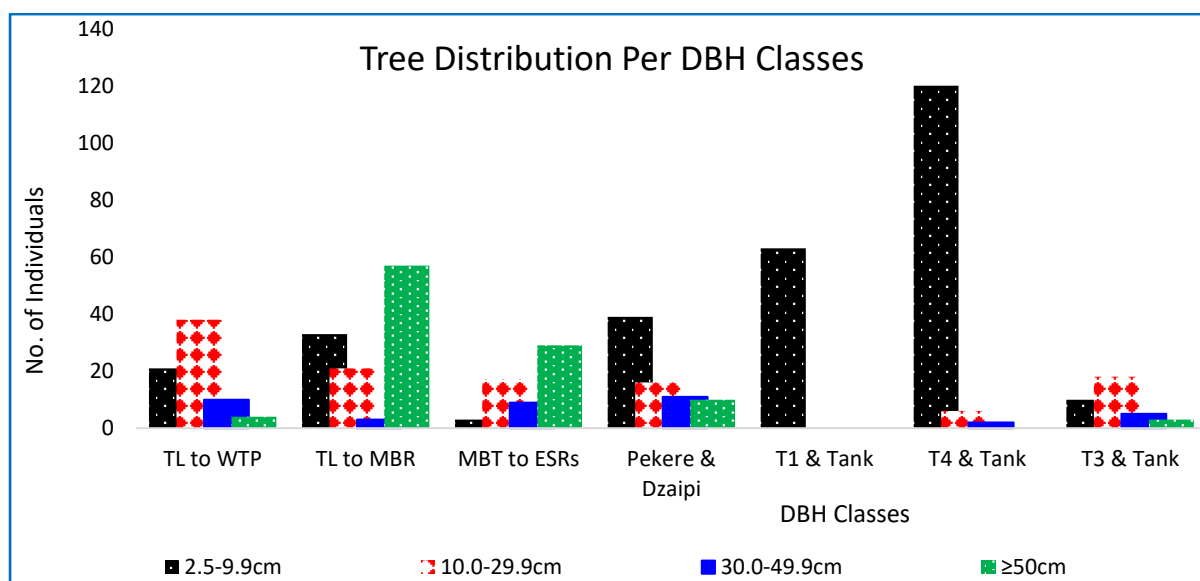


Figure 7-67: Tree distribution per Dbh class in the project area

7.4.3.3.3 Species Diversity

Table 7-21 shows the diversity values for plants from all sites and routes. Diversity of an area is considered to the number of different species. From the field surveys conducted in Adjumani water project, diversity was considered to be slightly higher according to the log series. From all sites, *Fabaceae* family registered the highest number of species with 70, followed by *Poaceae* (*Gramineae*) 59, *Asteraceae* (*Compositae*) 20, *Malvaceae* 19, *Euphorbiaceae* 18, *Acanthaceae* 14, *Cyperaceae* 12, *Rubiaceae* and *Convolvulaceae* sharing 10 each, *Apocynaceae*, and *Combretaceae* 9 each, *Amaranthaceae* 8, *Lamiaceae*, *Vitaceae*, and *Verbenaceae* 7 each, the rest of the families registered 6 or less (Annex 8).

Table 7-21: Shannon-Wiener and Alpha diversity values for plants from all the sites and routes

Index	MBR to ESRs	T1 & ESR	T3	T4 & ESR	TL to MBR	Pakele & Dzaipi	TL to WTP
Shannon H' Log Base 10.	1.551	2.015	2.077	1.949	1.707	1.84	2.089
Shannon Hmax Log Base 10.	1.643	2.083	2.14	2.017	1.732	1.93	2.14
Alpha	55.73	163.917	171.401	134.332	199.754	90.5	219.779

7.4.3.3.4 Similarities in Species Composition

Figure 7-68 shows similarities in species composition from different the study sites for plants. All sites were dissimilar at only 35%. Transmission line from the intake to WTP was similar to WTP to Pakele and Dzaipi and closer to T4 site in terms of plant communities and species composition.

Transmission line from WTP to MBR was similar to MBR to ESR routes, T3 and T1.

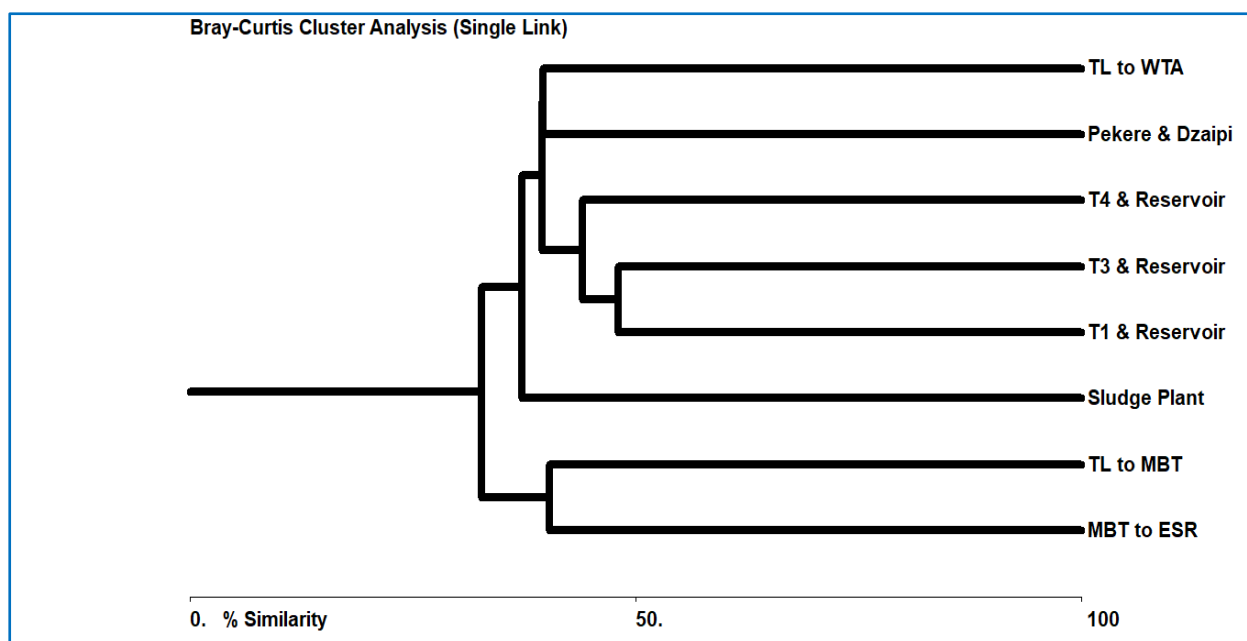


Figure 7-68: Similarities in plants species composition from different study areas

7.4.3.3.5 Species Abundance

Abundance is measured by presence/absence. Under this analysis, with presence/absence data, only a species within a quadrant is considered hence the simplest method of vegetation data analysis. Abundance is the count of individual tree stems, and not species within a quadrant. It is calculated by using the number of individual trees to the area covered. In this study, the calculations are not uniform because the sampled quadrants per transect in sites were not uniform too (Table 7-22).

Table 7-22: Individual trees recorded from all sampled sites for Adjumani water project.

Sites	No. of Quadrats	Individual	No. of trees per Hectare
Intake to WTP	14	73	166.06
TL to MBR	8	114	453.8
MBR to ESRs	14	58	181.93
TL from Pakele to Dzaipi	44	76	55.00
T1 & Logoangwa ESR	12	63	167.19
Ajugopi ESR	9	128	462.9
T3 & Melijo ESR	11	36	104.22

7.4.3.3.6 Conservation Status of the Species



Using the IUCN Red List Categories and Criteria at Global, Regional and National Levels. Out of the three hundred, sixty-seven (367) plant species encountered from all study sites and routes, only six (6) species have been listed under the IUCN Redlist of Uganda of 2016. Therefore, the species

raises a great conservation concern in the country and in the region. *Afzelia africana*, (*Fabaceae*), globally listed as VU and nationally as EN A2acd, *Milicia excelsa* (Mvule) (*Moraceae*), globally listed as Near threatened and nationally as (EN A2acd) *Tamarindus indica* (*Fabaceae*), globally as NE, and nationally as (VU A2acd), *Khaya senegalensis* (*Meliaceae*), globally, VU and nationally as (EN A2acd; B1ab (iii, iv), *Dalbergia melanoxylon* (*Fabaceae*) globally NT and nationally as VU A2ad., and *Vitellaria paradoxa* (*Saportaceae*), globally VU and nationally as VUA2ad. The species are therefore critically threatened and they deserve protection wherever they occur. The water transmission and distribution lines may not cause any major threat to the endangered species because the trees are located >25m from off the road. Furthermore, it is very clear that UNRA has already established RAP for the Atiak – Adjumani – Laropi Road of which the TL will move along its road reserves.

7.4.3.3.7 Distribution of the IUCN Threatened Plant Species

Milicia excelsa trees were recorded along transmission lines from the intake to MBR, MBR to Ciforo ESR. *Vitellaria paradoxa* was recorded at Melijo ESR and along the route to Logoangwa ESR site. *Dalbergia melanoxylon*, two (2) short trees were recorded about 0.7km from the intake (E366774, N387624) and *Khaya senegalensis* was recorded along the TL to the WTP.

Table 7-23: Some of the IUCN Threatened Plant Species in the project area

Location	Description	Photograph
Transmission route to Ciforo ESR E359763, N371961.	Land mark <i>Milicia excelsa</i> trees. 10 were recorded at time this field work was conducted. The trees ranged between 10-60cm of dbh	
Ajujo E-366774, N-389624	<i>Dalbergia melanoxylon</i> (<i>Fabaceae</i>) IUCN Red listed, VU, A2ad	

7.4.3.3.8 Invasive Plants Species

The term invasive has been defined differently. Cronk and Fuller (1995) refer to natural area weeds as invasive plants and the nonnative plants as aliens. Mosango *et al.* (1999) refer to weeds as invasive and any plant growing where it is not wanted and interfering with human activity to be a weed. Aliens (exotics) are non-endemic plants spreading naturally without the direct assistance of man in natural or semi natural habitat, to produce a significant change in terms of composition, structure or ecosystem processes.

Invasive species may be used to mean an alien species which becomes established in natural or semi-natural ecosystems or habitats, is an agent of change and threatens native biological diversity (IUCN, 1999). Invasive alien species are species introduced deliberately or unintentionally outside their natural habitats where they have the ability to establish themselves, invade, out-compete natives and take over the new environments (CBD News, 2001). According to the above descriptions, IUCN, CBD, CABI compendium and FOA, many of the recorded plant species have been categorized as invasive in some countries across all continents, but in Uganda, these species have not caused a major impact to the plant biodiversity. Some are very useful to the communities where they occur.

In this survey, only twelve (12) species were selected and have records of impacts to the habitats of Uganda. These include; *Bidens pilosa*, *Chromolaena odorata*, *Xanthium strumarium* (all in *Asteraceae*), *Ricinus communis* (*Euphorbiaceae*), *Acacia hockii*, *Dichrostachys cinerea* (*Fabaceae*), *Hyptis suaveolens* (*Lamiaceae*), *Sida acuta* (*Malvaceae*), *Imperata cylindrical*, (*Poaceae*), *Eichhornia crassipes* (*Pontederiaceae*), *Striga hermonthica* (*Scrophulaceae*) and *Lantana camara* (*Verbenaceae*).

Table 7-24: List of invasive species, their uses and impact of invasiveness on the ecosystem

S/N	Family	Species	Status	Impact	Uses
1	Asteraceae	<i>Bidens pilosa</i>	Exotic		
2		<i>Chromolaena odorata</i>		One of the world's worst weeds, highly competitive that can greatly colonize an entire area where it occurs hence reducing grazing space for animals	Can be used in mulching of degraded agriculture land
3		<i>Xanthium strumarium</i>		Major weed of row crops	
4	Lamiaceae	<i>Hyptis suaveolens</i>	Native	Reduced native biodiversity	
5	Fabaceae	<i>Acacia hockii</i>		Damaged ecosystem services, Habitat alteration, Modification of: fire regime, nutrient regime, successional patterns.	Fuelwood, exudate gum,
6		<i>Dichrostachys cinerea</i>		Successional patterns, Monoculture formation, negatively impacts agriculture	Forage, Soil improvement, Charcoal, Fuelwood, Wood,
7		<i>Mimosa pigra</i>		Infests wetlands, alters open grasslands into dense thorny thickets and negatively impacts on native biodiversity, affects large mammal distribution and their health	
8	Malvaceae	<i>Sida acuta</i>	Exotic	infests various habitats, becomes most problematic in pastures and rangelands	
9	Poaceae	<i>Imperata cylindrica</i>	Native	Prolific producer of seeds which are dispersed by wind over long distances to colonize cleared land. Affects animal's eyes hence determining their distribution	Fodder at early stages after burning

10	<i>Pontederiaceae</i>	<i>Eichhornia crassipes</i>		Adversely affects human activities (fishing, water transport) and biodiversity	It ferments rapidly due to its high-water content and can supply biomass for biogas production.
11	<i>Scrophulaceae</i>	<i>Striga hermonthica</i>	Exotic	Responsible for more crop loss in Africa than any other individual weed species	
12	<i>Verbenaceae</i>	<i>Lantana camara</i>	Exotic	Damaged ecosystem services, fire regime, negatively impacts: agriculture animal health; forestry; human health, Reduced native biodiversity	Fodder, ornamental, Erosion control, Fuelwood

7.4.4 Fauna

7.4.4.1 Surface Water Infrastructure

7.4.4.1.1 Butterflies

Twenty-Two (22) species were recorded at the different infrastructure sites and along the transmission lines (TL) and distribution lines (DL) (Figure 7-69). In terms of taxonomic, the species belong to four (4) families and fourteen (14) genera. The more time you spend in an area, the more species you come across. Butterflies also appear at different times of the year depending on season. No species with restricted / limited distribution were encountered.

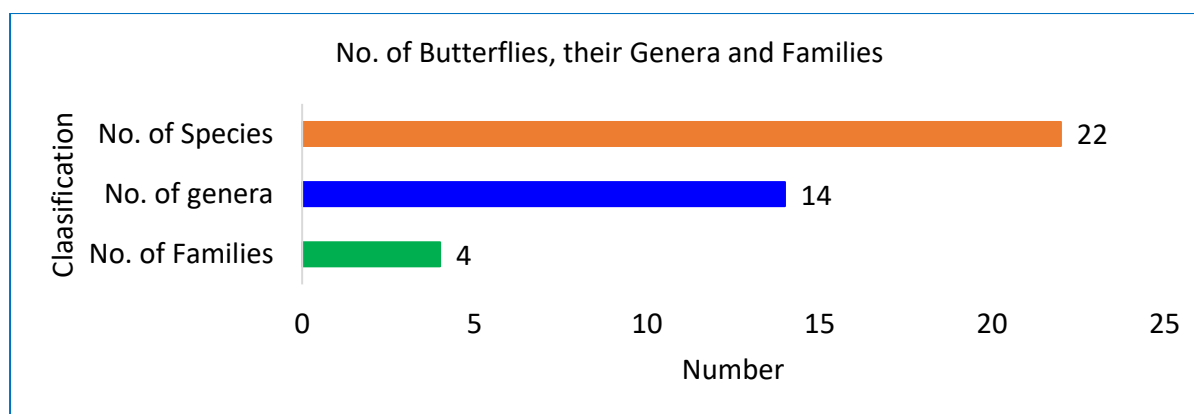


Figure 7-69: Butterflies encountered during the survey for surface water system

In terms of ecological characterization, most of the species recorded are widespread. Ten (10) widespread species were recorded (Figure 7-70). Migratory species recorded were six (6), Forest edge/woodland species were four (4) and two (2) open habitats species. *Neptidopsis ophione* Scalloped Sailer occurs in forest, woodland and riverine areas. *Catopsilia florella* African Migrant is a fast-flying butterfly that moves swiftly between flowers. It often engages in mud-puddling and is at times seen migrating in numbers. Little Commodore *Junonia sophia* is a butterfly which occurs in highland areas, ubiquitous in gardens and cultivated areas across the region. Most of the project area is a modified environment.

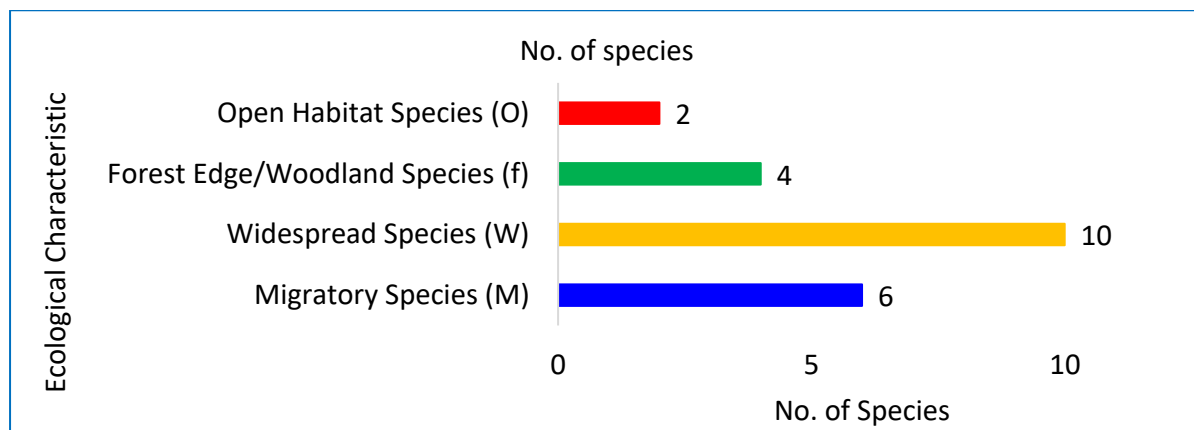


Figure 7-70: Ecological characterization of recorded butterflies for surface water system

According to Figure 7-71, in terms of site-by-site account, thirteen (13) species were recorded at the Water Intake, six (6) at the WTP site, fourteen (14) along the transmission and distribution routes, nine (9) at the MBR site, five (5) species were recorded at Ciforo ESR, ten (10) species were recorded at Pakele ESR site, five (5) species were recorded at Dzaipi ESR. The high numbers of species recorded at the water intake could be a result of the less disturbance at the site compared to the other sites.

Based on the 2020 IUCN Red List of Threatened species, none of the butterfly species encountered during the survey of the project area is of conservation concern. They are all Least Concern (LC).

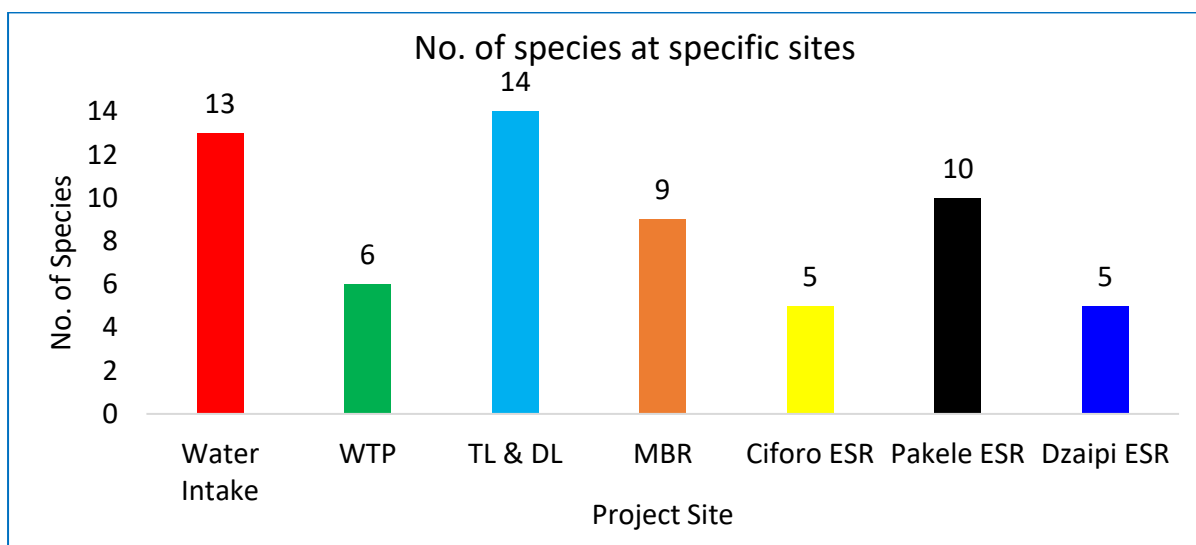






Figure 7-71: Number of butterfly species recorded at each site for the surface water system

Note: Transmission Line (TL) and Distribution Line (DL) include the Raw Water Pumping Main, Treated Water Pumping Main, Gravity Feeder Mains and Distribution Network.

Table 7-25: Some of the butterflies identified in the project area

	
<p>Orange Acraea <i>Acraea serena</i></p>	<p>Scalloped Sailer <i>Neptidopsis ophione</i></p>

	
<p>Encedon Acraea Acraea encedon (Nymphalidae)</p>	<p>Polka Dot Pardopsis punctatissima (Nymphalidae)</p>
	
<p>African cupid Eucharisops subpallida (Lycaenidae) at Borehole (T1) – River Nyegai</p>	<p>Blue Pansy Junonia oenone (Nymphalidae) at Borehole (T3) – River Adidi</p>

7.4.4.1.2 Dragonflies

During the survey, the weather was a bit dry and only five (5) dragonfly species were recorded (Table 7-26). Two (2) families including the Gomphidae and Libellulidae and five (5) genera were represented. The species were recorded at only four (4) sites i.e. the Intake, WTP, along the TL and DL alignment and Pakele ESR. Two (2) species were recorded at the intake site, one (1) specie at the WTP, two species along the TL and DL and one (1) specie at Pakele ESR. The Julia Skimmer *Orthetrum Julia* was the commonest species with ten (10) individuals recorded followed by Little Scarlet *Crocothemis sanguinolenta* which had six (6) individuals recorded.

No species were recorded at the other project sites. Based on the IUCN 2020 Red List of threatened species, no species of conservation concern were recorded. All species are listed as least concern.

The *Tigertail Ictinogomphus ferox* is a wide spread species that is found on open savanna and grassland areas along rivers or near open, still or moving water bodies.

Table 7-26: Dragonfly species recorded in the project area

Family	Species Present	IUCN Red List Status	Intake	WTP	TL & DL	MBR	Ciforo ESR	Pakele ESR	Dzaipi ESR
Gomphidae	<i>Ictinogomphus ferox</i> Common Tigertail	Least Concern (LC)							
Libellulidae	<i>Brachythemis leucosticta</i> Southern Banded Groundling	Least Concern (LC)	2						
Libellulidae	<i>Crocothemis sanguinolenta</i> Little Scarlet	Least Concern (LC)			6				
Libellulidae	<i>Orthetrum Julia</i> Julia Skimmer	Least Concern (LC)			10				
Libellulidae	<i>Palpopleura portia</i> Portia Widow	Least Concern (LC)	1	2				3	
Total Species			02	01	02	00	00	01	00

Table 7-27: Some of the recorded dragonfly species in the project area

	
<p>Southern Banded Groundling <i>Brachythemis leucosticta</i> pictured at Water Intake site</p>	<p>Portia Widow <i>Palpopleura portia</i> pictured</p>
	
<p>Painted Sprite <i>Pseudagrion hageni</i>, Picture near Adidi Borehole water Source T3</p>	<p>Little Scarlet <i>Crocothemis sanguinolenta</i> pictured a long Rusia distribution line near a stream 36 N 0367623, 0372537</p>

7.4.4.1.3 Amphibians

Five (5) species of amphibians were recorded from the project sites (Table 7-28). The species were recorded at the Intake and along the alignments for the TL and DL. The species constituted one (1) toad and four (4) frogs. Amphibians in dry weather are difficult to come by and they are also secretive creatures. It required more time to conduct the survey in order to compile a complete species list for the project sites. The few amphibians recorded were encountered in areas that are moist or which had water.

Four (4) species were recorded at the water intake and three (3) species along the TL and DL alignment. Eastern Groove-crowned Bullfrog *Hoplobatrachus occipitalis* and Mascarene Rocket Frog *Ptychadena mascareniensis* were the most common species recorded during the survey. Eastern Groove-crowned Bullfrog *Hoplobatrachus occipitalis* is usually found near or in water (Rödel 2000). It is found practically in all freshwater habitats. The species tend to migrate during

the dry season to the edges of rivers and in the wet season to surroundings of ponds (Spieler 1997). The Mascarene Rocket Frog *Ptychadena mascareniensis* is an adaptive species that can adapt easily to modified environment. Physiologically, the skin of Flat-backed Toad *Sclerophrys maculatus* are more adapted for dry weather than frogs.

No species of conservation significance was registered during the survey. All the species encountered are categorized as least concern (LC) according to 2020 IUCN Red List of threatened species. The IUCN regards the species as widespread and common over much of their range (Rödel. 2000). The Mascarene Rocket Frog *Ptychadena mascareniensis* is categorized as data deficient (DD) by the National Red List for Uganda (WCS 2016).

Table 7-28: Amphibian species recorded during the survey of project areas

Family	Species and Scientific Common Names	IUCN Red List	Intake	WTP	TL & DL	MBR	Ciforo ESR	Pakele ESR	Dzaipi ESR
Bufonidae	<i>Sclerophrys maculatus</i> Flat-backed Toad	Least Concern (LC)			1				
Dicroglossidae	<i>Hoplobatrachus occipitalis</i> Eastern Groove-crowned Bullfrog	Least Concern (LC)	5		2				
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i> Dwarf Puddle Frog	Least Concern (LC)	4						
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i> Natal Puddle Frog	Least Concern (LC)	3						
Ptychadanidae	<i>Ptychadena mascareniensis</i> Mascarene Rocket Frog	Least Concern (LC) / Data deficient	2		7				
Total Species			04	00	03	00	00	00	00

7.4.4.1.4 Reptiles

Six (6) reptile species were registered in the project sites (Table 7-29). The species include two (2) Lizards, three (3) snake and One (1) skink. Six (6) families and six (6) genera were represented. Black-Necked Spitting Cobra *Naja nigricollis* was reported by residents found working in the project area. Reptiles are secretive species and requires time to conduct a comprehensive survey to compile a complete species list.

Five (5) species were recorded at the Intake, one (1) specie at the WTP, three (3) species along the TL and DL, one (1) at the MBR site, one (1) at Ciforo ESR, two (2) at Pakele ESR and one (1) specie at Dzaipi ESR.

Red-Headed Rock Agama *Agama agama* and Rainbow skink *Trachylepis margaritifer* were the most common in the project site areas. Sixty-four (64) and Twenty-seven (27) individuals respectively were seen and counted during the survey. A number of them were seen basking on rock surfaces, buildings, wall fences and trees at the project sites or along the distribution and supply pipeline alignment. According to Harold (1992), most lizards have well-developed limbs; the head is normally held high off the ground, and they are agile predators. This increases their colonization success (Savage 1992). According to Gerlach, 2005, many Scincidae species (skinks) are generalists with a wide ecological tolerance. This might account for the Rainbow skink *Trachylepis margaritifer* abundancy in the project area.

The Nile Crocodile *Crocodylus niloticus* is a common reptile in River Nile. In consultation with local community members, they reported that at the water intake area and its surrounding, crocodiles have never been seen. However, during the ESIA field assessments, none was recorded.

None of the reptiles encountered and those reported by the community members are Red Listed. All the species are listed as least concern by IUCN 2020 Red List of threatened species. The Nile Monitor *Varanus niloticus* was listed under the Endangered Species Decree in 1975, meaning that international trade of the species is prohibited. The Species is listed under CITES Appendix II (Branch 1998).

Table 7-29: Reptile species recorded during the survey of the project sites

Family	Species Scientific and Common Names	IUCN Red List	Intake	WTP	TL & DL	MBR	Ciforo ESR	Pakele ESR	Dzaipi ESR
Agamidae	<i>Agama agama</i> Red-Headed Rock Agama	Least Concern	15	1	18	2	1	1	18

Colubridae	<i>Philothamnus angolensis</i> Angolan green snake	Least Concern			1				
Elapidae	<i>Naja nigricollis</i> Black-Necked Spitting Cobra	Least Concern	Reported						
Scincidae	<i>Trachylepis margaritifer</i> Rainbow skink	Least Concern	3		2			1	
Varanidae	<i>Varanus niloticus</i> Nile Monitor	Least Concern	1						
Viperidae	<i>Bitis arietans</i> Puff Adder	Least Concern	1						
Total Species			05	01	03	01	01	02	01

Table 7-30: Some reptiles recorded in the project area

			
Male Red-Headed Rock Agama, <i>Agama agama</i> along the TL		<i>Trachylepis margaritifer</i> Rainbow skink	Pictured at the intake site

7.4.4.1.5 Birds

Uganda is one of the richest birding destinations on the African continent. Uganda holds more than 50% of Africa's bird fauna. It has 1066 confirmed species as of May 2020. Fifty-Eight (58) species of birds were positively identified in and around the proposed sites e.g., intake, WTP, ESRs

as well as along the areas of the TL and DL. The species are grouped into Thirty-Two (32) families and Fifty-Two (52) genera (Figure 7-72). The project area is a modified environment. Detailed bird species list is attached as Annex 9.

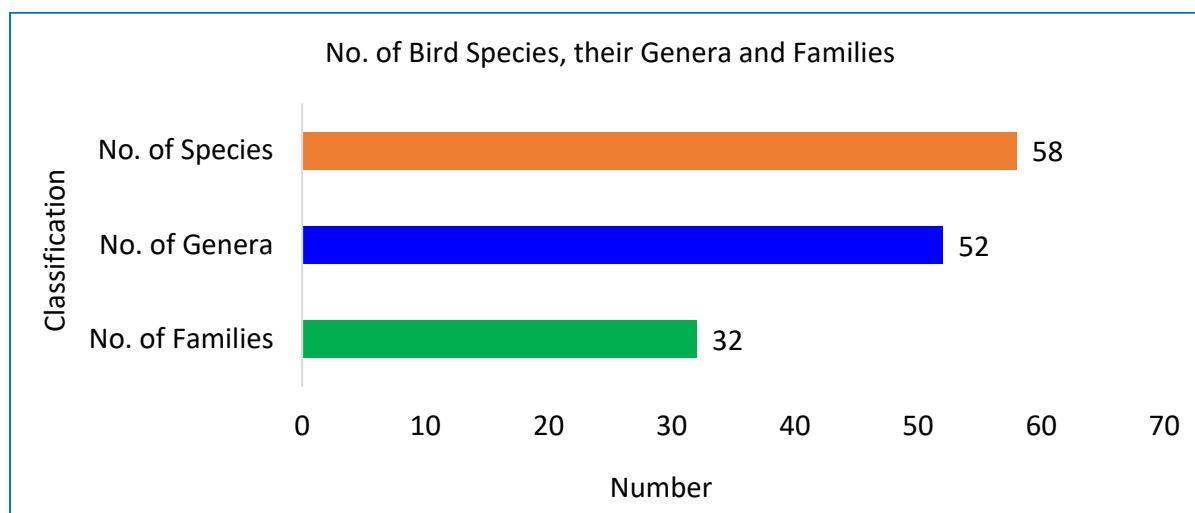


Figure 7-72: Birds encountered during the survey for surface water system

In terms of ecological characterization, two (2) bird species were forest specialists, seven (7) birds species forest generalists, and Fifteen (15) bird species were forest visitors (Table 7-31). These prefer trees as an ecological feature and are normally encountered where trees are found. Seven (7) bird's species were water specialists and these were recorded where wetlands are represented. Two (2) species were water generalists and these comprise wetland visitors. Twenty-four (24) species prefer open grassland areas and two (2) species categorized as widespread were also recorded. Three (3) species were Afrotropical migrants, two (2) species were Palearctic migrants and one (1) species was Afro-Palearctic. The Afrotropical migrants come from other African countries while the palearctic migrants come from European countries during time of winter. Afro-Palearctic migrants are those with populations both in Africa and Europe. The Black Kite *Milvus migrants* is categorized as migratory but the tropical (Or Ugandan) ones are resident. It is widely distributed in Uganda. The Tree Pipit *Anthus trivialis* and Little Green Bee-eater *Merops orientalis* are palearctic migrants. The Common Ringed Plover *Charadrius hiaticula* is also migratory spending the winters in Africa. Red-chested Cuckoo *Cuculus solitarius* and Grey-Backed Fiscal *Lanius excubitoroides* are afro-tropical and migrate within the African continent.

Table 7-31: Ecological characterization of birds recorded in the project area

Ecological description	Numbers	Descriptions
Forest Specialists (FF)	2	Forest interior birds
Forest Generalists (F)	7	Normally breed in the forest or fragments but may occur outside the forest
Forest Visitors (f)	15	Non-forest birds

Water Specialist (W)	7	Restricted to wetlands or open water
Water Generalist (w)	2	Often found near water
Grassland Specialist (G)	24	Characteristic of open grasslands
Afrotropical (A)	3	Species migrating within Africa
Palearctic (P)	2	Species breeding in Europe or Asia
Afro-Palearctic (Ap)	1	Species with both Palearctic and Afrotropical populations
Wide Spread	2	Species with a wide distribution

In terms of site-by-site account, at the intake, thirty-eight (38) species were recorded, eight (8) at the WTP, fifteen (15) along the TL and DL, four (4) at the MBR, eight (8) species were recorded at Ciforo ESR, Eleven (11) Species at Pakele ESR and only two species at Dzaipi ESR (Figure 7-73). Dzaipi area was surveyed on a market day which could have influenced the low species numbers recorded in the area. The high numbers of species recorded at the intake could be a result of the less disturbances at the two sites compared to the other sites.

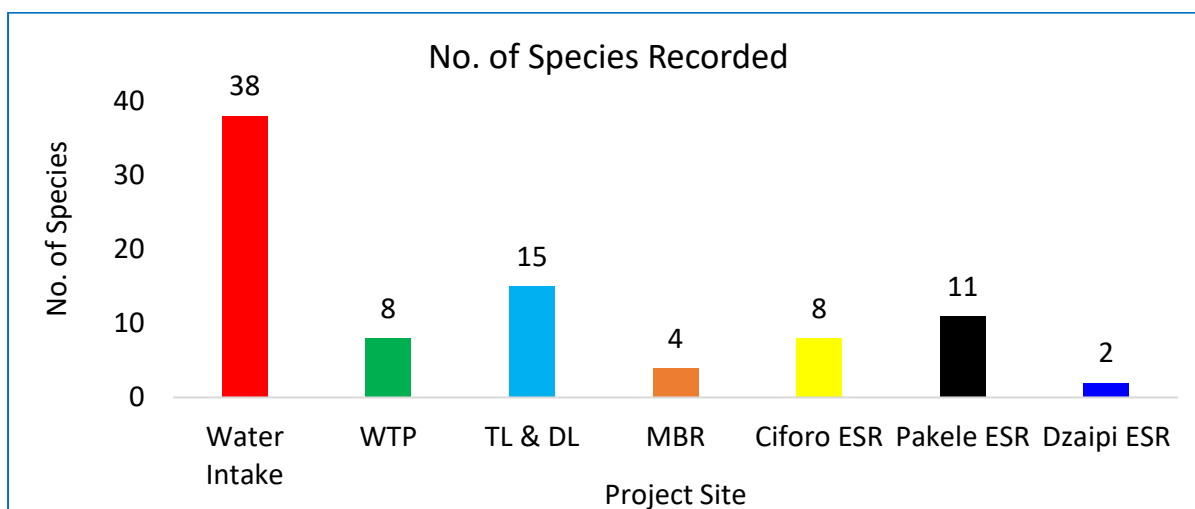


Figure 7-73: Number of species recorded at each site in the project area

It was found out that one (1) species is of global conservation concern. The Bateleur *Terathopius ecaudatus* is categorized as Regionally Near Threatened (R-NT) by the IUCN Red List of Threatened species 2020. The Bateleur is an open habitat species inhabiting grasslands and savanna (Ferguson-Lees and Christie 2001). It is generally considered resident but some adults as well as immatures are nomadic (Ferguson-Lees and Christie 2001). Their nests are built in the canopy of a large tree. The general absence of large trees in the project area may account for the few individuals in the project area. The few individuals of bateleur might have come from the forest reserves across the Nile in Moyo District. The global population of Bateleur across much of its

range is declining due to habitat loss and incidental poisoning (Bird Life International, 2016). The rest of the bird species are categorized as Least Concern (LC).

Table 7-32: Some of the bird species encountered in the project area

	
<p>Black Crake <i>Zapornia flavirostra</i> pictured near the water Intake</p>	<p>Long-Crested Eagle <i>Lophaetus occipitalis</i> perched on a tree near the WTP site</p>

7.4.4.1.6 Mammals

Three (3) mammal species were recorded during the survey. The species were the Black and White Colobus Monkey *Colobus guereza*, Black rat *Rattus rattus* and the Least Epauletted Fruit Bat *Epomophorus minimus*. Occurrence of the Black and White Colobus Monkey *Colobus guereza* were reported by residents that they at times come by along Rusia - Pakele TLs and DLs. The Least Epauletted Fruit Bat *Epomophorus minimus* were recorded on the Mvule trees along the TL and DL within Adjumani Town Council, where they have a big colony. Residents also reported the occurrence of the black rat *Rattus rattus*. The Black Rat *Rattus rattus* mainly occur in people's houses in and around people's homes. It also occurs in wild habitats. This rat is of social economic importance. It is a pest and dangerous disease vector. It carries a flea which is the principal carrier of plague bacillus which killed 60,000 people in Uganda in the 1917 and 1942 (Kingdon J., 2015). No species were recorded in the other project sites. However, incase wild animals are encountered, the UWA should be notified in time to take action of returning the animals to their designated places.

Hippopotamus Hippopotamus amphibius is common in some parts of River Nile. However, community members reported that there are no hippopotamuses at the water intake site and its surroundings, and that they have never seen any hippos in the area.

None of the species above is of conservation significance. They are categorized as Least Concern by the IUCN 2020 Red List of threatened species. The biggest part of the project area is in an urban setting, therefore, keeping vegetation around the project infrastructure and along the distribution and supply pipelines will go a long way in conserving the recorded mammal species.

7.4.4.2 Ground Water Infrastructure

7.4.4.2.1 Butterflies

Seventeen butterfly species were recorded in and around the different borehole project sites (Figure 7-74). The species are grouped into three families and Ten genera. No species with restricted distribution were recorded.

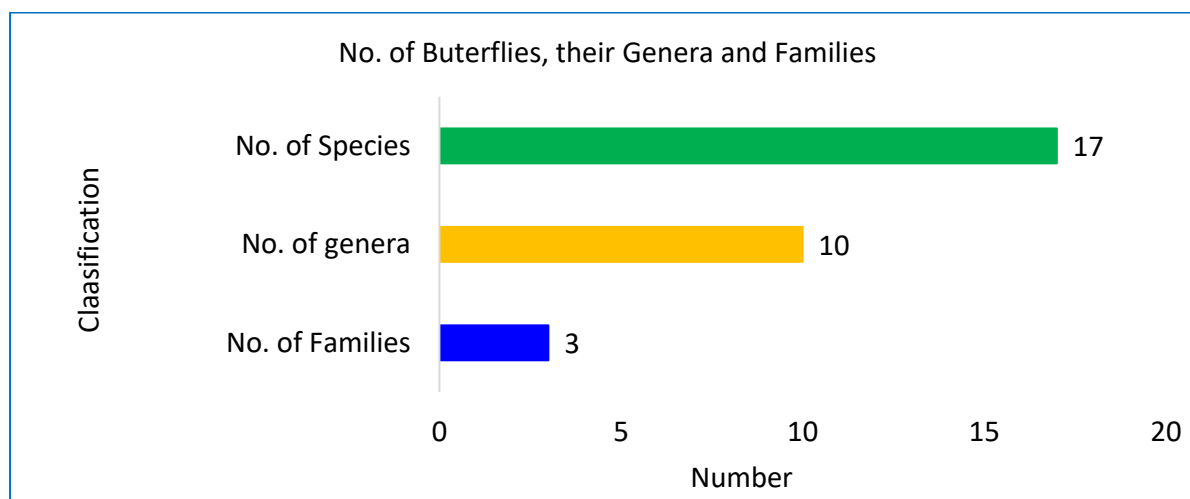


Figure 7-74: Butterflies encountered during the survey for groundwater system (GWS)

In terms of ecological characterization, most of the species recorded are widespread. Nine widespread species were recorded (9). Migratory species recorded were four (4), Forest edge / woodland species that were two (2), one (1) forest dependent species and one (1) open habitat species.

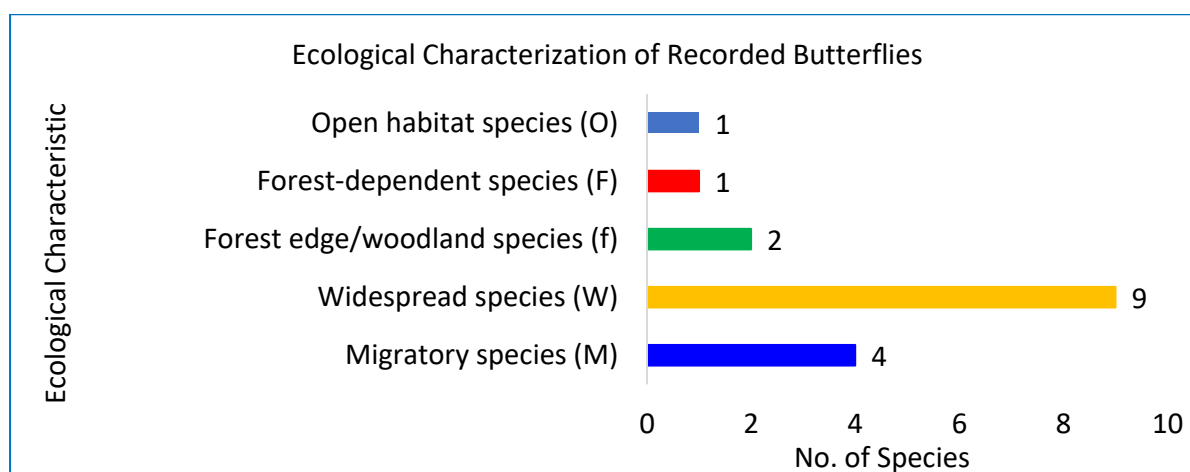


Figure 7-75: Ecological Characterization of recorded butterflies for groundwater system

At site-by-site level, eleven (11) species of butterflies were registered at Borehole (T1) near River Nyegai, six (6) species registered at Logoangwa ESR and six (6) species were registered along TL and DL area for T1 water system (Table 7-33). Ten (10) species were recorded at Borehole (T3) near River Adidi, eight (8) species recorded at Melijo ESR (in Olua) and four (4) species recorded

along the TL and DL area for T3 water system. Six (6) species were registered at Borehole (T4) in Ajugopi – River Surumu, nine (9) species registered at Ajugopi ESR (in Maiaciku) and seven (7) species were encountered along the TL and DL areas for T4 water system. Based on the 2020 IUCN Red List of Threatened species, none of the butterfly species encountered during the survey of the project area is of conservation concern. They are listed as Least Concern (LC).

Table 7-33: Butterfly species registered at the Borehole project sites

Family	Species Scientific and Common Names	IUCN Red List	T1	Logoangwa ESR	TL & DL for T1	T3	Melijo ESR	TL & DL for T3	T4	Ajugopi ESR	TL & DL for T4
Lycaenidae	<i>Euchrysops subpallida</i> African cupid - O	Least Concern	3	1		3				1	
Nymphalidae	<i>Acraea encedon</i> Encedon Acraea - W	Least Concern			1					1	
Nymphalidae	<i>Acraea serena</i> Orange Acraea - W	Least Concern	1		3	1					
Nymphalidae	<i>Acraea sotikensis</i> Sotik Acraea - F	Least Concern	3	1			3				2
Nymphalidae	<i>Acraea uvui</i> Tiny Acraea - W	Least Concern	3			2	3	1		5	
Nymphalidae	<i>Danaus chrysippus</i> African Queen- M	Least Concern	1	1		2			3	3	1
Nymphalidae	<i>Hamanumida Daedalus</i> Guinea fowl Butterfly – W	Least Concern	6				5			2	
Nymphalidae	<i>Junonia oenone</i> Blue Pansy - W	Least Concern	3	1	1	2	3			3	
Nymphalidae	<i>Junonia orithya</i> Eyed Pansy - W	Least Concern					1				1
Nymphalidae	<i>Junonia sophia</i> Little Commodore - W	Least Concern				2		2	1		

Nymphalidae	<i>Junonia stygia</i> Brown Pansy – f	Least Concern	1		1	1					1
Nymphalidae	<i>Neptidopsis ophione</i> Scalloped Sailer – f	Least Concern				4			1		
Pieridae	<i>Belenois aurota</i> Brown-Veined White (Caper White) – M	Least Concern	2								
Pieridae	<i>Belenois creona</i> Common White (African Caper) – M	Least Concern	1			1	1		1		1
Pieridae	<i>Catopsilia florella</i> African Migrant – M	Least Concern	4		1		2		3	3	1
Pieridae	<i>Colotis evippe</i> Round-Winged Orange Tip – W	Least Concern		3				1		3	
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow – W	Least Concern	16	6	1	3	8	2	3	8	1
Total Species			12	6	6	10	8	4	6	9	7

7.4.4.2.2 Dragonflies

Six (6) species of dragonflies were recorded at the borehole project sites (Table 7-34). They represent two (2) families *Coenagrionidae* and *Libellulidae*. Dragonfly species were only recorded at four (4) sites namely; One (1) at Borehole T1, two (2) at Borehole T3, one (1) at Melijo ESR and two (2) species along TL and DL areas for T3 respectively. The rest of the sites had no dragonflies registered.

The dragonflies are of no conservation significance. The Little Scarlet *Crocothemis sanguinolenta* is not evaluated. The rest of the dragonflies are listed as least concern (LC).

Table 7-34: List of dragonfly species recorded in and around the GWS.

Family	Species Scientific and Common Names	IUCN Red List	T1	Logoangwa ESR	TL & DL for T1	T3	Melijo ESR	TL & DL for T3	T4	Ajugopi ESR	TL & DL for T4
Libellulidae	<i>Brachythemis leucosticta</i> Southern Banded Groundling	Least Concern									2
Libellulidae	<i>Orthetrum Julia</i> Julia Skimmer	Least Concern							1		
Coenagrionidae	<i>Pseudagrion hageni</i> Painted Sprite	Least Concern							1		
Libellulidae	<i>Crocothemis sanguinolenta</i> Little Scarlet	Not Evaluated									2
Libellulidae	<i>Palpopleura portia</i> Portia Widow	Least Concern								2	
Libellulidae	<i>Trithemis arteriosa</i> Red-veined Drooping	Least Concern	19								
			01						02	01	02

7.4.4.2.3 Amphibians

Only two (2) amphibian species were encountered and recorded during the survey of the ground water systems. These included *Bufo steindachneri* Steindachner's Toad and *Hoplobatrachus occipitalis* Eastern Groove-crowned Bullfrog. The *Bufo steindachneri* Steindachner's Toad was recorded at Borehole (T4) in Ajugopi and the *Hoplobatrachus occipitalis* Eastern Groove-crowned Bullfrog was recorded along the TL and DL for T3. Species of family *Bufonidae* have a skin more resistant to desiccation and so live in areas away from water. As earlier mentioned, Eastern Groove-crowned Bullfrog *Hoplobatrachus occipitalis* is usually found near or in water (Rödel, 2000). The species tend to migrate during the dry season to the edges of rivers and in the wet season to surroundings of ponds (Spieler, 1997). The two (2) species are categorized as least concern according to 2020 IUCN Red List of threatened species. The IUCN regards the species as widespread and common over much of their range (Rödel, 2000).

7.4.4.2.4 Reptiles

Six (6) species of reptiles were registered during the survey of the borehole project sites (Table 7-35). Two (2) Lizards, two (2) snakes and two (2) skinks were recorded. The reptiles were recorded at four (4) project sites including One (1) specie at Logoangwa ESR, two (2) species were recorded at Borehole (T4), three (3) species Borehole (T3) and two (2) species were encountered a TL and DL for T3 water system. Brown snakes were reported at borehole (T4) – in Ajugopi but the description given could not lead to ascertaining the identity of the species. The presence of three (3) species were reported by residents in the area. These include the Black-Necked Spitting Cobra *Naja nigricollis*, the Central Africa Rock Python *Python sebae* and the Nile Monitor *Varanus niloticus*. The Black-Necked Spitting Cobra *Naja nigricollis* was reported at Borehole (T3) – River Adidi. The Central Africa Rock Python *Python sebae* was reported at Borehole (T4) – River Surumu. *Varanus niloticus* Nile Monitor was recorded at two (2) sites i.e., T4 and T3.

Of all species encountered, the *Trachylepis margaritifer* Rainbow skink was the most common, meaning Rainbow Skinks have been successful in getting the requirements for its survival from the surrounding environment. According to Gerlach (2005), many Scincidae species are generalists with a wide ecological tolerance.

None of the reptile species encountered and those reported by the community members are of conservation significance. They are listed as least concern by IUCN 2020 Red List of threatened species. The Central Africa Rock Python *Python sebae* and Nile Monitor *Varanus niloticus* are listed under the Endangered Species Decree of 1985, meaning that international trade of the species is prohibited. The Species are listed under CITES Appendix II (Branch 1998). However, in Uganda the two (2) species were down listed from Appendix II because they are still abundant and wide spread in the whole country.

Table 7-35: List of Reptile species encountered during the survey of the GWS

Family	Species Scientific and Common Names	IUCN Red List	T1	Logoangwa ESR	TL & DL for T1	T4	Ajugopi ESR	TL & DL for T4	T3	Melijo ESR	TL & DL for T3
Agamidae	<i>Agama agama</i> Red-Headed Rock Agama	Least Concern									2
Elapidae	<i>Naja nigricollis</i> Black-Necked Spitting Cobra	Least Concern							Reported		
Pythonidae	<i>Python sebae</i> Central Africa Rock Python	Least Concern				Reported					
Scincidae	<i>Trachylepis maculilabris</i> Speckled-lipped Skink	Least Concern		1							
Scincidae	<i>Trachylepis margaritifer</i> Rainbow skink	Least Concern							10		1
Varanidae	<i>Varanus niloticus</i> Nile Monitor	Least Concern				Reported			Reported		
Total Species				01		02			03		02

7.4.4.2.5 Birds

Thirty-Three (33) species of birds were recorded in and around the Boreholes, Reservoirs and their TL and DL network (Figure 7-76). The species are grouped into Twenty-Two families and Twenty-Nine genera. The borehole water system project areas are situated in a highly modified environment. Detailed species list provided in Table 7-36. In terms of ecological characterization, two species (2) were recorded in and around Borehole (T1), four (4) species were recorded in and around Logoangwa ESR and five (5) species were recorded along the TL and DL for T1. Fourteen (14) species were recorded in and around borehole (T3); ten (10) species at Melijo ESR and thirteen (13) species in and along the TL and DL for T3. Eleven (11) species were recorded in and around borehole (T4); seven (7) species in and around Ajugopi ESR and four (4) species along the TL and DL for T4.

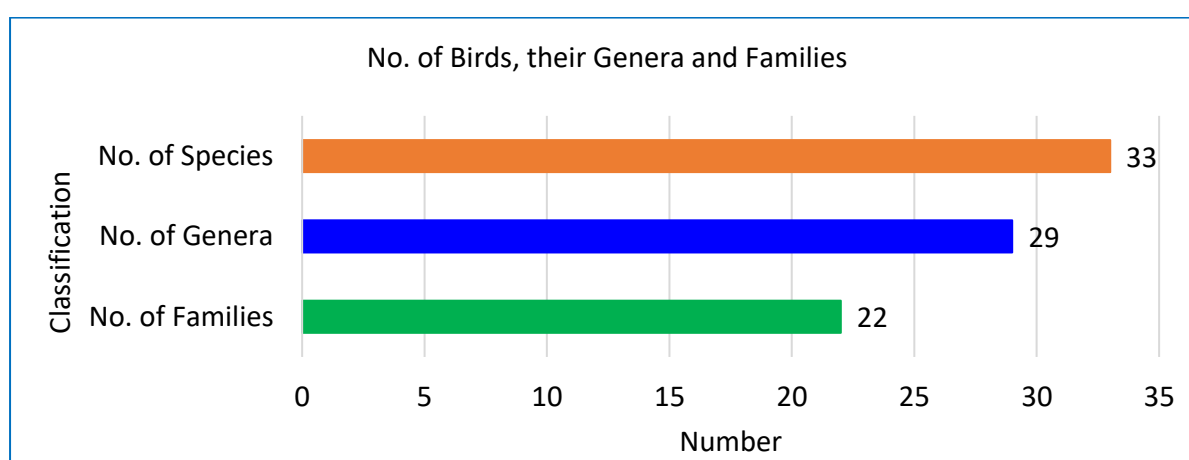


Figure 7-76: Birds encountered during the survey for groundwater system (GWS)

Table 7-36: Bird species recorded in and around the borehole water Sources and networks

Family	Species Scientific and Common Names	IUCN List	Red	T1	Logoangwa ESR	TL & DL for T1	T3	Melijo ESR	TL & DL for T3	T4	Ajugopi ESR	TL & DL for T4
Accipitridae	122 - <i>Lophaelus occipitalis</i> Long-crested Eagle – f	Least Concern							1	1		
Accipitridae	73 - <i>Elanus caeruleus</i> Black-shouldered Kite - O	Least Concern						1	2			
Accipitridae	75 - <i>Milvus migrans</i> Black Kite – pA (widespread)	Least Concern PM					1		4			
Alcedinidae	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	Least Concern					3		1			
Alcedinidae	383 - <i>Ceryle rudis</i> Pied Kingfisher - W	Least Concern							2			
Apodidae	358 - <i>Cypsiurus parvus</i> Palm Swift - O	Least Concern		6	3			1	3	3	3	
Ardeidae	26 - <i>Ardea melanocephala</i> Black-Headed Heron - w	Least Concern							1			1
Bucerotidae	420 - <i>Lophoceros nasutus</i> African Grey Hornbill - O	Least Concern						1	2			

Cisticolidae	645 - <i>Cisticola chiniana</i> Rattling Cisticola - O	Least Concern		2		1			2	
Cisticolidae	657 - <i>Cisticola ayresii</i> Wing Snapping Cisticola - G	Least Concern				1				
Coliidae	369 - <i>Colius striatus</i> Speckled Mousebird – O	Least Concern				13	3			
Columbidae	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	Least Concern				5		2	4	2
Columbidae	284 - <i>Streptopelia decipiens</i> African Mourning Dove - O	Least Concern						4	2	2
Columbidae	289 - <i>Streptopelia senegalensis</i> Laughing dove - O	Least Concern				1	1		2	
Coraciidae	401 - <i>Eurystomus glaucurus</i> Broad-billed Roller - A	Least Concern			1		1			
Cuculidae	323 - <i>Centropus superciliosus</i> White-browed Coucal - O	Least Concern				2			1	
Estrilididae	963 - <i>Lagonosticta rubricata</i> African Firefinch - O	Least Concern					2			
Estrilididae	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	Least Concern					3		1	

Hirundinidae	513 - <i>Hirundo rustica</i> Barn Swallow - Pw	PM				2					
Laniidae	815 - <i>Lanius excubitoroides</i> Grey-Backed Fiscal - A	Least Concern		2							
Malaconotidae	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	Least Concern			2	3			6		
Meropidae	385 - <i>Merops pusillus</i> Little Bee-eater - G	Least Concern				1					
Meropidae	391 - <i>Merops orientalis</i> Little Green Bee-eater - P	PM			1					2	
Muscicapidae	593 - <i>Saxicola rubetra</i> Whinchat - P	PM								1	
Musophagidae	296 - <i>Corythaeola cristata</i> Great Blue Turaco - F	Least Concern						2			
Musophagidae	302 - <i>Musophaga rossae</i> Ross's Turaco - F	Least Concern				1					
Musophagidae	376 - <i>Crinifer zonurus</i> Eastern Grey Plantain Eater - f	Least Concern				6					
Nectariniidae	810 - <i>Cinnyris cupreus</i> Copper Sunbird - f	Least Concern							3		

Numididae	142 - <i>Numida meleagris</i> Helmeted Guineafowl - O	Least Concern							6		
Ploceidae	295 - <i>Quelea quelea</i> Red-Billed <i>Quelea</i> - A	Least Concern				3			13		
Pycnonotidae	562 - <i>Pycnonotus barbatus</i> Common Bulbul - f	Least Concern	1	9	3	2	6		2	1	2
Sturnidae	872 - <i>Lamprotornis purpuroptera</i> Ruppell's Starling - O	Least Concern			1			2			1
			02	04	05	14	10	13	11	07	04

Three species were forest generalists and Six (6) species were forest visitors (Table 7-37). Forest generalists and forest visitors prefer trees as an ecological feature and are normally encountered where trees are found. One (1) specie was a water specialist and it was recorded in a wetland. One (1) species was a water generalist and it is categorized as a wetland visitor. This probably visits wetlands to feed. Thirteen (13) species prefer open grassland areas and one species categorized as widespread were also recorded. Migrant species were also recorded. Four (4) were Afrotropical migrants, three (3) species Palearctic migrants and one was Afro-Palearctic. The Afrotropical migrants are species that migrate within Africa. The palearctic migrants are species that breed in Europe or Asia. Afro-Palearctic migrants are those with populations both in Africa and Europe.

No species of conservation significance was registered. The IUCN Red List of Threatened species 2020 categorizes all recorded bird's species as Least Concern (LC).

Table 7-37: Ecological Characterization of species registered at the Borehole water network sites

Ecological description	Numbers	Descriptions
Forest generalists (F)	3	Normally breed in the forest or fragments but may occur outside the forest
Forest visitors (f)	6	Non-forest birds
Water specialist (W)	1	Restricted to wetlands or open water
Water generalist (w)	1	Often found near water
Grassland specialist (G)	13	Characteristic of open grasslands
Afrotropical (A)	4	Species migrating within Africa
Palearctic (P)	3	Species breeding in Europe or Asia
Afro-Palearctic (Ap)	1	Species with both Palearctic and Afrotropical populations
Wide Spread	1	Species with a wide distribution

7.4.4.2.6 Mammals

Two (2) mammal species African Grass Rat *Arvicanthis niloticus* and Buffoon striped grass mouse *Lemniscomys macculus* were recorded. They belong to the same family Muridae. Both were recorded around Borehole (T3). None was recorded at other borehole sites and along the TL and

DL areas. The two (2) species are listed as Least Concern (LC) by the 2020 IUCN Red List of Threatened Species.

Overall Fauna Assessment

The general environment in which the proposed Adjumani Water and Sanitation infrastructure is going to be laid is a modified environment under intense cultivation and settlement. The TL and DL alignments are will be in the road reserves which are generally disturbed environments implying increased human/anthropogenic activities e.g., cattle keeping, settlements, road construction, bush burning, among others.

The project catchment (disturbed / modified environments) has low richness in fauna biodiversity is low hence no pristine natural environment will be affected. Transmission and distribution pipelines are going to pass at the edges of wetlands and will be generally located in road reserve areas (which have already been disturbed by road construction activities). The fauna that will be affected will be very minimal.

The conservation significance of most of the species recorded are categorized as least concern and are widely distributed at the local level in the project areas and nationally in other parts of the Country. None of the butterflies, dragonflies, amphibians, reptiles and mammal species recorded in the project area is of ecological concern according to the IUCN 2020 Red list.

7.5 Health and Safety

7.5.1 Traffic Safety

From the interview with the Deputy OC traffic Adjumani Police Station, the traffic office has only four (4) officers, considering that Adjumani has many roads, this number is small. The deputy OC traffic recommended a total of six (6) traffic officers to handle the workload and also proposed a budget of 1,400,000 UGX for community traffic sensitization, driver training and traffic accident investigations. January to May 2022 statistics show that a total of 13 minor, 44 serious and 5 fatal accidents were recorded (see Table 7-38 and Figure 7-77). The number of accidents is high because of the ongoing road construction works.

According to the Deputy OC traffic, 90% of 62 the traffic accidents in Adjumani are caused by motorcycle riders (Boda-boda). These are accidents are a result of; few motorcycle riders having training and about only 4% of them have permits (mostly those working for NGOs), human error, nature of the roads, human behaviour and lack of enforcement due to few traffic officers. The major means of transport around the project area is by use of motorcycles (Boda Bodas) and bicycles (See Figure 7-78 and Figure 7-79). See Annex 13.

Table 7-38: Road Traffic Accidents for January to May 2022

Month	Minor	Serious	Fatal
Jan	2	6	1
Feb	5	10	1
Mar	1	12	0
Apr	2	6	2
May	3	10	1

Source: Adjumani District Central Police Station (CPS) 2022

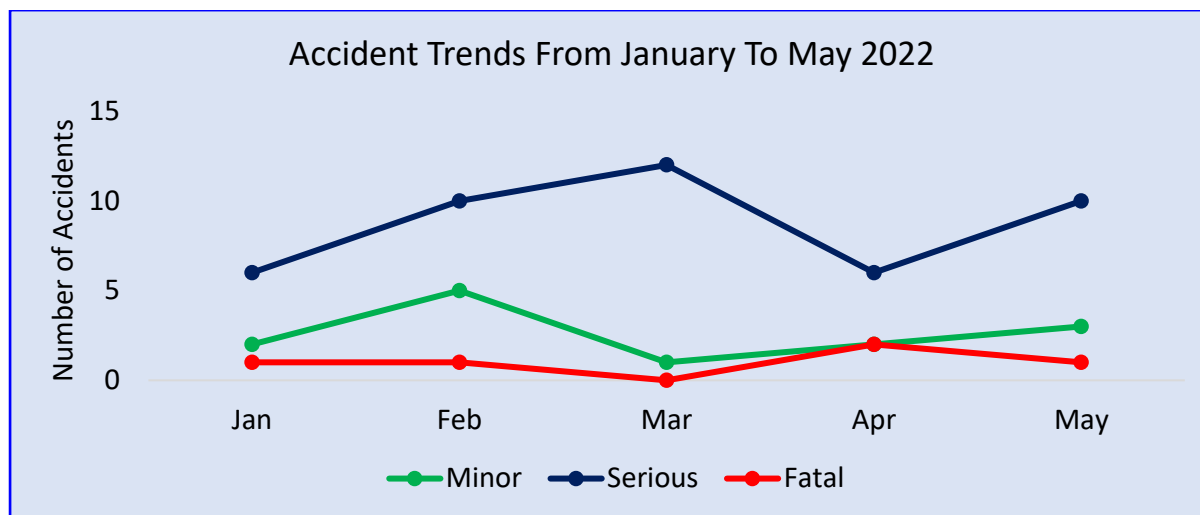


Figure 7-77: Adjumani Accident Statistics



Figure 7-78: Boda Boda man interacting with the Passenger



Figure 7-79: Man carrying a sack of charcoal

7.5.2 Project Area Access Roads

The roads leading to the project facilities WTP, reservoir and water intake sites are all marram roads. The one to the FSTP is not very good, while others are good and being worked on. The access roads to the health facilities around the project implementation areas were also assessed for example, Pakele HC III (Figure 7-80), Ciforo HC III, etc. It is very important for accesses to the projects site be worked on so as to make it easy for Police, emergency services, project vehicles, etc to access the sites during project implementation. Also, accesses to health facilities are very important, to handle accident emergencies and sicknesses that may affect project staff.



Figure 7-80: Access road to Pakele Health Centre III - main entrance

7.5.3 Fire Service

Adjumani district does not have a fully-fledged fire station, therefore incidents of fire may not be swiftly handled by the police, given this limitation. 7 fire calls were recorded between December 2021 to May 2022, an average of 1 case per month. One notable fire incident is the fire at Stanbic Bank Adjumani Branch. Therefore, the district depends on what we call God's mercy when it comes to fire emergencies and rescue. For any emergency response, Gulu Fire Station and Arua Fire Station are the ones to respond. These two (2) Fire Stations are far from the project area.

7.5.4 Security

The interaction was made with Adjumani CPS, Pakele Police Outpost, and Dzaipi Police Outpost. The most common crimes (domestic violence, defilement, etc.), equipment and other resources available for handling security emergencies were the areas of concern. This is such that, the level of impact of the project to the security and crime rates around the project implementation areas can be assessed. According to the criminal report for January to May 2022, 129 cases of domestic violence (DV) and 53 cases of defilement were recorded (See Annex 13). These figures are very high, indicating high criminality in the project area. The District Police Commander (DPC)

proposed a budget of 4,400,000 UGX, to handle incidents of crime, mainly to support in community sensitization, policing, investigations and training. The following was noted for;

Adjumani Central Police Station (CPS)

The station has 4 Patrol cars of which two (2) are in good conditions and one has mechanical issues, 4 police motorcycles, and UTL emergency lines for easy communication i.e., 0714667916 / 0714667917 / 0713881817. Common crimes in the area are; Domestic violence, Theft, Child Abuse and Land wrangles.

Pakele Police Outpost

The station has only four (4) officers and one old motorcycle, which is in a poor condition. The main crimes are; Domestic violence, Sexual harassment, Land wrangles and Theft. This police outpost is situated along the road and is highly accessible.

Dzaipi Police Outpost

The outpost is located just opposite the health center and in close proximity to Dzaipi market. The police outpost has only five officers and do not have the means of transport. Even the motorcycle that is available is faulty. Therefore, they have to use 'Boda Bodas' to transport suspects which makes their work difficult. The common crimes are; Theft for cows which is at 60%, theft for money, land wrangles, domestic violence etc.

Arra Police Outpost

The most crimes in Arra are assault, domestic violence and cattle theft. The above-mentioned crimes are mostly due to drug abuse like eating 'Mairungi' and smoking Marijuana. Also, men this side tend not to cater for their wives hence leading to fights.

Table 7-39: Criminal report for Jan to May 2022

Month	DV	Defilement
Jan	25	14
Feb	30	10
Mar	40	10
Apr	19	9
May	15	10

Source: Adjumani District Central Police Station (CPS) 2022

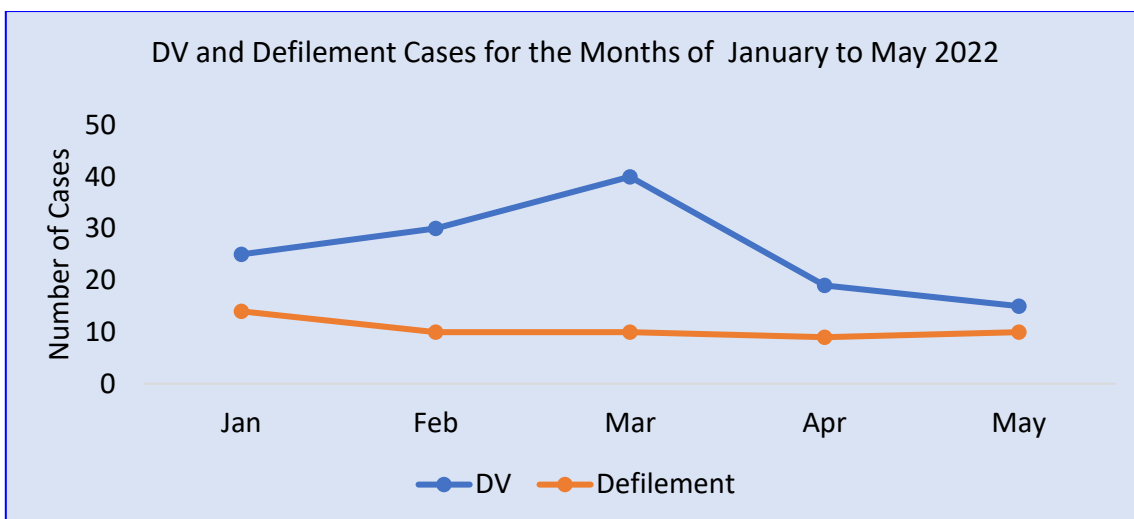


Figure 7-81: Specific criminal trends in Adjumani for the months of January to May 2022

7.5.5 Health Facilities and Their Status

Ciforo Health Centre III

The health facility is located at Ciforo Sub-County. The facility serves and attends to a population of more than 1000. The facility has 9 staffs, 30 beds (10 for female ward, 10 for male ward and 10 for children ward), a lab with old equipment, and a non-functioning fridge. The health facility has no ambulance, no emergency unit, and no blood transfusion services. The most common diseases treated are Malaria, Respiratory infections like flu, cough, etc., and skin diseases. The health facility also provides reproductive health services, VCT and HIV treatment. The main challenge facing the facility is shortage of drugs.



Figure 7-82: Non-functioning fridge at Ciforo HC III

Pakele Health Centre III

The most common diseases are malaria at 90%, Respiratory infections, Skin diseases, COVID-19, etc. These are mainly caused by people not sleeping under mosquito nets, Bushes, poor roads with dust and many streams within the area. This facility serves over 12000 people, all of which are handled by 19 staff members only. Out of 19 staff members its only 6 who are provided with accommodation. The facility also doesn't have enough beds and currently has 14 beds in number. No mosquito nets and even the few they had were stolen by patients. The facility provides reproductive health services, VCT and HIV training, has a lab which is not fully equipped, and has solar which has malfunctioned. The services not provided are surgery, ambulance, and blood transfusion. The facility also has no emergency unit, though they can handle accident emergencies with the little available resources. Another major challenge is lack of drugs to give to patients.

Dzaipi Health Centre III

The most common diseases are Malaria, Upper Respiratory Tract Infectious Diseases, and Pneumonia in children. This hospital serves a population of approximately 9769 people. They have 12 competent staff members. There is no emergency unit, and they use general ward for even emergencies, no theatre because it's a Health Centre III, no ambulance and most times they use for nearby refugee settlement and no blood transfusion services. There is a lab with old equipment and has no printer. This lab also offers reproductive health education, VCT and HIV treatment services. The main challenges are lack of power supply to some wards, no stable water supply, a lack of enough space for trainings, shortage of drugs and lack of infrastructure (Figure 7-83).



Figure 7-83: Old building at Dzaipi Health Centre III

Pagirinya Health Center III

This facility handles the refugee settlement and serves a population of more than 12157 people. The common diseases are Malaria which is at 40%, skin diseases, pneumonia in children, respiratory diseases, etc. This facility has no emergency unit and uses procedure rooms for emergencies. They have one ambulance, no theatre, have 40 beds, 27 competent staffs, have a lab and provide blood group tests. The facility also offers VCT services and HIV treatment and above all offers reproductive health education. The main challenge faced by the facility is water shortage.

Pachara Health Centre II

This is located In Pachara sub-county, and it serves a population of about 33,000 people. The common illness in treated in Pachara H/C II include malaria at 85%, diarrhoea, cough, skin diseases etc. Since it is a health centre II, it only gives first aid services and for advanced cases they are referred to H/C III or main hospital. The surrounding areas are bushy, dust is also a problem, and the health facility lacks a means of transport.

Arra Health centre II

The most common diseases are Malaria at 60%, Respiratory infection diseases, intestine worms and skin diseases. The facility is supposed to have 9 staff but for now, they are 6 including the supporting staff. The facility has no transport means and ambulance for handling emergencies, they mostly call main hospital. The facility doesn't have emergency unit to handle accident emergencies, but they only give first aid and call main hospital which responds in time. The common accidents received are motor accidents and the facility does not have any emergency bed and no emergency unit. They have a small lab that can test malaria, pregnancy and HIV but they don't treat HIV. The health facility serves a total population of about 2476 with 6 staff members including the supporting team. The main challenge is Inadequate infrastructure where the facility does not have even space for beds (Figure 7-84).



Figure 7-84: Infrastructure at Arra H/C II

Adjumani General Hospital

The hospital has 180 competent staff, an emergency unit with only 2 beds, 3 ambulances, 160 beds, a theatre, a lab and blood group testing. The hospital also provides VCT, HIV treatment and antenatal services. For now, the hospital doesn't provide first aid training since they do not have a service provider.

7.5.6 Chemicals to be Used in Water Treatment

Alum and Chlorine will be used for treating water. Chemicals will be stored in a separate chemical storage room. Regarding Quality, Material Safety and Data Sheets for chemicals- more details can be given once design and specifications will be ready (Details in Annex 12).

7.5.7 Accommodation

The accommodation for project workers, equipment yards and material yards are needed since the project area is remote and doesn't have sufficient motels, hotels and lodges with enough space to house project workers, equipment and construction materials. The project may employ about 214 people, as shown in **Table 7-40** below. However, the NWSC will decide on the exact number of employees in addition to the key personnel.

Table 7-40: Composition of project workers

Serial No.	Position	Number
	Environmental officer	1
	Health and safety officer	1

	QA/QC engineer	1
	Social expert/sociologist	1
	Surveyor	3
	Project manager	1
	Site manager	3
	Civil engineer	2
	Electrical engineer	2
	Casual	48
	Operator	12
	Driver	12
	Technician (mechanical, electrical and civil)	9
	Laboratory technician	1
	Plumber	18
	Welder	18
	Carpenter	12
	Camp chef	6
	Camp cleaner	6
	Security guard/officer	12
	Mason	18
	Steel bender	9
	Steel fixer	9
	Storekeeper	3
	Administrator	3
	Site Clinic Nurse	3

Source: Estimates

7.6 Socio-Economic and Land Use Activities Environment

This section provides a summary of the existing socio-economic conditions in the project area before the start of the project; several variables such as source of drinking water, availability of electricity, sanitation facilities, building materials, and possession of household durable goods. The information is based on documentary review, field primary data collection and stakeholder engagement with the local communities in the area, Adjumani DLG technical officials, political representatives, Office of the Prime Minister (OPM) and Refugee implementing humanitarian partners.

As far as has been possible, the focus for the socio-economic baseline has been on observations in the beneficiary communities; and observations in the communities through which the pipelines pass and where key facilities are to be installed such as Pakele Town Council, Adropi subcounty, Ciforo sub-county, Adjumani Town Council and Dzaipi subcounty.

7.6.1 Political and Administrative Setup

The Adjumani water supply and sanitation project components traverse 5 Subcounties, 2 Town Councils, 15 Parishes and 4 Wards, and 24 Villages and 7 Cells as shown in Table 7-41 below.

Table 7-41: Project area and administrative setup

Subcounty	Parish	Village
Adjumani Town Council	Central Ward	Central II Cell
		Mbere Cell
		Minia West Cell
		Molukpwoda Cell
	Cesia Ward	Lajopi Cesia Cell
	2	5
Adropi	Lajopi	Mokolo East
		Mokolo West
		Rende
	Palemo	Deri
	2	4
Ciforo	Agojo	Duba
		Ebiamgba
		Marila
	Loa	Obugo
	Mugi	Mocope
	Okangali	Kabaoli
	4	7
Dzaipi	Ajugopi	Egge
		Maiaciku
	Ajugopi	Ringa
	Logoangwa	Pagirinya
	Mgbere	Dzaipi Central
	3	5
Pachara	Alere	Robidire
	Jihwa	Mijale
	Marindi	Marindi Central
		Rassia West
	Omi	Arra West

Subcounty	Parish	Village
	4	5
Pakele	Boroli	Liria
	Melijo	Gonyilaa
		Melijo
	2	3
Pakele Town Council	Central Ward	Agalejo Cell
	Pereci Ward	Maanyalwa Cell
	2	2
Total	19	31

Source: RAP (2022)

7.6.2 Study Area Population and Demographic Characteristics

The 2014 Population and Housing Census established the total population of Adjumani District (East Moyo county) at 231,623, of which 52.2% were female and 47.8% were male. This conforms to the country situation where there are more female than males. Pakele sub-county has the highest population in the district, while Adropi sub-county has the lowest. Similarly, Pakele has the highest number of households and still Adropi with the lowest. The table below show the population distribution from the respective sub-counties that are going to be traversed the proposed NWSC water supply system.

Table 7-42: Population of Adjumani district

Lower Local Government	Total Households	Population		
		Male	Female	Total
Adjumani Town Council	5,830	20,781	21,749	42,530
Adropi	2,287	5,955	5,987	11,942
Ciforo	3,149	7,134	7,388	14,522
Dzaipi	7,400	19,904	22,874	42,778
Pachara	2,959	8,373	8,832	17,205
Pakele	8,918	22,740	26,075	48,815
Adjumani District	30,543	84,887	92,905	177,792

Source: Population and Housing Census result, 2014

7.6.3 Refugee Settlements

Adjumani is one of the major refugee hosting districts in Uganda with 10 registered settlements. By March 2021, the total population of the district stood at 224,270, closely matching with the refugee population of 217,387. According to the NWSC feasibility report 28 the project is going to benefit some refugee settlements such as Nyumanzi, Pagirinya, Boroli and Olua with a combined population of 98,165 from 14,672 households which translates into approximately 7 persons living in every household.

Table 7-43: Refugee settlements in project area

Zones	HHs	Individuals
Nyumanzi	5,126	41,251
Pagirinya	6,525	36,918
Boroli I	1,681	10,136
Olua 1 and 2	1,340	9,860

Source: UNHCR-Uganda - Refugee Statistics February 2021 – Adjumani

7.6.4 Gender of Household Heads

The headship of a household is considered an important demographic variable. The household head is the person acknowledged by members of the household as responsible for the day-to-day running of the household. The household head is responsible for making the main decisions within the household although he/she is not necessarily the main income earner of the household. Survey results indicate that there were more male household heads (80.3%) in comparison to the female (19.7%).

Table 7-44: Gender of household heads in project area

Type of household head	Frequency
Female headed	223 (19.7%)
Male headed	948 (80.3%)
Total	1181 (100%)

Source: Field data (2021)

7.6.4.1 Structure of Uganda's Productive Economy, by Sector and Gender

The vast majority of women work in subsistence agriculture, particularly 60% of women list “cropping” as their occupation (Lawson 2003). Women are more active than men in agriculture, particularly in food crop production, marketing, and processing of agricultural products²⁹. This

28 Adjumani Water Supply and Sanitation Project Feasibility Report, October 2021

²⁹ Gender and Economic Growth in Uganda Unleashing the Power of Women, 2006

gender division was confirmed by consultations from the key stakeholders and the Akello (2001) study which indicated an 8% to 92% access to productive resources such as land by men and women respectively.

Sector	Share of GDP	Gender intensity of Production		Contribution to GDP	
		Women	Men	Women	Men
Agriculture	49	75	25	72.6	23.8
without smallholder					
sector	33	80	20	— —	
Traditional exports	3.5	60	40	— —	
Nontraditional agricultural exports	1	80	20	— —	
Industry	14.4	15	85	4.3 24.8	
Without manufacturing	6.8	—	—	—	—
Services	36.6	32	68	23.1	50.4
Economy as a whole	100	50.6	49.4	100	100

7.6.5 Marital status

On the issue of marital status, when respondents in the project area were questioned on marital status majority 74.6% of the men indicated that they are married in comparison to 6.6% female. More women were divorced/separated (3.8%) and widowed (8.2) compared to the men (1.6%) and 0.7%) respectively. Households were questioned about their marital status, owing to the fact that it is vital to capture the marital status of household members as marriage is one of the principal factors that influence the household size. Accordingly, a married woman is highly exposed to the chance of becoming pregnant and bearing children, hence increasing the dependency burden in a household.

Table 7-45: Marital status by gender

Gender		Single	Married	Divorced/Separated	Widowed	Total
Female headed	Count	11	63	36	78	188
	%	1.2%	6.6%	3.8%	8.2%	19.7%
Male headed	Count	33	713	15	7	768
	%	3.5%	74.6%	1.6%	0.7%	80.3%
Total		Count	44	776	51	85
						956

	%	4.6%	81.2%	5.3%	8.9%	100.0%
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Source: Field data (2021)

7.6.6 Age-group of the Respondents

Results from the socio-economic baseline indicate, that the general trend of most respondents fall in the 26-35, 36-45 and 46-55 age groups with a percentage of 26.1%, 26% and 22.4% respectively. This reveals that the area is predominantly made up of youthful and active people.

Table 7-46: Age group of respondents

Age of household head	Frequency
15-25 years	85 (7.2%)
26-35 years	308 (26.1%)
36-45 years	307 (26%)
46-55 years	265 (22.4%)
56 and above	216(18.3%)
Total	1181(100%)

Source: Field data (2021)

7.6.7 Vulnerabilities at Household Level

Vulnerability is a state of being or likely to be in a risky situation, where a person is likely to suffer significant physical, emotional or mental harm that may result in their human rights not being fulfilled³⁰. From the field survey, it was established 4.3% of the respondents had a physical impairment, 2.3% hearing disorder, 1.3% blindness and 7.9% old age.

Table 7-47: Vulnerability of household head

Vulnerability of household head	Percentage
Physical impairment	40(4.3%)
Hearing disorder	26(2.8%)
Blindness	12(1.3%)
Old age	73(7.9%)
Mental disorder	9(1.0%)
None of the above	768(82.7%)

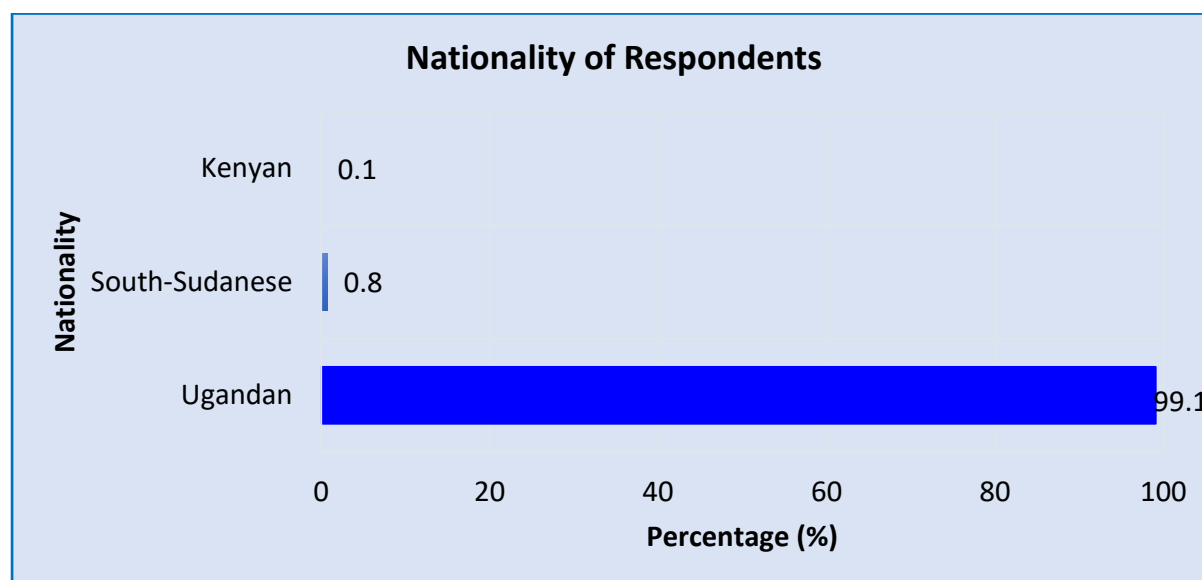
³⁰ Ministry of Gender, Labour and Social Development, Orphans and other Vulnerable Children Policy, 2005

Total	928(100%)
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Source: Field data (2021)

7.6.8 Nationality of Respondents

Most of the respondents (99.1%) were Ugandan while the rest were South-Sudanese (0.8% and Kenyans (0.1%).

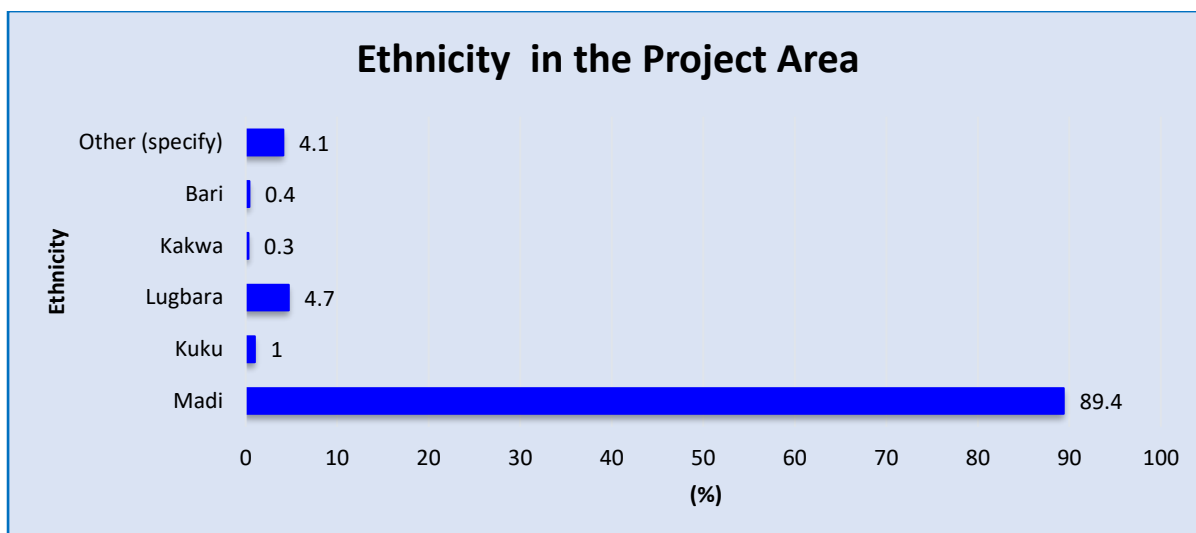


Source: Field data (2021)

Figure 7-85: Nationality of respondents

7.6.9 Ethnicity of Respondents in the Project Area

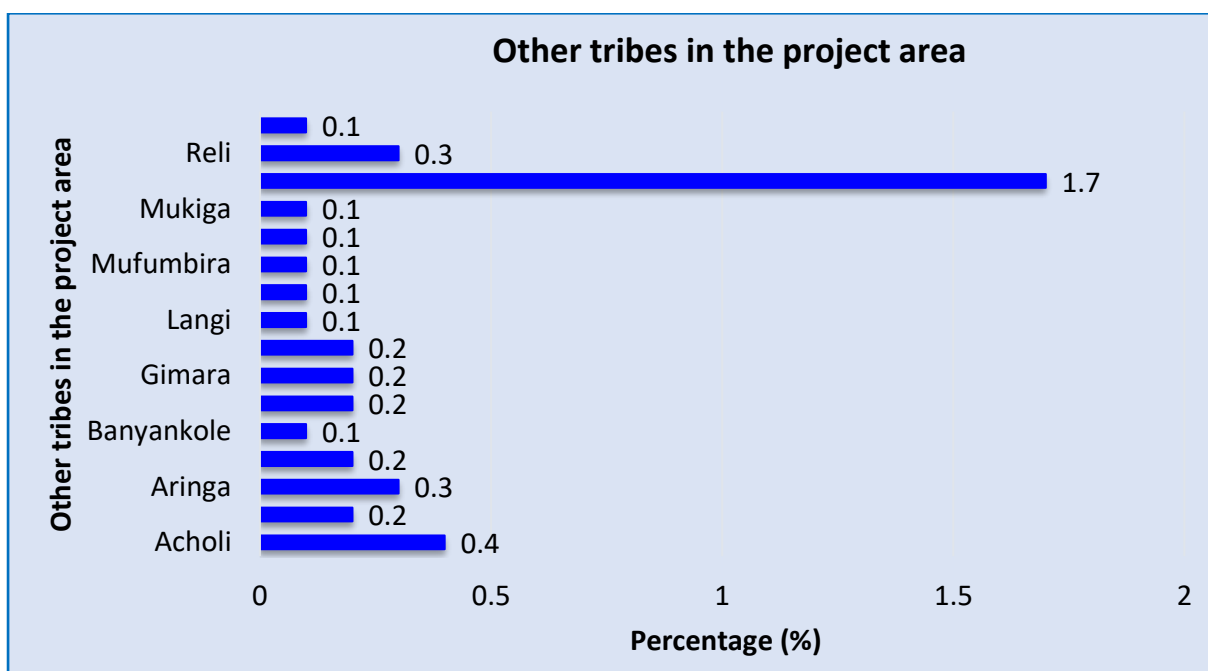
The inhabitants of the project area are predominantly of the Madi race (89.4%), who are the one of the main ethnic groups making up in Adjumani, other tribes include Lugbara (4.7%), Kakwa (0.3%), Bari (0.4%) and the Kuku (1%) are some of the tribes in the project area. Given that the majority respondents are Madi, project implementation should adopt Madi as the language of communication during subsequent community engagements



Source: Field data (2021)

Figure 7-86: Ethnicity in the project area

Similarly, there were also some migratory tribes in the project area such as the Baganda, Banyoro, Banyankole, Samia, Bamasaba who are mainly Bantu of speaking dialects while the Aringa, Gimara, Reli and Mening were also found in the project area as shown in Figure 7-87.



Source: Field data (2021)

Figure 7-87: Other tribes in the project area

7.6.10 Nature of Dwelling and Household Assets

In all the communities surveyed there were a mix of housing types ranging from modern houses built with bricks to mud houses which were predominant in most of the communities. While the modern houses appear conducive the same cannot be said of the mud houses most of which were poorly ventilated, with poor flooring and roofing materials. Most of the houses lack toilet facilities

therefore human wastes were often disposed into the pit latrines and surrounding bush in some cases.



Figure 7-88: Type of dwelling in the project area

Data from the field study, reveals that the majority of structures (46.2%) in the project area were Mud built using Mud block, 18.6% Mud and wattle, 17.5% Mud block and plaster, 10.9% concrete blocks, 5.5% reed thatch and sticks and 1.2% stone as shown in the table below.

Table 7-48: Nature of dwelling in project area

Nature of dwelling	N	Percentage
Mud block	546	46.2
Mud and Wattle	220	18.6
Mud block with plaster	207	17.5
Concrete Blocks	129	10.9
Reed Thatch or Sticks	65	5.5
Stone	15	1.2
Total	1181	100

Source: Field data (2021)

7.6.11 Ownership of Physical Assets

A diverse portfolio of assets is not only critical for households to cope with unexpected shocks, but can free access to a range of consumption smoothing options that are vital for them to maximize utility over time. Diversity in asset choice is also important in order to allow households

to manage risk in any one period. A household that is constrained in its access to credit or other assets may not be able to survive a negative shock³¹. Cognizant of that, the socio-economic interrogated asset ownership in the project area and established that 27.4% own houses, 22.3% mobile phones, 17.2% domestic animals, and 19.3% Radio.

Table 7-49: Ownership of assets

Type of Asset	N	Percentage
House	997	27.4
Domestic animals	627	17.2
TV set	77	2.1
Radio	701	19.3
Car	18	0.50
Motorcycle	137	3.8
Bicycle	264	7.3
Mobile phone	811	22.3
Other	5	0.1
Total	3637	100

Source: Field data (2021)

7.6.12 Land Tenure and Method of Acquisition

The land tenure system in Adjumani is communal or customary tenure. Within the customary tenure system, the land is administered by family/clan leaders. Access is based on inheritance; thus, there are limited rights and entitlements for those outside the family, clan, or community³². Women in Uganda make up 51% of the population (UBOS, 2014) and provide over 70% of the labour for agriculture. Despite these statistics, women own only 7% of land as their rights to ownership is restricted both in the natal and matrimonial homes while men own 93% of the land. (Ellis et al., 2006)³³ From the field assessment majority (95.3%) indicated that they were land owners, tenants (1.5%), Licensee (1.6%), squatters (0.8%) and 0.2% encroachers. Regarding method of acquisition, the vast majority of respondents (83.2%) indicated inheriting the land from parents, 12.8% indicated having bought the land, 3.2% renting and 0.8% revealed that they settled on the land by squatting on it.

Table 7-50: Land tenure and ownership by respondents

Capacity of possession	Frequency	Percentage
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³¹ Household asset choice among the rural poor in Ghana, 2004

³² Local Integration as a Durable Solution? Negotiating Socioeconomic Spaces between Refugees and Host Communities in Rural Northern Uganda, 2021

³³ Women's Rights to Land Ownership in Uganda: Policy and Practice-2014

Landowner	1126	95.3
Tenant (Kibanja)	18	1.5
Co-owner	7	0.6
Squatter	9	0.8
Licensee[renting]	19	1.6
Encroacher	2	0.2
Total	1181	100.0
Method of acquisition		
Bought	151	12.8
Inherited from parents	983	83.2
Renting (tenant)	38	3.2
Squatter	9	0.8
Total	1181	100.0

Source: Field data (2021)

7.6.13 Economic Activities

Majority of inhabitants of the affected communities are farmers (54.7%). Other subsidiary occupations are formal employment (13.5%), Service provision (salon, transport) (8%), trading (7.7%), casual labour and those that were found to be in school (8.4%). From observation both men and women are mainly involved in trading as their secondary occupation. Farming which is the primary occupation of majority of people in the affected communities is both trees cropping and subsistent with maize, rice, cassava, plantain and beans as the main crops.

Relatedly, evidence from focus group discussions indicates that the level of unemployment (for salaried jobs which the people especially the youths prefer) is high. A few observations regarding the occupational study indicate that (i) the youths are not necessarily jobless contrary to what obtain elsewhere; some of them have acquired artisan training, some are petty traders, contractors, political jobbers while almost all follow their parents to the farm in a typical peasant settlement.

Table 7-51: Economic activities in the project area

Source of livelihood	Frequency	Percentage
Farming	639	54.7
Formal employment	158	13.5
Casual labour	59	5.1
Trading	90	7.7

Service provision (salon, transport)	94	8.0
Student	98	8.4
Fishing	24	2.1
Brick making	6	0.5
Total	1168	100.0

Source: Field data (2021)

7.6.14 Livestock Keeping in the Project Area

Table 7-52 below shows households that practised livestock keeping the project area. Livestock keeping (cattle, goats, sheep, pigs and poultry) is the second most important economic activity with low yields due to wide spread pest, diseases, poor pasture, and lack of safe-drinking water sources for animals. The most common animal diseases in the district are tick borne, foot and mouth, Lumpy skin disease, PPR, Contagious bovine pleuropneumonia, Contagious caprine pleuropneumonia, Black quarter, and helminthiasis. On average, a sizeable number of households keep between 2-3 animals. However, the estimated income from sale of farm produce cannot be predicted, as people do not keep records. Majority of the population spend their income on payment of school fees, and purchase of more domestic animals, consumables (daily household needs) , medical care and leisure. Regarding livestock production, societal norms determine the different roles and activities women and men perform in livestock management (FAO 2012). More women than men are the primary animal caretakers and the same is consistent with the practice and culture of the project area based on community consultations. The role of men is often supervisory and involves giving instructions on how to manage livestock, indirectly interpreted as giving care to animals (Rothschild, 2011).

Table 7-52: House that practised livestock keeping in the project area

Type of livestock	N	Percentage
Goats	190	31.9%
Cattle	116	19.5%
Poultry	215	36.1%
Pigs	57	9.6%
Sheep	16	2.7%
Rabbits	2	0.3%



Figure 7-89: An example of livestock kept in the project area

7.6.15 Fishing Activities

From the field survey, it was also established that fishing is one of the sources of livelihood in the project with 2.1% of the respondents indicating that they're involved in fishing activities especially on River Nile in Arra West village in Pachara sub-county where the water intake is going to be located. The main commercial fish caught are Tilapia, Nile perch, mormyrids and Clarias. Subsistence fish farming in ponds is practiced in Ofua, Ukusijoni, Pachara Dzaipi sub counties. Fishing technologies in use include passive gill nets mesh size 108 mm/4" hooks number 9 and below. However, Illegal gears and methods like Kokota and under size gill nets both multi/monofilament nets persist. Transportation is still done on bicycles which limits the marketing of fresh fish.



Figure 7-90: Fishing activities at Arra West village in Pachara Subcounty

7.6.16 Industry

Industrialization is generally low in the district and dominated by cottage industry preoccupying 0.42% of the population. Other activities include: carpentry woodwork (5.7%), metal products (3.2%), leather manufacturing (4.6%), mechanical repairs (3.3%), brick laying (6.5%), food & cash crop processing (58.3%), and embroidery and other crafts (17.98%) (UBOS, 2014). Women who are able to obtain the majority of raw materials locally mainly do embroidery and crafts.

7.6.17 Average Annual Income of Respondents

Survey results show that 66.7% earn more than 1,403,000, 19.8% earn between 503,000 - 1,403,000 and 13.5% earn less than 503,000 as shown in the Table 7-53 below.

Table 7-53: Annual income of respondents

Average annual income	Frequency	Percentage
Less than 503,000 (Low)	149	13.5
503,000-1,403,000 (Medium)	219	19.8
More than 1,403,000 (High)	738	66.7
Total	1106	100.0

Source: Field data*Income ranges adopted from the MWE Water Supply Design Manual 2000

7.6.18 Access to Healthcare

Access to affordable and quality healthcare is one of the most essential human requirements. As Sustainable Development Goal (SDG) 3 notes, ensuring healthy lives and promoting the well-being for all, at all ages is essential for the sustainable development of any country. As such the socio-economic survey sought to establish access to healthcare in Adjumani district and survey results indicate that the majority of respondents (61%) use Health centre III to access medical services, 14.4% Privately run clinic /drug shop and 10.3% Health Centre II. Only 9.2% visit hospitals to access medical services and 4.8% use community health centers.

Table 7-54: Nearest Health facility in project area

Type of nearest health facility	Frequency	Percentage
Referral hospital	109	9.2
Privately run hospital	2	0.2
Health Centre III	720	61.0
Health centre II	122	10.3
Maternity hospital	1	0.1
Community Health Centre	57	4.8

Privately run clinic /drug shop	170	14.4
Total	1181	100.0

Source: Field data (2021)

7.6.19 Distance Travelled to Access Healthcare Services

Distance to a health facility has a direct impact on healthcare outcomes. Patient travel to attend medical clinics in many cases is reliant on the distances they have to travel access healthcare facility. According to the MoH Uganda, a patient shouldn't travel a distance beyond 5 km to the nearest health facility from their principal place of residence. Results from the survey indicate that majority of the respondents (63.6%) travel over 4km to access the nearest health facility. The table below show the various distance travelled to access healthcare services.

Table 7-55: Distance travelled to the nearest health facility

Distance travelled	Frequency	Percentage
0 - 1km	176	14.9
1 - 2km	86	7.3
2 - 3km	57	4.8
3 - 4km	110	9.3
Over 4km	750	63.6
Total	1181	100.0

Source: Field data (2021)

7.6.20 Most Common Diseases

The most common diseases are malaria (47.1%) upper respiratory tract infections (36.1%), skin diseases (2.1%), and diarrhoea diseases such as Cholera (0.2%) and dysentery (2.4%) among others as shown in the Table 7-56 below. The first three are common to all age groups while diarrhoea cases are commonly reported amongst children less than five years of age. The period with the highest cases of outpatient cases is between April to June and August to November, with peak rainfall usually experienced in May during which mosquitoes and other disease-causing agents thrive.

Table 7-56: Most common diseases reported by respondents

Most common diseases	Frequency	Percentage
Malaria	1154	47.1
RTI	884	36.1
Cholera	5	0.2

Dysentery	59	2.4
HIV	12	0.5
Gonorrhea	3	0.1
HPV	3	0.1
Intestine infections	60	2.4
Ulcers	95	3.9
Skin disease	51	2.1
Others	124	5.1
Total	2451	100

Source: Field data (2021) - *Multiple response question

7.6.21 Level of Education of Respondents

Education provides a foundation for development, the groundwork on which much of our economic and social wellbeing is built. It is the key to increasing economic efficiency and social consistency. Similarly, it enriches people's understanding of themselves and world, increases the overall productivity and intellectual flexibility of communities hence the need to assess the literacy profile of communities to inform development planning and project implementation³⁴. Results from the field show that respondents had attained primary level and Ordinary level education at 41.1% and 31.3%. This points to a fairly literate society that can easily be mobilised to participate in project activities or better still supply both skilled and unskilled labour which would increase social acceptance of the project.

Table 7-57: Level of education of respondents

Level of education	Frequency	Percentage
Primary Education	485	41.1
Ordinary level	370	31.3
A' level	50	4.2
Vocational	80	6.8
University/college	92	7.8
None	98	8.3
Junior	6	0.5
Total	1181	100

³⁴ The Role of Education in Economic Development: A Theoretical Perspective, 2008

Source: Field data (2021)

7.6.22 Distance Travelled to Access Education Services

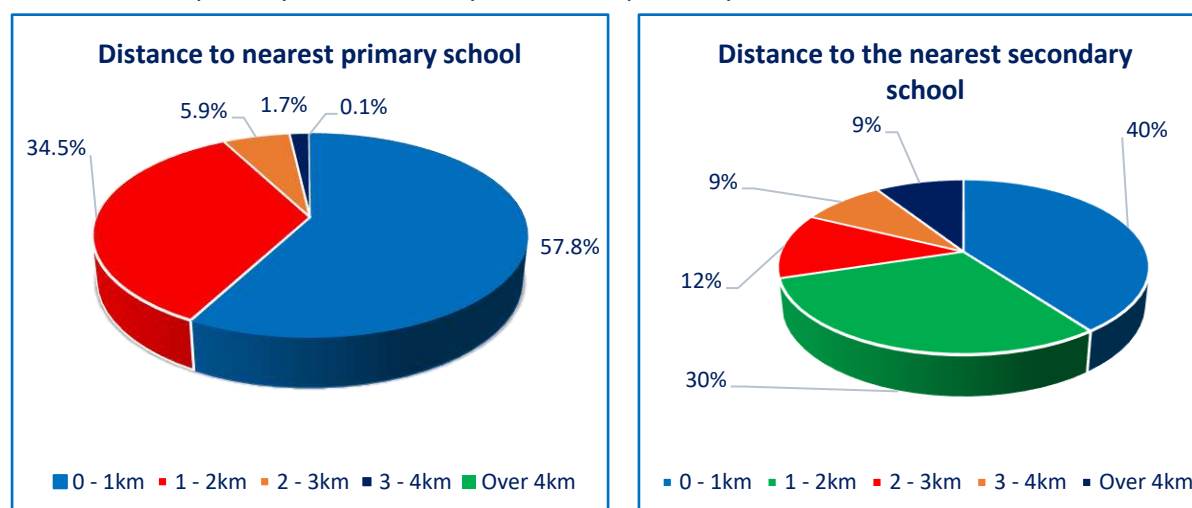
According to the 2017 MoE, Education Abstract 2017, Adjumani district has a total of 100 primary schools of which 66 are government grant aided and 34 are Private/Community primary schools. There are 6 government-aided secondary schools and 9 private secondary schools and one technical institute. Specifically, the project beneficiary sub-counties 45 primary schools, and six secondary schools with a total enrolment of 26,614 for primary schools and 2,113 for secondary schools.

Table 7-58: Erolment by subcounty

SUB COUNTY/TC	NO. OF P/S	ENROLMENT		TOTAL	NO. OF SS	ENROLMENT		TOTAL
		M	F			M	F	
Adropi	3	1048	882	1930	0	0	0	0
Ciforo	9	1942	1875	3817	1	174	95	269
Dzaipi	10	4059	3468	7527	1	226	57	289
Pacara	8	2990	1846	3836	1	442	173	615
Pakele	15	5035	4469	9504	3	276	670	812
Total	45	15074	12540	27614	6	1118	995	2113

Source: Adjumani DDPIII 2020/2021–2024/2025)

One of the hurdles that have the most effect on school attendance and learning outcomes is the distance travelled to access education services, yet some schools are located kilometres away from their home stay where leaners have to move for long hours to get to their school. This survey, therefore sought to find out the distances travelled by leaners and teachers to access education services in the project area as it impedes constructive learning. Findings from the field, indicate that 57.8% of the learners travel 0-1 km to reach the nearest primary schools, while 39.8% travel 0-1 km to get to the nearest secondary schools. Only 0.1% and 9.1% travel over 4 km to get to the nearest primary and secondary schools respectively.



Source: Field data (2021)

Figure 7-91: Distances to nearest primary and secondary schools

Poverty is the other problem affecting education for children in the project area owing largely to the youth unemployment rate of 13.3% between the age of 18-30³⁵. The rates of unemployment, malnutrition, and poverty are higher in rural areas than the urban. This is as a result of population density that makes it more visible. Poverty, in turn, affects educational outcomes and frequently leads to early dropouts. In this case, most children do not even think of joining secondary education but rather drop out in primary.

Relatedly, the lack of teachers is yet another huge obstacle to education in the project area since it is extremely difficult to attract teachers, and hiring, in general, is tougher in rural areas which is largely attributed to the quality of life which is not suitable for teachers. The reason is, rural life is not suitable for everyone.

Additionally, the challenges of enrolment and attendance have been exacerbated by the Covid-19 pandemic since many learners lost interest in education because of the prolonged 2 year lock down which occasioned abandonment of school facilities, engagement in gainful employment to fend for families especially by the boys, unwanted pregnancies by the girls³⁶.

7.6.23 Latrine/ Hand Washing Coverage

Generally, there has been a persistent increase in the latrine/hand washing coverage in the district over the past years as shown in the Table 7-59. However, there is need to put more emphasis on hand washing facilities and use in the community in the district and special attention need to be equally paid to Dzaipi, Adropi, Ciforo and subcounties address latrine coverage to improve general hygiene situation to address hygiene related diseases in the district.

Table 7-59: Latrine and hand washing coverage

Issues / Item	Adjumani TC	Pachara	Ciforo	Adropi	Pakelle	Dzaipi
Latrine Coverage	92.30%	90.20%	78.20%	76.80%	75.70%	70.20%
Hand Washing Coverage	71.20%	55.20%	61.20%	36.70%	46.90%	35.90%

Source: DHO's Office (2021)

7.6.24 Access to Water Sources and Sanitation

Water is a key strategic resource, vital for sustaining life, promoting development and maintaining the environment. Access to clean and safe water and improved sanitation are very crucial to the

³⁵ Uganda Bureau Of Statistics, Statistical Abstract 2020

³⁶https://static1.squarespace.com/static/5be066eca9e028fe088be707/t/5fd3a8b8872d8f1a0aceac6f/1607706809187/Final+Paper+_+Education+Group+_+GSFP+Cohort+3.pdf

health population and therefore have a direct impact on the quality of life and productivity of the population. The percentage of rural inhabitants with access to improved sanitation increased from 68% in 1991 to 85% in 2002 (Source USAID). However, access to clean and safe water is still far from universal. In 2003, only 59% of rural inhabitants had such access. Despite the improvement, the current levels are still below the Poverty Eradication Action Plan (PEAP) targets of 100% and 90% for urban and rural areas respectively by 2007/08 and the MDG target of 80% for all areas by the year 2015. Field result indicate that 78.7% of the respondents access their water from boreholes, 10.5% open stand pipes and 5.9% Piped water in house.

Table 7-60: Sources of water

Sources of water	Frequency	Percentage
Community Borehole	930	78.7
Protected Spring	4	0.33
Unprotected spring	2	0.21
River/Lake	14	1.23
Piped Water in House	106	8.92
Open Stand Pipes	124	10.5
Rain Water	1	0.11
Total	1181	100.0

Source: Field data (2021)



Figure 7-92: One of the community boreholes in the project area (Arra West near Etojo P/S)

7.6.25 Sufficiency of Water Supply

Regarding sufficiency, 69.1% revealed having insufficient water supply especially during the dry season while only 30.9% indicated having a sufficient water supply. This is mainly attributed to extended droughts, encroachment on water sources and limited technology. From the consultations with community members, FGDs and key informant interviews, it was reported that a majority of households were facing water shortage. This was mainly reported by residents of Arra, Pakele, Dzaipi, Nyumanzi and Adjumani Town councils. Many of the residents now fetch water from rivers such Nile and Echuku among others.

Table 7-61: Sufficiency of water supply

Sufficiency of water supply	Frequency	Percent
Sufficient throughout the year	365	30.9
Insufficient during dry season	816	69.1
Total	1181	100

Source: Field data (2021)

7.6.26 Sanitation

Generally, there has been a persistent increase in the latrine/ coverage in the district over the past since the town council and other sub-counties rely mainly on pit latrines for disposal of human wastes. However, this poses a threat to the nearest surface water sources such as rivers and the ground water sources. The quality of the Pit latrines varies from one family to the other due to economic status per family. The field visit revealed that most of the people 96.3% adopt pit latrine because of lack of adequate water for flushing system. Only a few 1.6% use flush toilets and 2% community latrines. Regarding disposal of refuse, most respondents burnt the rubbish (44.2%) and Dug compost pit (33.3%) as methods of managing domestic waste.

Table 7-62: Sanitation in project area

Method of disposal	Frequency	Percentage
Toilet	19	1.6
Pit latrine	1137	96.3
Community Latrine	24	2.0
Bush	1	0.1
Total	1181	100.0
Disposal of refuse	Frequency	Percentage
In a landfill	1	0.1
In a dumpsite	265	22.4
Burn	522	44.2
Dig a compost pit	393	33.3

Total	1181	100.0
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Source: Field data (2021)

7.6.27 Energy Sources

In all villages comprised in the project area, the main source of energy both for cooking and at times lighting is traditional biomass (mainly wood fuel). Specifically, 64.4% of the respondents indicated using Firewood as a source of energy for cooking while 68.6% used solar for lighting.

Table 7-63: Source of energy in project area

Source of energy for cooking	Frequency	Percentage
Firewood	955	64.4
Gas	1	0.1
Charcoal	512	34.5
Solar	10	0.7
Kerosene	2	0.1
Biogas	1	0.1
Electricity	1	0.1
Other	1	0.1
Total	1483	100.0
Source of energy for lighting	Frequency	Percentage
Firewood	7	0.6
Charcoal	1	0.1
Solar	859	68.6
Kerosene	44	3.5
Biogas	1	0.1
Electricity	90	7.2
Other	250	20.0
Total	1252	100.0

Source: Field data (2021)

7.6.28 Gender and Water Burden in Rural Uganda and Adjumani District

In African households that collect water outside their residence, the burden reflects in the division of labour along gender lines within the households (Dos Santos, 2012). In line with socially-constructed gender roles, the burden of water collection and storage usually falls on the women and girls of a given household (UNDP 2006).

According to the UNHS (2016) overall, the majority of household members involved in fetching water were adult females (41%), followed by female minors (22%) and this was the trend in both male and female headed households as well as rural areas, urban areas and sub-regions. Specifically, in the West Nile where Adjumani district is located, 58.8% of the adult females and 22.9% minor females are involved in fetching water in comparison to 9.3% adult males and 9% minor males. This confirms the notion that the burden of fetching water falls on women and the girl child which was also consistent with the field consultations.

Similarly, despite the improvement in access to water sources in the district, many communities remain underserved in terms of access to safe water. From the consultations with the communities many women still have to trek long distances to water in order to perform tasks such as washing utensils, cooking food, washing clothes, cleaning and child rearing. On average rural communities spend about 29 minutes waiting for water (queuing) at their main source of water (UBOS ,2010). However, in some areas women and girls have to wait for over 1 hour due to poor water flows from the source owing to changes in seasonal flows of ground water sources. Therefore, construction of the water supply system will go away in lifting this burden as water points will be closer to households and therefore distances travelled by the women and girls will be less.

7.6.29 Gender-Based Violence

Gender-based violence is defined by the United Nations as any act of violence that results in physical, sexual, or psychological harm or suffering to women, girls, men, and boys, as well as threats of such acts, coercion, or the arbitrary deprivation of liberty³⁷. As such, this study set out to better understand the gender violence risks that exist in communities of the project area where poor water, sanitation, and hygiene (WASH) access is a known problem and also capture baseline indicators of the potential triggers of GBV issues related to infrastructure projects. Data from the UPF Crime report 2020 shows that there were 119 sex related cases, 42 cases related to child abuse and 74 cases related to assault in Adjumani. Furthermore, when asked about the common forms of abuse experienced, respondents indicated Verbal insults 39.4% and battering/beating 31.6% as the main forms of abuse in the community. Other forms of violence experienced in the community are presented in the Table 7-64 below.

Table 7-64: Common GBV within project area

Forms of GBV	N	Percent
Battering/beating	696	31.4%
Burning	17	0.8%
Verbal abuses/insults	868	39.2%
Attempted murder	7	0.3%
Forced sex	105	4.7%

³⁷ Uganda Demographic and Health Survey 2016

Unwanted sexual touches	103	4.7%
Marrying off girls early	139	6.3%
Threatening violence against spouse or children	63	2.8%
Use of proceeds/money without spouse consent	13	0.6%
Preventing spouse from owning property	6	0.3%
Preventing spouse from using family land	14	0.6%
Stop spouse from talking/community meetings	10	0.5%
Preventing spouse from working outside home	17	0.8%
Engaging children in work instead of school	25	1.1%
Not economically supporting family	112	5.1%
Locking spouse or children out of house	7	0.3%
Other...	13	0.6%
Total	2215	100.0%

Source: Field data (2021) - *Multiple response question

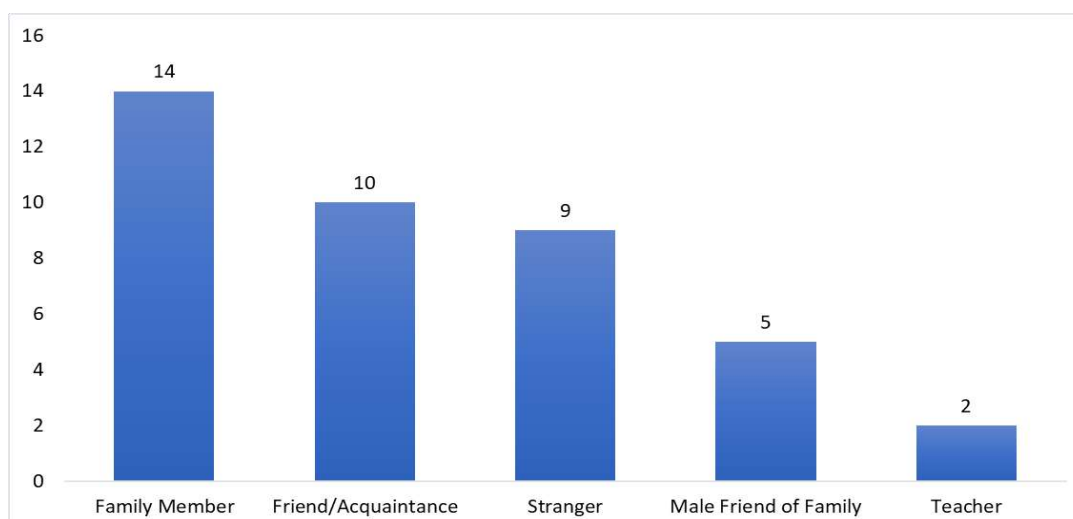
Regarding the victims of GBV in the community, married women (39.5%) and Girls (28%) were found to be the most common victims of abuse, while children (15.6%) and men (10.5%) also indicated being victims of GBV.

Table 7-65: Main victims of GBV in project area

Main victims of GBV	Frequency	Percentage
Girls	630	28.0
Married women	887	39.5
Boys	138	6.1
Men	235	10.5
Children	350	15.6
Maids	8	0.4
Total	2248	100.0

Source: Field data (2021) - *Multiple response question

According to VAWG (2020) survey, 53% of the women indicated that they had experienced sexual violence by one perpetrator and only two percent by two or more perpetrators (Figure 7-93). The below show that shows that the greatest perpetrators of non-partner sexual violence was by family members (14%) and friends/acquaintance (10%).



Source: VAWG, UBOS Survey (2020)

Figure 7-93: Perpetrators of non-partner sexual violence

The above is consistent with field findings regarding perpetrators of violence. When asked about who the perpetrators of this violence are, 47.6% and 21.9% cited Male and female spouses respectively as the main perpetrators of gender-based violence, other relatives (8%), community members (11.4%) and strangers (5%) among others.

Table 7-66: Perpetrators of violence in project area

Perpetrators of GBV	Frequency	Percentage
Male spouse	908	47.6
Female spouse	419	21.9
Other relative	153	8.0
Clan elder	41	2.1
Community leader	14	0.7
Stranger	96	5.0
Employer/boss	16	0.8
Male teacher	16	0.8
Community member	218	11.4
Police man/soldier	15	0.8
Male teacher	13	0.7
Total	1909	100

Source: Field data (2021)

7.6.30 GBV Case Reference

When GBV happens in the communities, most victims refer their matters to LC/community leaders 55% and 18.6% Police, Clan leaders (8.1%), Sub- County/probation officer/CDO (4.7%) and religious leader 4.6%.

Table 7-67: GBV referrals

GBV case reference	Frequency	Percentage
Police	337	18.6
LC/community leaders	996	55.0
Religious leader	84	4.6
Clan leader	147	8.1
NGO/CBO	59	3.3
Sub-county/probation officer/CDO	85	4.7
Head-teacher	1	0.1
Health worker	101	5.6
Total	1810	100.0

Source: Field data (2021) - *Multiple response question

7.6.31 HIV/AIDS Analysis

According to the Ministry of Health estimates 2020, the HIV prevalence among adults (15-49 years) in Uganda is 5.4%. The prevalence is higher among females. Specifically, for Adjumani district, the HIV/AIDS prevalence rate is 2.9% for the host community with a positivity rate of 0.9% while the prevalence rate in refugee settlements is 1.8% with a positivity rate of 0.8%³⁸. HIV/AIDS presents enormous challenges of coping with the devastating social and economic impact and therefore the study sought to establish the prevalence rates in the project area to inform the project proponent on how best this risk can be mitigated during implementation. Results from the field interviews indicate that the majority of the prevalence rates are low (58.9%) and (18.8%). 6.3% and 2.1% of the respondents revealed that the prevalence rates are high and very high respectively. 13.9% of the respondents indicated not knowing the prevalence of infections in the district as shown in the table below.

Table 7-68: Prevalence of HIV/AIDS infection in the area

Prevalence of HIV/AIDS infection in the area	Frequency	Percentage
Very low	221	18.8
Low	694	58.9
High	74	6.3
Very high	25	2.1
Don't know	164	13.9
Total	1178	100.0

³⁸ UNHCR HIS Report 2021

Source: Field data (2021)

Migration, mobility, and the spread of HIV are closely linked. Mobile men with money—commonly referred to as “the 3Ms” - are a major force in the spread of HIV infrastructure projects³⁹. It is pertinent to note that the project area will attract some migrant workers and by implication fraternization with women and girls in the community. Therefore, it is important to interrogate the potential causes of HIV/AIDs spread in the community. From the survey, respondents cited a variation of reasons that could precipitate HIV/AIDS spread and chief among them were alcohol abuse (22.1%), Poverty (17.3%), Lack of information (17.2%), peer pressure (10%) and drug abuse (9.5%). Drug abuse is viewed as a major cause of HIV/AIDS. Poverty also increases vulnerability of people with HIV, hence there is need to redirect resources towards support services to poor households. Progressive gains on poverty reduction may be reversed if concerted efforts are not urgently put in place to bring the HIV/AIDS pandemic under control. Implementation of the project thus needs to create comprehensive HIV/AIDS awareness among the workers along the project area. Other factors that could increase the risk of HIV/AIDS spread are presented in the Table 7-69 below.

Table 7-69: Factors affecting the risk of HIV/AIDs spread

HIV/AIDs factors	Frequency	Percentage
Poverty	488	17.3
Lack of information	486	17.2
Peer pressure	301	10.6
Alcohol abuse	624	22.1
Drug abuse	268	9.5
Parental neglect	104	3.7
No antenatal care service	113	4.0
No HIV service providers	110	3.9
GBV	91	3.2
Prostitution	78	2.8
Early marriage	144	5.1
Don't know	20	0.7
Total	2827	100.0

Source: Field data (2021) - *Multiple response question

When questioned on methods that can be used to control this spread, the majority of respondents (31.1%) revealed that Sensitization activities would be the most appropriate strategy

³⁹ HIV Prevention and Infrastructure: Mitigating Risk in the Greater Mekong Subregion-2008

to curb the spread of the disease, while 19.7 cited Testing & counselling and 12.2% Promotion of ABC within the community especially during project implementation.

Table 7-70: Methods of controlling HIV/AIDs

HIV/AIDS control methods	Percentage	Percentage
Sensitization activities	808	31.1
Prevention of GBV	123	4.7
Bylaws against prostitution	66	2.5
Promotion of ABC	318	12.2
Bylaws against drug/alcohol abuse	235	9
Improve antenatal care services	122	4.7
Engage HIV service providers	127	4.9
Bylaws against early marriage	144	5.5
Gender empowerment	146	5.6
Testing & counselling	511	19.7
Total	2600	100

Source: Field data (2021) - *Multiple response question

HIV/AIDS awareness is very important to the community and also helps to inform the project on the best strategy that can be used to disseminate information related to HIV/AIDS during project implementation. Results from the survey indicate that radio (24.9%) and health facilities (21.5%) are the most common sources of HIV/AIDS information.

Table 7-71: Sources of HIV/AIDS information

Source of Information	Frequency	Percentage
Television	35	1.2
Radio	701	24.9
Newspapers	170	6.0
Billboards	26	0.9
Posters/brochures	17	0.6
Community outreaches	235	8.4
Drama performances	88	3.1
Health facilities	605	21.5
NGO/CBO/CSO	155	5.5
Religious leaders	230	8.2

Traditional leaders	71	2.5
Local leaders/Political leaders	290	10.3
Family members	103	3.7
Friends/peers	84	3.0
Total	2810	100

Source: Field data (2021) - *Multiple response question

7.6.32 Child Labour in Adjumani

Child labour refers to Children 5-11 years engaged in any economic activity; or children 12-13 years doing Child labour refers to Children 5-11 years engaged in any economic activity; or children 12-13 years doing work other than, light work “or do work beyond 14 hours a week”; or children 14-17 years involved in hazardous forms of labour or working for an equivalent of 43 hours in a week or beyond. “Children and youth remain a very vulnerable group in the heart of the development process evident from the levels of child Labour in the country now at 15% (Uganda Bureau of Statistics (UBOS), 2018). From consultations with the Adjumani district Community Services Department, it was revealed that many children have dropped out of school owing to the COVID-19 lockdown and closure of schools and majority are involved in commercial work and supply of labour. Relatedly, according to the Uganda National Household Survey (2016/17) by the Uganda Bureau of Statistics, over two million children are engaged in some form of child labour with 20.1% of children between 14-17 years in West Nile being engaged Children in hazardous work or working excessive hours

7.6.33 COVID 19-Status in Uganda and Adjumani District

The novel coronavirus (“COVID-19”) pandemic is unprecedented and its impact continues to threaten economies globally hence the need to capture the status of infections at national and district level. Currently Uganda has 145,963 confirmed cases of COVID-19, with 98,497 recoveries and 3,306 deaths⁴⁰. Specifically, for Adjumani district, 1021 cases were reported and these included 156 refugees, 860 nationals and 5 foreigners⁴¹. From these cases, 19 deaths were recorded, 4 of them from the refugee settlements, 14 from the host community and 1 employee from Plan International one of the implementing partners. Being a project that will involve movement of workers and interaction with community members, the project will have to take extra caution while recruiting and also institute robust mitigation measures to curb the spread of the virus within the community and the work force during implementation.

⁴⁰ <https://www.health.go.ug/covid/-accessed -04/01/22>

⁴¹ District Council Surveillance Report, 2021

7.7 Cultural Heritage and Archaeological Resources

During fieldwork in the project area i.e., from the water intake location at Arra West village on the bank of R. Nile River, then along transmission route following the road up to the WTP, MBR and 3 ESR sites of Ciforo, Pakele and Dzaipi. There were no physical cultural resources discovered in the project area. However, the only 2 graves in Rassia West Village, Pachara Subcounty will be impacted on by the distribution line. A RAP for the PCRs has been done and valued. NWSC will also facilitate the land owner PAP Ref A030 – Anyama Patrick – with grave relocation allowance. No graves were encountered at the preferred or proposed intake site.

Nevertheless, the activities of the Adjumani WSS have the potential to trigger OP 4.11 PCRs. Therefore, the project shall need to make effort to have all chance finds protected and conserved in case they are discovered along the project implementation phase and treated in line with the requirements of OP 4.11. This shall be in consultation with the local leaders. A Chance Findings Procedure (CFP) has been developed to guide the contractor onsite on how to handle the PCRs in case of any discovery (Annex 5).

8 PUBLIC CONSULTATIONS AND DISCLOSURE

8.1 Introduction

Open and transparent engagement with project stakeholders at the beginning of project planning and throughout the project Lifecycle can improve the environmental and social sustainability of projects, and enhance project acceptance. Additionally, early and meaningful engagement with stakeholders provides them with opportunities to express their views on the project risks, impacts, and mitigation measures which make a significant contribution to successful project design and implementation (World Bank, OPs).

Public participation is a means to involve those who are affected by the decision in the decision-making process. It promotes sustainable decisions by providing participants with the information they need to be involved in a meaningful way and it communicates to participants how their input affects the decision. This forms an integral and compulsory part of the Environmental and Social Impact Assessment (ESIA) process as stipulated in the National Environment Act No 5 of 2019 and World Bank Safeguards Policy (OP 4.01 Environmental Assessment. Therefore, the interaction with the communities should be meaningful, adequate, timely and proportionate to ensure significant contribution to successful project design and implementation.

Specifically, on this project, stakeholder engagement entailed an interactive process where input of key stakeholders such as project affected communities, district technical officials, political leaders, government regulatory institutions, other interested parties and key-implementing partners was sought and incorporated in the planning process as early as possible. Information disclosed included details of the purpose, nature, location, duration, the project benefits and adverse impacts, as well as the proposed enhancement and mitigation measures.

The stakeholder engagement mechanisms employed during this study included information sharing meetings with the stakeholders, focus group discussions and key informant interviews. The information was disclosed in the local language of Madi and in a manner that is accessible and culturally appropriate. Therefore, this chapter describes the public information and consultation process that was implemented by the consultant as part of the ESIA.

8.2 Environmental, Social, Health and Safety

8.2.1 Objectives of Consultation and Disclosure

The objectives of consultations during the ESIA study were to ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format, to raise awareness, obtain baseline information, and to provide project-affected parties with accessible and inclusive means to raise issues and grievances and allow them the opportunity to raise concerns and express their views on the proposed project. This aided improving decision-making by tapping on local knowledge and information through the involvement of individuals, groups and organizations with a stake in the proposed transmission lines project.

Consultation targeted relevant stakeholders, communities, government ministries, surrounding business/commercial entities and aimed at:

- Generate a good understanding of the project.
- Understand people and expectations about the project (from construction through to water and sewer lines use).
- Understand and characterize potential environmental, socio-economic risks/impacts of the project.
- Developing effective mitigation measures and management plans.
- Enhance local benefits from the Adjumani water project.
- Enable affected communities to provide views hence participating in or refining project design, where applicable.

8.2.2 Stakeholder Identification

Stakeholders are individuals and organizations potentially affected by the project (directly or indirectly), or who have an interest in or influence on the project and its impacts, either positive or negative. In order to develop an effective consultation programme, it was necessary to determine exactly who the stakeholders were, basing on the definition above. A list of stakeholders that were consulted during the ESIA process is given in Table 8-1 below

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Table 8-1: Stakeholders engaged during consultations

No	Stakeholder (Institution/ Communities/Government Officials)	Date	Reason for engagement	Approach
1.	National Water and Sewerage Cooperation (NWSC)	29 th November 2021	Being the client and bears project conception knowledge. On grounds that they are the project implementing agency, bear project conception knowledge and have to establish mechanisms for compliance to ESHS requirements.	Formal meeting
2.	Adjumani District Local Government (CAO, Senior CDO, Environmental Officer)	30 th November 2021	Mandated agency to oversee all activities of Lower Local Government including water and sanitation pipe Works, Environment, Social, Health and Safety in the District.	Formal meeting
3.	Sub-County officials (Paraca, Ciforo, Dzaipi, Pakele Town Council, Adjumani Town Council)	30 th November to 9 th December 2021	Ensure that social risks and impacts that may arise are mitigated.	Formal meeting
4.	OPM (Adjumani)	30 th November 2021	There are different categories refugees from different countries and settled in different camps. The information about plans the government has for these refugees and how Adjumani WSSP suites such government plans	Formal meeting
5.	NGOS (Lutheran World Federation, Medical Teams International,	30 th November to 1 st December 2021	There are several relief agencies in the project area that support refugee activities. These NGOs will be useful in creating linkages between communities and project management to ensure social cohesion.	Formal meeting

6.	Community members (Parara, Dzaipi, Ciforo, Pakele and Adjumani Town Councils, and settlement camps)	1 st December to 9 th December 2021	Being direct beneficiaries and project affected persons, these provide ownership of the project, share views and concerns that may come as a result of the project, report safeguard issues, provide information for grievances management	One on one meetings, telephone,
7.	Ministry of Gender Labour and Social Development, MoGLSD (DOSH)	17 th May 2022	Environmental social safeguard issues and on how social, safety and health risks can be managed, during the design, planning up to implementation stages of the project	Formal meeting
8.	Ministry of Water and Environment, MWE (DWRM)	8 th June 2022	Issues related to water quality, monitoring ground and surface water resources and water pollution control. Also, on transboundary issues, water abstraction permits; river dredging permits, waste (effluent) disposal and discharge permits.	Formal meeting
9.	Uganda National Roads Authority (UNRA)	25 th March 2022	Compatibility of the Adjumani WSSP with the UNRA master plan for Adjumani	Formal meeting
10.	OPM (Kampala)	25 th March 2022	There are different categories refugees from different countries and settled in different camps. The information about plans the government has for these refugees and how Adjumani WSSP suits such government plans	Formal meeting

8.2.3 Stakeholder Processes

A summary of the key findings from the consultation process right from the inception to the detailed ESIA phase are presented in below and photo documentations of meetings.

8.2.3.1 Key Issues and concerns from District Local Governments and Subcounties

Early, informed, and prior consultation meetings were carried out first with district technical and political teams together with respective subcounty officials and these were conducted in November and December 2021. These meetings were held at respective district local government chambers where the consultant gave an overview of the project, explained the ESIA process together with likely potential and negative risks/impacts. An interactive discussion was held; participants shared experiences of similar projects, provided their views, fears, expectations regarding the Adjumani WSSP and thereafter responses by the contractor and consultant shared. Key concerns, expectations and opportunities expressed at Adjumani District Local Government level during consultations (Figure 8-1) and are summarized in Table 8-2 below.



Meeting with Labour Officer and CDO on 30th November 2021



Meeting with DCAO, Adjumani district on 30th November 2021



Meeting with Deputy Mayor LC3 on 3rd December 2021



Meeting with Subcounty and Parish officials on 30th November 2021



Meeting with RDC of Adjumani on 6th December 2021



Meeting with District Water Engineer on 8th December 2021



Meeting with DEO and DE on 26th November 2021



Meeting with Parish Chiefs and LC1 of Mukolo on 10th December

Figure 8-1: Key stakeholder engagements at the District Local Governments and Subcounty levels

Table 8-2: Views from Local Government stakeholders

SN	Institution	Name and contact	Views	Responses
1	The D/CAO, Adjumani District 30 th November 2021	Edema Richard D.CAO-0782315200	Welcomed the project noting the prevailing water supply and sewerage management challenges in Adjumani District.	Noted.
			The consultant should also meet with the Sub- County and all technical personnel officials	The consultant is aware and plans to consult these officials.
			There is need to consult and engage the political leaders by the project proponent to ensure that there is stakeholder buy in by the community leaders	Stakeholder consultation is a continuous process that will be carried out throughout the project period. Both political and technical team will be engaged.
			Residents of Adjumani town generally live in overcrowded conditions and are more vulnerable to water borne diseases such as cholera, and other diarrhoeal diseases. The months of November to March have very serious dry spells and therefore water become extremely scarce.	
			The increasing population of refugees in Adjumani refugee settlements is greatly threatening resources including demand for water.	Similar infrastructure is going to be extended to the refugee settlement areas like Borali, Pagirinya, Olua and Nyamwanzi and reduce on the competition for water resources.
			Majority of population in the district rely on boreholes and a few springs.	Noted

			River Nile which is less than 12km has been untapped. This can be an opportunity for the district and communities have access to clean water.	Noted
			There is a concern that the project may lead to destruction of the ecosystem. For example, cutting of trees.	
			Ensure that the local communities are employed.	
			The project should also ensure that there is good practice of guarding against Sexual exploitation and assault. Put in place plans to safeguard workers and communities against sexual exploitation and abuse.	A Code of Conduct for workers will be used to mitigate sexual exploitation and Assault.
			The project should look at enforcing standard Operating procedures in light of the Covid-19 pandemic. Ensure that a COVID-19 management Plan is developed, and all SOPs are observed.	The project will ensure that all SOPs are followed as stipulated under MoH and WHO.
			Ensure that the project has an HIV/AIDs management plan and policies in place to inform sensitization of communities.	The stakeholder engagement will focus on consultations and sensitization about risks and impacts and possible mitigation. These will include diseases such as HIV/AIDs, COVID19 among others. Various management plan such as HIV/AIDS management plan will be developed to inform the management of such risks.
			Need to carry out meaningful consultations with the affected communities.	In order for the project to be successful, there will be continuous stakeholder engagements with both the district and local communities. Engagements

				will be transparent and carried out early and in languages that are understood by the stakeholders.
			Ensure that grievances are well managed. The district has already been in grievance management on similar projects and these have help manage project related issues. Therefore, this should be enforced on the project.	<p>A grievance mechanism for both the community and workers will be established on this project.</p> <p>The grievance mechanism is expected to address concerns promptly and effectively, in a transparent manner that is culturally appropriate and readily accessible to all project-affected parties, at no cost and without retribution.</p>
2	District Engineer (DE), Adjumani District 9th December 2021	AFAYO NICK-0787340844	The district welcomes the project and glad that the consultant under NWSC is following the right procedure of consultations and disclosure to the district political and technical teams	Noted
			Consultation should be done with UNRA to know more about the upcoming projects (Laropi bridge) and what are the provisions in the already ongoing projects e.g. the Atiak – Adjumani – Laropi Road since you are going to use their road reserves	The Consultant together with the Client have already sent a letter to UNRA requesting for a meeting.
			NWSC should put in place the Source Protection Plan (SPP) for the Intake in Arra West	The source protection plan is outside the scope of this study but usually the client engages a separate consultant to do the SPP.
			As NWSC intends to implement the FSTP, are there any plans to put in place the sewerage system (lines) in the Adjumani Town Council since it is developing very fast?	Currently, NWSC has no plans to implement a sewerage line the town council but recommendation has been taken
			On behalf of the District Technical Team, the after the final design, NWSC should organize to present the project to the both the district technical and political	NWSC emphasizes to present the final design to the District Council in case the studies are complete

			<p>teams through a workshop since it very key and influential.</p> <p>This will help the district technical team to align the project to their physical plan to avoid overlapping projects</p>	
			NWSC should plan for stakeholder meetings during the implementation stage	NWSC together with Contractor of the project will make sure that stakeholder meetings are done including the district leadership for the success of the project
			People of Adjumani listen very well to their political leaders (LCs), therefore, endeavor to consult their leaders for the purposes of project success.	Consultations with most of the LCs have been done and the process is still ongoing (Annex 1)
3	District Water Officer (DWO), Adjumani District 9th December 2021	IZAKARE K. RICHARD-0772584363	You are welcome to Adjumani and as a Water Office, this is an opportunity to the district.	Noted
			Although the project is good for the district and its people, you need to put more effort to convince people to accept the project since it includes land take	The consultant has engaged the district team, local leaders and communities in the process. Also, the RAP team is on ground to hand issues of PAPs and condensation on this very project
			There is a need for for better stakeholder engagement since very many people in Obo including political leaders were complaining of why the intake site was changed but as technocrats at the district we explained to them the reasons for the change of site since the design team had already engaged the district team.	

			<p>There is an existing motorized system in Nyumanzi, why is NWSC adding them more yet other areas have none?</p> <p>Always move with political leaders for quick success of this project, otherwise, it may be rejected by the communities</p> <p>Be open, straight and clear to the local communities about this project so that we don't get a white elephant project in Adjumani though water is scares.</p> <p>During implementation, the NWSC/Contractor should concerns of raised and incorporate in project design e.g incase excavators are used to dig trenches, where possible local people should be given a chance to do backfilling so that they get jobs</p> <p>Water should be taken back to where it is abstracted for the local communities to gain e.g. at the ferry crossing in Laropi and Arra. NWSC should not put tanks in Miaciku, and the distribution is only for Nyamnzi Refugee camp.</p>	
4	Adjumani Town Mayor, Town Clerk Council, Physical Planner	Mangapi Lawerance- 0774362990 Vuconi Francis Didi- 0772016224	<p>What are the tank locations?</p> <p>Why is that the FSTP is going to be located in Ciforo yet the Town Council already has available land of about 3 acres? The team requested design team to relocated the facility site to the town council</p>	<p>Tanks will be located at different locations where the main tank will be in Ajumani TC and three smaller tanks in Ciforo, Pakele and Dzaipi to distribute water to the respective areas</p> <p>The ESIA, Client and Design team will go onsite and assess the situation of the proposed land in the town council to make a conclusion</p>

	8th December 2021	Sadik Shaban-0772343964	There will be land issues and a natural bad perception of local people about the FSTP	When the assessment of the available land is done, then the RAP team will cover the land issues of the site chosen and continuous awareness done about the FSTP
			There is inadequate supply of water in the town. Therefore, the coming of Adjumani water Supply system will help improve the problem.	NWSC recognises that and it is reason why the Adjumani WSSS is going to be implemented
			Contractors should consider hiring the locals in the community for jobs on this project	The project team considers the locals as priority for employment at all levels. All potential employees shall be required to produce recommendation letters from the LC chairpersons.
			All Project teams should not use children as a source of labour during the project	The project does not condone child labour
			There is need to sensitize the community on the compensation process	Note and this will be done by the RAP team. All PAPs will be sensitized
			There is concern about inappropriate sexual behaviour common with contractor's labour.	The contractor will have a code of conduct that will signed by every employee to curb fraternization and sexual misconduct on the project and its associated facilities.
			The design team should continue working together with the Town Council team mainly the Physical Planner to ensure the compatibility of the project	The project considers continuous engagements with the technical team a way to go.
5	The District Community Development	Mawaddri Ramadhan-	a. The prevalence rate for child labour is high. There are so many children working for money; for example, at quarry and mining sites.	This is noted. Community engagements are part of the process where women are included and engaged.

Officer, Labour Officer 30/11/22	DCDO- 0772841354 Olema Swaib- 0774421836	b. Children on the streets selling food stuff on behalf of the families.	
		c. Adjumani has registered a high number of child marriage and teenage pregnancies. i.e. about 800 cases.	
		d. During implementation, the project should continuously engage and actively involve the district in monitoring of social safeguards	The district will be involved in monitoring of social safeguards issues through its various officers such as the DCDO, CDOs of the relevant sub counties, environment officers, labour officers and probation officers to ensure that safeguards standards are upheld during the project life cycle. Therefore, the project will undertake training of implementing partners
		e. Ensure that all workers are provided with proper PPE.	These recommendations have been included in the EIA report as mitigation measures
		f. Need to work as a team to Sensitize communities likely to benefit and to be affected. This should be done before project implementation.	Community engagement will be carried out. Note that since the exercise has carried out during the Covid-19 pandemic, limited community gatherings will be made. However, the consultant intends to engage the local leaders as well have one on one engagements with community members. Further engagements will be made before and during project implementation.
		g. Issues of alcohol intake should be controlled by the contractors' workers. Therefore, codes of conduct should be issued to workers	

			h. Ensure that employment opportunities are considered for local people especially the youth.	Local people will have priority for employment at all levels. All potential employees shall be required to produce recommendation letters from the LC chairpersons.
			i. Men should be involved since these also usually blame the women for taking longer hours when going to fetch water for home use	Noted.
			j. Before the contractors starts work, they should ensure that the workers employed are provided with contracts and that they should sign code of conduct in order to document all workers	
			k. There is need to protect children given that there are many children in the area who are potential sources of child labour.	NWSC will not employ children below 18 years old as it is stipulated in the Employment Act by taking further precautions eg asking for the LC1 Letter to verify age and residence of workers
			l. There is need for gender sensitization of the community and workers on the project because similar projects showed that there were many cases of Gender Based Violence reported. There is fear GBV issues may increase when such a project is implemented.	<p>The proposed project will be implemented while following the SGBV framework that was developed by the Ministry of Gender, Labor and Social Development (MGLSD) as well as UNRA's Environment and Social Management System and relevant World Bank Policies.</p> <p>Project workers including the foreign workers will be sensitized and educated on the laws against defilement and other sexual offences; their gender rights and responsibilities, including signing up to a Code of Conduct.</p>

				Display on signs within the project area and making it clear that the work site is a violence free zone and Violence Against Women and Girls (VAWG) will not be tolerated.
			m. The project should have a grievance redress system and ensure that the district team is involved when establishing the committees at committee level. For example, the Labour and Community Development Officers should be part of the committee.	
			n. HIV/AIDs awareness should be mitigated by awareness, screening among others.	
			o. Vendors would be encouraged to become scheme or kiosk operators; vendors would be encouraged to tender for public water points a livelihood restoration initiative following stakeholder consultations.	Noted
6	OPM Settlement Commandant, Adjumani 30/11/22	Andeoye Robert 0772366170	a. There are 19 sub settlements in the district. b. The settlements have people of different culture and origin. c. There is no tribal conflict since the refugees are sensitized right from the onset they camp.	Noted.
			d. There are different project partners the main one supporting them is Luther World Federation (LFW).	

		e. Majority of the settlements have boreholes but these have been upgraded to motorised water system.	
		f. In Boroli Settlement, there is a big challenge of scarcity of water. Therefore, the water project will help mitigate the problem.	
		g. The settlements have WSCs that help with maintenance.	
		h.	
		i. Where water pipes traverse settlements, the teams will not have any issues of compensation. NWSC should only work with the settlement commandants to ensure work goes on smoothly.	Noted
		j. Only if crops of individual are affected, the project will ensure that compensation is made.	
		k. Engagement with the leaders in each settlement to talk to the community members.	There will be sensitization meetings carried out with affected communities. The contractor will have a sociologist as part of the team who will regularly meet communities.
		l. Ensure that camp commandants are involved to support the team in case of any challenges.	
		m. Most construction works for water supply often lead to cutting of access roads for pipe network and most often are left poorly reinstated or not at all. Thus, the project implementers, supervisors	Project proponent will work to ensure that the contractor reinstates all infrastructure and this will be inserted in the contract.

			and the future contractor should avoid such cases and always adequately reinstate the cut areas.	
			n. There is need to protect children given that there are many children in the area who are potential sources of child labour.	NWSC will not employ children below 18 years old as it is stipulated in the Employment Act.
			o. Ensure that children below 18 years are not employed.	
			p. Sensitize the employees on the dangers of HIV/AIDS given that majority of them will have disposable income.	Recommendation will be given for NWSC to have a nominated HIV/AIDS organization that shall conduct workplace HIV/AIDS awareness, and control programs for the contractor's workers and communities.
			q. There is already existing Refugee welfare councils at each settlement which is composed of 11 members which also acts like the local council. Therefore, the project should consider continuing with the existing structure.	
			r. In case of any issues within the camps, the project teams should work hand in hand with field camp commandants.	
7	Pachara, Dzaipi, Pakele Sub-County officials	Contacts attached attendance sheet in	s. There is need for sensitization of the communities and workers on the project minimize cases of Gender Based Violence reported. There is fear GBV issues may increase when such a project is implemented.	The proposed project will be implemented while following the SGBV framework that was developed by the Ministry of Gender, Labour and Social Development (MGLSD). Project workers will be sensitized and educated on the laws against defilement and other sexual

				<p>offences; their gender rights and responsibilities, including signing up to a Code of Conduct.</p> <p>Display on signs within the project area and making it clear that the work site is a violence free zone and Violence Against Women and Girls (VAWG) will not be tolerated.</p>
			t. Provide unskilled labour for the locals from Adjumani and specifically to members from local communities.	Noted. Priority will be given to the locals from Adjumani district.
			u. Grievance committees should be established to resolve issues related to the project such as SGBV, pregnancies, welfare issues among others.	GBV referral pathways will be included in GRM structures Recommendations will be given to employ women on the project.
			v. There is need to provide jobs to the local youth within the project area given the high unemployment rate.	Local people will have priority for employment at all levels. All potential employees shall be required to produce recommendation letters from the LC chairpersons.
			w. Sensitize the employees on the dangers of HIV/AIDS given that majority of them will have disposable income.	Recommendation will be given for NWSC to have a nominated HIV/AIDS organization that shall conduct workplace HIV/AIDS awareness, and control programs for the contractor's workers and communities.
			x. Child labour should be prohibited at the site during construction of the water pipes.	All employees will be required to provide their National IDs to avoid employing underage children.
			y. Employment opportunities should be Gender inclusive.	Emphasis will be made to ensure that 30% of workforce is female.

			z. The contractor should provide proper written contracts to the employees.	In line with Employment Act of 2006, the contractor will be required to prove contract to all employees clearly spelling out terms of services and attendant remuneration.
			aa. The water project might potentially trigger GBV in the community owing to cases of infidelity with migrant workers.	Mitigation measures such as continuous sensitization and engagement of communities will be put in place to minimize the risk of GBV on the project.
			bb. In case the project affects people's land, will it be compensated?	Yes and a RAP is going to be done. The affected people will be compensated
			cc. Will communities' benefit from the water? Communities are worried that the transmission lines may only traverse their land and not benefit.	After the project construction, distribution lines will be brought back to the communities to enable them access water from NWSC.
8	Yihwa Parish	Contacts attached attendance sheet	a. Why has the location of intake changed from Nyeu to Arra west?	The survey was done and found that in Nyeu, the part of the river that was chosen can dry up any time water in the river reduces
			b. In case one has land within the Row and is going to be affected by the water pipes, will they be compensated?	Yes, valuation and surveying will be done.
			c. If water is installed into institutions like schools and churches, will the payment rate be similar to that of individual users?	NWSC offers a range of tariffs for both domestic and commercial establishments. In case of institutions the commercial rates apply which are affordable and offer the best customer experience.
			d. There was a concern of contractors under paying the workers that they will employ.	The project will ensure that the Employer issues work contracts to every employee/worker with

			e. Casual workers on the project should not serve for a period exceeding 4 months without a contract of service. Most contractors avoid giving their staff contracts.	written particulars to act as evidence of their employment terms. Recommendations will be given to ensure that before a worker is employed, a contract is signed and a copy shared with the employee.
			f. Need to control the movement of workers, to and from the site to mitigate the spread of Covid-19.	A site specific Covid-19 management plan will be drafted to inform the movement of workers on and off site.
9	Adjumani Town Council	Vice LC III Chairperson, Health Inspector, Ass. Water Engineer	a. There is inadequate supply of water in the town. Therefore, the coming of Adjumani water Supply system will help improve the problem.	Noted
			b. Contractors should consider hiring the locals in the community for jobs on this project	The project team considers the locals as priority for employment at all levels. All potential employees shall be required to produce recommendation letters from the LC chairpersons.
			c. All Project teams should not use children as a source of labour during the project	The project does not condone child labour
			d. There is need to sensitize the community on the compensation process	Note and this will be done by the RAP team. All PAPs will be sensitized
			e. There is concern about inappropriate sexual behaviour common with contractor's labour.	The contractor will have a code of conduct that will be signed by every employee to curb fraternization and sexual misconduct on the project and its associated facilities.
10	Resident District Commissioner	Mugweri Moses Deputy	f. The RDC office needs to be involved in security related matters.	The project will continuously engage the relevant security offices to ensure that project minimizes the risk of crime.

	RDC-079663428	g. There is need for continuous flow of water once the project is implemented in the district.	Noted.
		h. Ensure that those whose property will be affected as a result of the project be fully and timely compensated.	Fair and adequate compensation will be given to all affected PAPs in line with national laws and international best practices.
		i. Employment opportunities should be given to the local community especially the unskilled labor.	The project team considers the locals as priority for employment at all levels. All potential employees shall be required to produce recommendation letters from the LC chairpersons.
		j. The project will need to work with local leaders for purposes of monitoring and sensitizing the communities	The valuation teams will move together with local leaders to identify the rightful owners of properties that will be affected.

8.2.3.2 Key Issues and concerns from Ministries, Departments and Authorities

During the consultation meetings (Figure 8-2), key concerns, expectations and opportunities expressed at Ministries, Departments and Authorities are summarized in Table 8-3 below.



Consultative meeting with DWRM Officials at MWE Head Offices on 08th June 2022



Consultative meeting with MoGLSD Officials on 17th May 2022



Consultative meeting with UNRA Officials at UNRA Offices - Nakawa on 25th March 2022

Figure 8-2: Key stakeholder engagements at the Ministries, Departments and Authorities

Table 8-3: Views from Ministries, Departments and Authorities

SN	Institution	Name and contact	Views	Responses
1	Ministry of Gender, Labour and Social Development	Sentongo Ambrose- Principal Safety Inspector ambrose.ssentongo@gmail.com Francis Gimiro Odong- Principal Safety Inspector fgodong@yahoo.com	Ensure that architectural/site layout plans for piped water system and all that is entailed therein are submitted and approved from relevant authorities such as Adjumani Council and construction unit at MGLSD	Noted
			Geotechnical survey/ study reports on bearing ratio to hold the pipes should be submitted	Noted
			Consent forms from local leaders and other concerned authorities on land ownership should be availed to address the issues of land ownership.	Noted
			The developer should register with the OHS Department, Ministry of Gender, Labour and Social Development.	The Developer will be advised to register with the Ministry of Gender and also have the Plans approved
			Child labour should be prohibited at the site during construction and operation of the port.	All employees will be required to provide their National Identifications to avoid employing underage children.
			Employment opportunities should be gender inclusive.	Emphasis will be made to ensure that 30% of workforce is female.

SN	Institution	Name and contact	Views	Responses
			Labour Administration requires fair conditions and Compensation (e.g. for occupational accidents, occupational diseases, unfair termination) at the workplace.	Recommendation will be given for the developer to follow the national laws such as employment Act 2006, OSH Act 2006, Workers Compensation Act 2000, and NSSF Act Cap 222. Labour Officers from respective districts will be engaged during project implementation to sensitize workers/employees and employers on their rights and responsibilities before the commencement of the programme / project.
			The developer should prepare an Emergency Preparedness Plan for the site.	The Contractor will prepare an Emergency Preparedness Plan before commencement of works.
			Measurements of air quality and noise should be done periodically to safeguard employees and neighbouring communities from negative impacts of air pollution.	The consultant has carried out air and noise measurements and recommendations will be given to ensure that the contractor periodically carries out measurements.
			The contractor should construct sanitation facilities to cater for labour force to be employed different from	Noted

SN	Institution	Name and contact	Views	Responses
			public toilets planned for the communities.	
			Provide firm working platforms and safety belts for employees working at heights. Provide Personal Protective Equipment (PPE) to all employees	These recommendations have been included in the EIA report as mitigation measures
			Need to carry out meaningful consultations with the affected communities.	A Community or Stakeholder Engagement Plan (SEP) will be developed for this project to guide on all public and institutional engagements in line with National Policies, guidelines and international Best Practices to guide the subsequent consultations with specific interest groups such as youth, elders, women. The SEP detailing how communities and other stakeholders will be consulted and engaged during planning, design, implementation and monitoring of programmes/projects.
			The ESIA should be in line with various national policies and guidelines in relation to children, women, people with disability, women and workers.	The project will follow the National laws and guidelines as well as follow international guidelines.

SN	Institution	Name and contact	Views	Responses
			Ensure that the project has an HIV/AIDs management plan and policies in place to inform sensitization of communities.	Relatedly, the stakeholder engagement will also focus on consultations and sensitization about risks and impacts and possible mitigation. These will include diseases such as HIV/AIDs, COVID19 among others. Various management plan such as HIV/AIDS will be developed to inform the management of such risks.
2	Uganda National Roads authority (UNRA)	Eng Kenneth Muniina- Hydrology- 750 124 024, Kenneth.Muniina@unra.go.ug Patrick Muleme- Head Design) Patrick.Muleme@unra.go.ug	The design team should provide definite crossing points especially at town junctions called service ducts	Noted Recommendations shall be made to ensure that before any works commence, NWSC team engages with UNRA team
			There is lack of consultations with UNRA as decisions are made to cross roads without notification and inputs to UNRA	
			There is no interface from NWSC to update UNRA on their master plan for water networks or other specific requirements for decisions to be made collectively	
			There is extortion of money from UNRA due to co-existence of right of way as UNRA is required to pay money for relocation. There should be agreements	

SN	Institution	Name and contact	Views	Responses
			<p>of funds required to better implementation of projects</p> <p>If there is need to be in UNRA's right of way, considerations should be established for issues to be discussed before implementation as described in UNRA's new regulations</p> <p>In case there is need of implementing water works with crossing points on UNRA proposed road constructions, consultations should be made so as to harmonise works and prevent cutting of pipes during the initial road works.</p> <p>The design team should submit their typical road crossings and typical valves so as they can be synchronised with UNRA's class of concrete and also to know the size of ducts required especially in big towns.</p> <p>Liaise with UNRA to know future road constructions especially bridges / right of way are not in close proximity with water abstraction points so as not to</p>	

SN	Institution	Name and contact	Views	Responses
			contaminate the quality of water sources	
			Swamp crossings of hankers should not block the incoming flow on roads to avoid flooding of debris and water.	
3	Ministry of Water and Environment – DWRM and DEA	International Transboundary Water Affairs Water Quality Management Wetlands Management Water Quality Management Water Resource Monitoring and Assessment	a. The technical team wanted more clarity on whether the abstraction points are inside the refugee settlement camps. This was attributed to concerns from the local communities as focus on service delivery is put on refugees leaving out the refugee hosting communities.	The intake for surface water and 2 groundwater sources will be in the refugee hosting community in Arra West, Ajugopi and Pagirinya whereas 1 ground water source located in Melijo will be in the camp
			b. As service delivery is focused on refugees, the meeting also informed that there is going to be continued friction or hostility on the refugees because the refugee hosting communities have been bypassed by the distribution mains. Therefore, the design team should consider incorporating the hosting communities in the water supply.	All ground water system are targeting refugee camps therefore, such conflicts will be minimal

SN	Institution	Name and contact	Views	Responses
			c. The meeting also informed that the component of sanitation facility coverage in the hosting communities is at 20%-30%, an implication on open defecation in the area. Therefore, more sanitary facilities should be considered.	Noted Recommendation will be forwarded to NWSC
			d. A question was raised on whether there are other downstream water users on R. Nile	Currently, there are no proposed abstractions downstream of the proposed intake before R. Nile exits Uganda - except Laropi Ferry crossing point 2.3km
			e. What could be the amount of water going to be abstracted from the Nile.	The proposed surface water abstraction is 12MLD (138 l/s) whereas for ground water systems, test pumping reports will be out immediately drilling is done.
			f. What are the possible solutions to flooding around the surface water abstraction sources at the Intake in Arra West?	A proposal to raise the intake and pumping station infrastructure by 2 – 4 m above the existing ground level has been proposed to NWSC. This also applies to the intake approach road
			g. Was the water source protection component considered under this project? If not NWSC should develop Water Source Protection Plans and ensure that they are implemented	The water source protection plan was not in the scope of this assignment; however, this has been noted and will be a recommendation to NWSC

SN	Institution	Name and contact	Views	Responses
			during the commencement period of the project such that the implementation activity takes place alongside the project so as everything is finalized at the same time and this will reduce on the man power required.	
			h. Ensure to develop sanitation/ solid waste management plans and clearly indicate the dumping so as to prevent pollution	This is noted. Additionally, the contractor will identify a licenced waste handler to take the waste to designated places for dumping
			i. The water resources assessment study should take into consideration of downstream or other adjacent water users to ensure that they would not be affected. Although water abstraction is expected to be minimal, a water resources assessment should be done indepedently.	A Hydrological Assessment was done in 2021 and report submitted to NWSC under the Feasibility Study

8.2.3.3 Key Issues and concerns from Communities in Adjumani District

Mobilization of the communities was done through the chairpersons of the respective villages. A total of 20 meetings were organized. A series of FGDs and KIIs were held with women, men, elderly, local leaders at selected villages where water and sanitation infrastructure will be implemented. Approximately 657 community members were consulted and of these 240 of the participants who turned up were women and the rest were men and the youth. All the community meetings were conducted in the local languages of Madi. Communities visited and consulted are listed in Table 8-4 and the key concerns raised from all community consultations (Figure 8-4) are summarized in the matrix Table 8-4 below.

Table 8-4: Communities visited during the ESIA study

No.	Cells where transmission lines will traverse	Date	Time	Persons met
PACHARA SUB-COUNTY				
1	Alere	4 th November 2021	10:00am	LC I Chairman Community members
2	Omi	4 th November 2021	11:00am	LC I Chairman Community members
3	Jihwa	4 th November 2021	12:00pm	LC I Chairman Community members
4	Marindi	4 th November 2021	2:00pm	LC I Chairman Community members
ADROPI SUB-COUNTY				
6	Lajopi	5 th November 2021		LC I Chairman Community members
PAKELE SUB-COUNTY				
8	Perceci Ward (Manyala, Marinyo, Pocile villages)	2 nd December 2021	2:00pm	LC I Chairman Community members

9	Atabo Ward (Atabo central A, B, Atabo West, Yayikoto villages)	2 nd December 2021	10:00am	LC I Chairman Community members
10	Central Ward (Agalejo, Wanziriri, Keliukwesibonjo)	2 nd December 2021	2:00pm	LC I Chairman Community members
11	Nyivura Ward (Ojigo, Tiolio, Majiaderi villages)	2 nd December 2021	4:00pm	LC I Chairman Community members
DZAIFI SUB-COUNTY				
12	Marindi	4 th December 2021	10:00am	LC I Chairman Community members
13	Leya	4 th December 2021	12:00pm	LC I Chairman Community members
14	Dzaip Central	4 th December 2021	2:00pm	LC I Chairman Community members
15	Aboki			
ADJUMANI TOWN COUNCIL				
16	Koroko	5 th December 2021		LC I Chairman Community members
17	Abirichaku	5 th December 2021		LC I Chairman Community members
18	Lajope, Cesia, Lajope Ginnery, Adjumani TC	6 th December 2021		LC I Chairman Community members
	Biyaya	7 th December 2021		



community meeting at Abricaku cell, Adjumani TC



Community meeting at Lajope Ginery, Adjumani TC



Figure 8-3: Community consultations at respective cells where the proposed lines will traverse



FGD with fishermen at Arra West



FGD with women at Omi Parish



Figure 8-4: FGDs with community members and KIIs with local leaders

Table 8-5: Key issues from communities

SN	Institution	Views	Responses
Community members from respective Sub-counties/Town Councils/Divisions			
1	Pachara Sub- County in villages of Alere Omi, Jihwa, Marindi, Arra West	<p>a. In case they affect someone property, will they be compensated</p> <p>b. What happens to people's developments such as pavers that may be destroyed during digging to install the pipelines?</p> <p>c. What plans does NWSC have for fishing community at Arra.</p> <p>d. As a way of resolving labour influx related risks such as SGBV, early pregnancies etc., the project should have a grievance redress mechanism.</p> <p>e. In case one is interested to connect water up to their household, who will be responsible? Is it an individual or NWSC?</p> <p>f. What if the water supply service is not affordable by some communities?</p>	<p>Yes, a RAP survey will be carried out to identify affected persons who will be compensated.</p> <p>People's developments will be reinstated by the contractor.</p> <p>The fishermen will be relocated to a different site and their details will be covered in the RAP study and also associated Livelihood restoration strategy /Plan will be prepared to inform the processes thereafter.</p> <p>The project will have a GRM at community and contractor level with clear referral pathways and attendant community liaison persons who will be in charge of recording and escalating the grievances through the various redress structures.</p> <p>NWSC is going to be responsible for installation of water services at individual households, institutions, markets and any other place that will require to have a reliable water supply. And as such, the modalities of applying for the service will be communicated once the system is operational.</p> <p>NWSC conducted a feasibility study to inform the rates that will be levied from the communities. Therefore, charges will</p>

SN	Institution	Views	Responses
			be based on NWSC tariff guide which is arrived at after wide consultation and due consideration to the income levels of the communities were its extending the water supply service.
		g. What source of energy will be used to pump the water? Is it environmentally friendly?	Grid electricity will be used.
		h. Will affected trees be compensated for?	Yes. These will be valued and approvals made by the CGV.
		i. Most of the land owners are not around, how will they be informed.	This is noted, contacts of all affected persons will be collected and further contracted.
		j. When will construction commences?	Construction will start as soon as the project is approved by all key stakeholders including the funder (WB), NEMA as well as affected communities.
		k. How wide and deep are the pipes to be installed?	The pipes are 300mm wide and 1.5 meters deep
		l. What happens when someone's structure is affected?	Will be compensated for improvements but not for the land
		m. In case pavers are affected, what plans does NWSC have for such people.	These will be reinstated.
		n. There was inquiry on how crops will be valued and later compensated.	In case they are affected, these will be valued and compensated.
		o. What procedure will be followed when looking for labour?	Recommendations will be given for the contractor to work hand in hand with local leaders when employing local labour

SN	Institution	Views	Responses
2	Pakele Sub- County Perceci Ward (Manyala, Marinyo, Pocile villages)	a. There is inadequate water supply in Pakele. Communities use boreholes which are far away from their homes.	The Adjumani Water project will help improve on the issue.
		b. Will water be free of charge or their will be some charges incurred?	Water will be post-paid where customers will be paying a nominal fee after receiving the bill from NWSC
	Atabo Ward (Atabo central A, B, Atabo West, Yayikoto villages)	c. There are water schemes by the Northern Umbrella although they are not enough.	Once the water supply system is constructed and commissioned, the service level and quality will be improved and as a result improve customer experience and satisfaction.
		d. There is a big challenge with Northern Umbrella when it comes water pipes breakage and maintenance.	The turnaround time for responding to complaints regarding water supply will be improved since NWSC will have a fully-fledged team to carry out repairs and maintenance of water supply infrastructure
	Central Ward (Agalejo, Wanziriri, Keliukwesibonjo) Nyivura Ward (Ojigo, Tiolio, Majiaderi villages)	e. Payment made to Northern umbrella to connect water is high.	
		f. The contractors should create good relationship with the communities through consultations prior to construction activities so that the communities have a role in the management of the lagoon activities	There will be adequate consultations with communities before and during project implementation
		g. Contractor should build a cardio relationship with security agencies.	Noted
		h. The community inquired whether there would be a distribution line that will be able to serve the community after the pipeline construction.	Yes, after the project construction, distribution lines will be brought back to the communities to enable them access water form NWSC

SN	Institution	Views	Responses
		i. Community members inquired whether they will be compensated for the affected land where pipelines are going to be installed.	Land to be secured for the water transmission area will be acquired by NWSC as an easement and there will be limited development on it after the line has been constructed. Construction of houses will be prohibited along the line and growing of big trees.
		j. What happens if my hedges need to be cut down because of laying pipelines?	These will be compensated,
		k. There was a concern on whether local communities will be involved and employed during construction of the proposed facilities. The contractor should consider employing the local people in the project affected areas and the procedure he will follow to engage them spelt out.	The locals should be given priority when the work starts.
		l. Loss of business during construction period.	This will be a short-term period and owners of businesses will be notified prior to works about the digging and laying activities. The contractor will be urged to provide access for those with business, and not to affect people's businesses.
		m. Most communities are faced with most pipes bursting.	These will be replaced.
		n. Will PAPs be able to use the land again after it is acquired by the project?	Yes, however

SN	Institution	Views	Responses
		o. In case people's walls are affected, will they be compensated	These will either be reinstated or compensated for.
		p. There was an inquiry from the community if a PAP would be compensated in case their crops and destroyed under routine repair.	Yes, the contractor will compensate for any damages made during civil works.
		q. The community inquired whether there would be a distribution line that will be able to serve the community after the project construction.	Yes, after the project construction, distribution lines will be brought back to the communities to enable them access water form NWSC.
		r. Members of the communities raised an issue of GBV which is was precipitated by the time women take when fetching water from the water source especially during dry season. Most husbands attribute the length of time taken to collect water to infidelity which in most cases creates tension and physical altercation at household level.	This is noted. If implemented on time, this water ss project will reduce the travel time to water sources since water sources will be in close proximity to households in the community.
3	Ciforo Subcounty	a. Request that contractor's team are continuously consulted on issues related to sexual exploitation and abuse and child abuse since there are many young girls and children that may be victims.	<p>Recommendations will be given to ensure that both the contractor are sensitized on SEA/harassment.</p> <p>The contractor shall have a Code of conduct that includes adherence to Child protection regulations and Zero tolerance sexual harassment.</p>

SN	Institution	Views	Responses
			The contractor should establish child protection within a code of conduct signed by all employees; that all staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour.
		b. The contractors of the proposed project should consider first the locals of Ciforo when constructing the lagoons so that the community people can get employment, especially the unemployed youths.	The project team considers the locals as priority for employment at all levels. All potential employees shall be required to produce recommendation letters from the LC chairpersons
		c. The communities were concerned whether all crops within the 8-meter corridor likely to be affected will be compensated?	All perennial crops that will be affected will be valued and will be due for compensation. For annual crops, PAPs will be given ample time to harvest their crops and therefore, will be require compensation.
		d. The communities inquired the fate of a PAP whose land is small in size and the remaining portion is not sufficient for any development.	The RAP study is going to be done and all PAPs will be identified and sensitized on the land acquisition process.
		e. There should be continuous and effective communication with stakeholders at all stages of the proposed development. For instance, affected persons should be provided with project timelines to enable them plan to vacate affected areas in adequate time.	Information about the project shall be availed to local people in native languages for effective disclosure, engagement and meaningful feedback.

8.2.3.4 Key Issues and concerns from NGOS



Consultation with Department of Refugees, Office of the Prime Minister (OPM) – Kampala on 22nd March 2022

Table 8-6: Key views from NGOs

SN	Subject	Name and contact	Views	Responses
1	Medical Teams International (MTI)		a. Construction of water supply system will lighten the burden of travelling long distances to collect water for women and young girl both in refugee settlements and host communities.	Noted. If well implemented, the water supply system will indeed alleviate this challenge. NWSC should also form WUCs in communities with equal gender representation to safeguard the water sources.
			b. Access to water is still a challenge especially during the dry periods. The proposed improvement of the water supply system will hopefully improve in the water quality, supply and greater customer experience.	Noted
			c. The distances to travel to collect water is far and this has in most cases lead to sexual exploitation and abuse especially for underaged girls.	Community sensitizations will be done. The contractor will have a code conduct, policy on sexual abuse and exploitation.
			d. High cases of SGBV and this has been attributed to Covid-19	
			e. There is a challenge of inadequate water supply especially during the dry season and this affects the health centres.	Construction of the new water supply system will help to mitigate these issues especially for health centres since water will be abstracted and

SN	Subject	Name and contact	Views	Responses
				supplied from a reliable water source which is R. Nile.
			f. There is also a challenge of flash floods which serve as breeding grounds for disease vectors such as mosquitos.	Noted.
			g. Improvement in water ss will also help to solve oral faecal diseases such as diarrhoea, typhoid by improving the hygiene within the communities. Acute watery diarrhoea is one of the diseases that affects the communities with a 2% prevalence rate. h. Similarly, the communities are also dogged by skin diseases, eye conditions and intestinal worms at a prevalence rate of 6%, 2% and 2% respectively.	Noted.
			i. The project will need to conduct community outreach activities to sensitize communities about HIV/AIDs, Covid-19.	The project will have management plans such as HIV/AIDs and Covid-19 management plans that will inform the strategy for sensitization and creating awareness within the communities about the risk of contracting those diseases.

SN	Subject	Name and contact	Views	Responses
			j. The contractor needs to continuous sensitize the communities on issues of sexual abuse and harassment.	The proposed project will be implemented while following the SGBV framework that was developed by the Ministry of Gender, Labour and Social Development (MGLSD) as well as relevant World Bank Policies. Project workers including the foreign workers will be sensitized and educated on the laws against defilement and other sexual offences; their gender rights and responsibilities,
			k. The project might bring about influx of migrant workers which will increase the risk of spread of HIV/AIDS and other STDs. l. The rate if at 2.9% at the district and at 0.8% at the refugee settlement camps. MTI provides preventive services such as distribution of condoms, have condom distribution points, carry out awareness to community members etc.	The project shall ensure that they conduct workplace HIV/AIDS awareness, and control programs for the contractor's workers.
2		BAFAKI CHARLES – Principal Settlement Officer (PSO)	Most of the refugee settlement camps in Adjumani District are on government-owned land with a few exceptions.	This is noted and the RAP team will put it into consideration

SN	Subject	Name and contact	Views	Responses
	Office of the Prime Minister (OPM)	0772361418	Therefore, any compensation activities may consider crops or structures encountered but not land.	
	Department of Refugees		There are no host communities found inside the designated refugee settlement.	Noted
			Refugees should be considered for employment as laborers on the project since they had the right to work in Uganda.	As the biggest pervcent of local labourers will come from the project area, refugees will also be considered accordingly
			Ensure that no child (refugee or from host community) is employed on the project. Structures should be put in place for safeguards implementation.	The law doesn't even allow employment of children under the Children Act, Cap 59
			Conflict for water scarcity in the area has mainly been recorded amongst refugees than against or within the host community. Therefore, the project should be mindful of this.	The consultant shall recommend the extension of water to more areas in the refugee camps

8.2.3.5 Key issues and concerns on OHS from Police and Health Centres

SN	Institution(s)	Stakeholder Consulted	Questions Asked	Response(s)
1	Uganda Police	Adjumani CPS	<ul style="list-style-type: none"> Do you do community policing? Do you have a fire station? Do you have enough staff? Do you have enough resources to provide security during project execution? 	<ul style="list-style-type: none"> ✓ Perform community policing to persuade community members not to purchase items stolen from contractor ✓ No fire station and depend on Gulu or Arua fire station, but the DPC confirmed that the fire equipment has been procured and are being shipped to Adjumani. ✓ Have only four patrol pick-ups ✓ Government gives fuel ✓ The police station also has four motorcycles
2		Adjumani General Hospital	<ul style="list-style-type: none"> Do you have an emergency unit? Do you have a functioning ambulance? Do you have functioning equipment? Hours of operation Theatre Common diseases 	<ul style="list-style-type: none"> ✓ Has an emergency unit with only two beds ✓ Have 3 ambulances of which one is in a bad condition ✓ Operates 24 hours a day ✓ Has a theatre ✓ The hospital has 180 competent staff ✓ This hospital serves more than 500,000 people ✓ Malaria and Dysentery are the common diseases registered in this hospital
3		Pakele Police outpost	<ul style="list-style-type: none"> Do you have enough staff? How do you respond to fire? 	<ul style="list-style-type: none"> ✓ The outpost has only 4 officers ✓ No firefighting facilities

			<ul style="list-style-type: none"> • Do you have enough resources? 	<ul style="list-style-type: none"> ✓ Not enough resources like patrol pick-up. ✓ They have only one old motorcycle.
4		Dzaipi Police Post	<ul style="list-style-type: none"> • Do you have enough staff? • How do you respond to fire? • Do you have enough resources? 	<ul style="list-style-type: none"> ✓ Has only five officers ✓ No means of transport ✓ No firefighting equipment
5		Arra Police Outpost	<ul style="list-style-type: none"> • Do you have enough staff? • How do you respond to fire? • Do you have enough resources? 	<ul style="list-style-type: none"> ✓ The outpost has a few staffs, and they didn't disclose the number ✓ No means of transport
6		Ciforo Health Centre III	<ul style="list-style-type: none"> • Services provided • Do you have a functioning ambulance? • Hours of operation • Theatre • Number of staff 	<ul style="list-style-type: none"> ✓ Antenatal, VCT, Laboratory tests, treatment of sicknesses like malaria, etc. ✓ The facility has only 9 staffs ✓ The facility has 30 beds ✓ The health facility has no ambulance, no emergency unit, and does not provide blood transfusion services Operates 24 hours a day ✓ No theatre
7	Health Centre	Pakele Health Centre III	<ul style="list-style-type: none"> • Services provided • Do you have a functioning ambulance? 	<ul style="list-style-type: none"> ✓ Antenatal, VCT, Laboratory tests, treatment of sicknesses like malaria, HIV, etc. ✓ Facility has 19 staff members

			<ul style="list-style-type: none"> • Hours of operation • Theatre • 8Number of staff 	<ul style="list-style-type: none"> ✓ Facility has 14 beds ✓ Facility has no emergency unit
8		Dzaipi Health Centre III	<ul style="list-style-type: none"> • Services provided • Do you have a functioning ambulance? • Hours of operation • Theatre • Number of staff 	<ul style="list-style-type: none"> ✓ Antenatal, VCT, Laboratory tests, treatment of sicknesses like malaria, HIV, etc. ✓ Facility has 12 competent staff ✓ No theatre ✓ No ambulance, but sometimes use for the refugee settlement ✓ Facility has no emergency unit
9		Pagirinya Health Centre III Ggolooba Elly eggolooba@medicalteams.org	<ul style="list-style-type: none"> • Services provided • Do you have a functioning ambulance? • Hours of operation • Theatre • Number of staff 	<ul style="list-style-type: none"> ✓ Antenatal, VCT, Laboratory tests, treatment of sicknesses like malaria, HIV, etc. ✓ Facility has 27 competent staff ✓ Facility has 40 beds ✓ No theatre ✓ Has one ambulance ✓ Facility has no emergency unit
10		Pachara Health Centre II	<ul style="list-style-type: none"> • Services provided • Do you have a functioning ambulance? • Hours of operation 	<ul style="list-style-type: none"> ✓ The facility gives first-aid services

			<ul style="list-style-type: none"> • Theatre • Number of staff 	
11		Arra Health Centre II	<ul style="list-style-type: none"> • Services provided • Do you have a functioning ambulance? • Hours of operation • Theatre • Number of staff 	<ul style="list-style-type: none"> ✓ The facility has 6 staff ✓ No ambulance ✓ No emergency unit ✓ The facility gives first-aid
12	District Local Government	District Engineer	<ul style="list-style-type: none"> • Water treatment chemicals • Quality of water treatment chemicals • Storage of water treatment chemicals 	<ul style="list-style-type: none"> ✓ Alum and Chlorine. ✓ Chemicals will be stored in separate chemical storage room ✓ Details regarding quality and MSDSs will be given after the design is completed

9 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

9.1 Introduction

Subsequent desk reviews, field site visits, stakeholder engagement views obtained and professional knowledge in similar projects, the potential significant environmental and social impacts of the proposed Adjumani Water Supply and Sanitation Project were identified and presented. The major infrastructural facilities to be setup comprise: Intake works; Water Treatment Plant (WTP) facility; Transmission and Distribution pipelines, Groundwater Boreholes, Elevated Storage Reservoirs (ESRs), power extension from the existing power grids to the intake/pumping station, WTP and boreholes (groundwater sources).

To endure the water supply in Adjumani, it is expected to draw water from the R. Nile (White Nile) near Laropi Ferry Crossing. It is currently planned to supply about 4 towns along the routes of transmission main, namely Adjumani TC, Pakele, Dzaipi and Ciforo and other several communities and refugee settlements in Adjumani district. Although water supply exists in most of these towns, the additional supply from NWSC will further boost the service level and reliable supply. This will translate in improvements in health, economic and social welfare of the community.

Nevertheless, in addition to the numerous possible beneficial impacts, adverse impacts may arise from these improvements hence, the prediction and analysis of possible positive and negative impacts was done. Therefore, this section provides an evaluation of the impacts (both positive and negative) and the corresponding mitigation of enhancement strategies identified at all phases of the project i.e., pre-construction, construction, operation and maintenance and decommissioning phases.

9.2 Positive Impacts

The development and operation of the proposed project will have substantial positive environmental and social impacts. The following are the positive impacts anticipated to arise from all phases of the project:

9.2.1 Pre-Construction Phase

9.2.1.1 Social Acceptability, Community Involvement and Ownership for the Project

The Adjumani community is welcoming and receptive, indicating favourable conditions of social acceptability. This is a good pre-construction impact as it will enable project success. During stakeholder consultations at all levels, it was revealed that communities and leaders are enthusiastically waiting for the water project as the project is inclined on improving livelihoods and local development. This favourable social acceptability has enabled successful completion of the pre-construction activities such as parts of the feasibility, draft engineering design, RAP and ESIA. It's anticipated that other additional pre-construction activities will be completed successful. These include: land acquisition, tendering, contractor's mobilizations for construction equipment and materials, site clearance, construction of access roads, improvement of existing roads, construction of campsites and other offices and transportation of construction material and equipment to the project sites. The social acceptability and community support are a positive

impact classified as direct, long- term, permanent and continuous at the local scale. The impact magnitude is assessed High if stakeholder consultations are done and sensitivity is also High if they are done at all levels with transparency hence a Major significance (+16).

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

Enhancement Measures

- There is need to ensure meaningful public disclosure of design and other information before, during and after project to avoid misinformation among communities especially in areas where the project is not covering (non-beneficiary areas). It should be noted that the hydrological assessments in the feasibility report indicated that River Nile has more than adequate water for surface water compared other proposed sites to the required water demand of the project area and other source. This source is reliable and sustainable in long-term. The reports further states that there is high groundwater potential towards South East of the project area. Besides, South-East portion of project area is located topographically at higher elevation and at long distance from project towns hence these areas were considered for water supply from groundwater sources. The Local government technical staff who are closely in line with the WASH sector namely DHO, DCDO, DLO, CDOs, SAS, Parish Chiefs should be directly engaged.
- Increase respectful engagement among those from diverse cultures and decrease intolerant practices by community members.
- Encourage respectful engagement by workers and other members
- Maintain a strict level of sensitivity to cultural concerns and differences between workers and members of the community.

9.2.2 Construction Phase

9.2.2.1 Employment Opportunities

Adjumani being among the major refugee hosting districts in Uganda (both internally displaced and receiving refugees from the insurgency in South Sudan), the district decries of a high unemployment rate. The water supply project is envisaged to create both short and long-term, direct and indirect employment and many other opportunities will be available for local communities in a number of disciplines during the construction phase. The possible direct jobs for community workers include unskilled (casual labour) and semi-skilled works for trenchers,

plumbers, masons, painters, carpenters, mechanics, electricians, mixer operators, steel benders, drivers, community educators, porters, cooks, and security guards involved in construction works e.g laying pipes, water towers, pump stations, among others. Skilled workers will include Engineers (Supervising Engineering team); Environmentalists; Civil works contractors; Contractor's staff (managerial, skilled and unskilled labour force) and Administrators. Other direct and indirect employment will be artisans; suppliers of machinery, materials and essential services; and construction monitoring personnel from the various Government agencies. This will create enhanced income to access basic needs among the local communities.

The likelihood of occurrence of the impacts is Certain. The impact magnitude has been assessed as high due to availability and willingness of community members to work. The sensitivity will be high since creation of job opportunities will improve financial security hence improved living standards hence a Major significance (+16).

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

Enhancement Measures

- To manage social conflicts and negative politics that could arise, the Client should coordinate with the appointed contractor to ensure that priority for employment is given to the local qualified people within the project zones depending on their skills and training.
- Adequate occupational health and safety standards should be provided to ensure the work environment is conducive.
- Conduct Labour Inspections on contractor's workplaces by District Labour Officer (DLO).
- Contractor should adhere to national labour laws, policies and regulations more so on remuneration and worker grievance management.
- The provision of jobs to local people should be properly handled in terms of transparency and openness. Involve LC1 village leaders in identifying casual and semi-skilled workers (Offer Identification / registration forms). The same should apply to refugee settlement with the help of the camp commandant. However, the contractor has jurisdictions over recruitment process and eligibility requirements.
- Where possible, the Adjumani WSSP should integrate social protection mechanisms such as offering casual jobs to vulnerable and marginalized people. These include the PAPs e.g., displaced households, women, youth, disabled persons, lactating mothers, widows, and

older persons. In case of employment of vulnerable members from child headed households, the person employed should be at least 18 years of age in line with the Employment Act.

- Women should be given preferential opportunities and employees should be issued appointment letters and contracts with clearly spelt out and understandable terms of employment.
- The contractor must also ensure that workers are paid on time. Vulnerable groups like the youth and disabled should be given priority.
- Contractors will be encouraged to pay a “living wage” to all workers.

9.2.2.2 Human Capacity Building in Form of Skills Training and Technology Transfer

Human capacity building is forecasted to happen in the construction and operations phases of the project, though most importantly at the construction phase. This will be through capacity building in water supply during the construction and operation (repair and maintenance) of water supply facilities. If a foreign company will be contracted to do construction, it should at least have a joint venture with a local company to build capacity of the local company for similar projects. The income accruing from such activities will obviously change local people’s standards of living. Therefore, it will not only enhance skills development in water construction but also environmental and social sustainability. The benefits of skill training and technology transfer are be positive classified as direct, short, long-term, permanent to a large extent and continuous thus a positive change. The intensity will medium given that not all people will be involved and the sensitivity will medium hence sinificance will moderate (+9).

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

Enhancement Measures

- Foreign companies should be required to have a joint venture with local companies to build their capacity.
- In addition, terms of agreement as per the Contracts terms for construction works Contractor for the project’s construction and O&M phase should emphasize knowledge transfer and the project developer (NWSC) should monitor and ensure that the objectives are met.

- O&M manual and standard operating procedures must be handed over to the operators (NWSC).

9.2.3 Operation and Maintenance Phase

9.2.3.1 Improved / Increased Access to Safe and Clean Water by Communities

Implementation of the Adjumani WSSP will improve services delivery rating for NWSC due to improved access to water through increased water supply. The population of 74,326 and 3,190 people from refugee host communities and 69,081 and 1,37,294 refugees from refugee settlements will be connected to the proposed surface and groundwater supply systems by 2040 yr. The two systems will cover 21 Parishes and 5 refugee settlements covering a total length and area of 266 km and 290.44km² in Adjumani, respectively. The population connected through direct water connections will increase from 16% to 90% in the year 2040 by providing better and sufficient quantities of portable water for personal, domestic and commercial uses for present and future generations by year 2040. The project will significantly contribute to both refuge and non-refugee communities to achieving global SDG 6 target that aims to ‘Ensure access to water and sanitation for all’ (UN⁴², 2021) as well as NDP III target on Water for All. Target 6.1 of universal and equitable access to safe and affordable drinking water for all by 2030 and the national targets of increased access to safe water in rural and semi-urban areas to 85% by 2025 and 100% by 2040 (Uganda NDP III and Uganda Vision 2040), respectively will be achieved (UNPA, 2020). According to the baseline, 69.1% revealed having insufficient water supply especially during the dry season while only 30.9% indicated having a sufficient water supply (Figure 9-1). It is difficult to get water for their daily use due to high transport cost attached, long distances and general lack of a clean source of water. Under increased access to safe water, the project will specifically contribute to Improved physical access to safe water points / connections and reduce walking distance and time to safe water source will reduce as per the WHO standard of 100 m to a water source. Although localized and reversible, it will be immense in magnitude, permanent (as long as the project is sustainably managed) and cumulative in benefit, thus a Major positive change (+12).

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

Enhancement Measures

42 <https://www.un.org/sustainabledevelopment/water-and-sanitation/>

- Conduct customer education and sensitize water users and communities about operations of new water system, especially on how to access new connections to minimise on the possible misconception and negative attitudes.
- Scale-up the intensification of lines, especially in areas where the trunk mains are too far away for the customers to be able to connect at reasonable cost.
- Ensure effective customer relations and customer care
- Ensuring that water is affordable and available all the time
- Need for continuous customer satisfaction surveys in order to obtain customer feedback and improve performance within new and old service areas. Additionally, NWSC Commercial Services Unit (CSU) should revise its customer education action plan to include aspects of catchment protection, mainstreamed with climate change adaptation and mitigations.
- Provide several communal water points will be provided for the community water needs, the locations of these water kiosks will be identified in consultation with the local residents and will be chosen bearing in mind the close proximity to the people they intend to serve.
- The amount of water dispensed by the kiosks should vary depending on the number of residents in that area.



Figure 9-1: Situations at the boreholes in Adjumani (Mukolo village)

9.2.3.2 Improved Public Health Conditions and Health Security

The improved access to safe water in Adjumani will directly influence better human health conditions and health security through reduction in diseases. In this regard, the project will specifically impact as follows;

According to the baseline, the most common water related (borne) diseases include malaria (47.1%), upper respiratory tract infections (36.1%), skin diseases (2.1%) and diarrhoea diseases such as cholera (0.2%) and dysentery (2.4%)

- Contribute to reduction in incidence and prevalence of water related diseases and illnesses* (e.g., Typhoid, diarrhoea, dysentery, bilharzia, gastronomic disorders, malaria, etc.) resulting from better access to safe drinking water, sanitation and hygiene.

- b) Improved on-site supply of water in health care facilities (WinHCF) – The project will improve / increase on-site supplies of clean water in many of health facilities e.g., Arra HC II, Pachara HC II, Cifforo HC III, Dzaipi HC III, Olia HC II. Nationally, the proportion of health facilities with basic water supply stands at 33% in Uganda (WHO Global Baseline Report, 2019). The UNICEF Joint Monitoring Programme (JMP) indicators on WinHCF show that Uganda ranks highest in terms of ‘Limited’ water at HCF at 65.15% in Sub Saharan Africa. It ranked 6th in terms of having ‘Basic’ water at 30.81% and 10th rank for having ‘No Service’. Therefore, the project will certainly improve the status of HCs with available and sustainable water supply hence care quality and infection prevention and control in HCs.
- c) Improve living conditions of medical staff at Health facilities – The improved access to on-site supply of water will contribute to better living conditions of medical staff that reside at health facilities.

Contribute to national health security plan and targets – The piped water project will directly impact on Uganda National Action Plan for Health Security (NAPHS) 2019-2023 which aims at detecting, preventing, responding and mitigating public health hazards and emergencies (such as Cholera, Covid-19, HIV/AIDs, Ebola) that are recurrent health threats for Uganda (MoH/NAPHS⁴³, 2019). In this case, Adjumani district is regarded as high-risk hotspot due to its high refugee population (mostly South Sudanese), as well influx of Most At Risk Populations (MARPS) that include traders, sexual workers, truck drivers, soldiers, among others. More so, the project it will contribute to NAPHS Objective 4 (Target 12 - Improve infrastructure for water systems, isolation facilities and waste management) and Objective 3 (Objective 3: Strengthen the Healthcare-Associated Infection Prevention and Control program).

The benefits are be positive classified as direct and indirect, short and long-term, permanent to a large extent and continuous thus a positive change. The intensity will high and the sensitivity will medium hence sinificance will Major (+12).

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

Enhancement Measures

43 Uganda National Action Plan for Health Security (NAPHS) 2019-2023

- Provide piped water connections to most health facilities (institutional connection) in Adjumani district i.e., Ciforo, Dzaipi, Pakele, Adjumani Towns, among others as part of the intensification lines.
- Ensuring that most of the communities in the project foot print are connected or have access to the piped water i.e., extend water to as many households as possible
- Ensuring that operations and maintenance are properly done to avoid issues of water contamination and shortage.
- Ensuring that water is affordable and available all the time
- Sensitize the communities about the dangers of using unsafe water

The project will have significant strategic benefits in reducing the burden on the cost of health care services as diseases could be reduced, promoting good health and reduce health care costs thus making overall household and national savings for investment in other developmental activities.

9.2.3.3 Gender Empowerment and Equality

Women play an important role in domestic and general economy of Adjumani. However, the existing challenge of water shortage fall squarely on them as the society expects them to draw and provide water to the households. The long distances and the unreliability of the existing water sources within their reach poses a daily challenge/barrier do their daily contribution to the economy as they spend more time in search of water.

The expansion of the water supply network will however work in their benefit and award them more time to other economic activities such as farming, selling their products in the open market, businesses among other income generating activities that could contribute to reducing poverty and furthering their education (thus increasing school enrolment). This will imply promotion of gender equality and empowerment of women and the girl child. The intensity is medium, intensity is medium and overall significance is moderate (+9).

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

Enhancement Measures

This impact will be enhanced through:

- Ensuring that women and girls are also given priority while recruiting personnel for the project.
- Ensuring the all the households within the project footprint are either connected or have access to clean and safe water.
- Mainstreaming gender into government policy and programming, together with Gender Focal Persons
- Create water programs that reflect the integral roles of women and girls as providers, users and managers of water supply services
- Increase capacity of the district and service providers to address gender and water.

9.2.3.4 Improved Education Outcomes due to Access to Safe Water

The piped water project will contribute to improved education outcomes and targets due to increased access to safe water in schools and Early Childhood Development (ECD) centres within Adjumani project area. The project is expected to translate into an increase in the enrolment ratio, especially for girls, and in the female literacy rate in reference to Section 7.6.22. Similarly, the ease of water fetching will contribute to the reduction in social conflicts related to water use such as those associated with the congestions at the existing boreholes. This 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. Therefore, the availability of safe and clean water will enhance education outcome at primary and secondary schools. The critical indicators that will be improved include: - increased enrolment rate; attendance rate; completion rate; teacher performance; reduced absenteeism among learners and teachers; lower dropout rate especially for girls; improve menstrual health conditions for girls and female teachers. Although localized and reversible, it will be immense in magnitude, permanent (as long as the project is sustainably managed) and cumulative in benefit, thus a Major positive change (+12).

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

Enhancement Measures

- Provide intensified lines / piped water connections to all 9 ECD centres, 12 primary schools and 1 seed secondary schools.
- Extend the distribution network to cover as many communities as possible

9.2.3.5 Abridged Water Vulnerabilities Among Rural & Urban Host and Refugee Communities

The project will reduce the vulnerability among poor host and IDP/refugee communities within Adjumani area. There are also sub-groups of people who are affected by extreme water vulnerabilities such as children, women, youth, lactating mothers, health and education facilities, urban poor, rural poor, farmers. For instance, 27% of children in Uganda are experiencing high / extremely high-water vulnerability (UNICEF⁴⁴, 2021). The project will contribute to reduction of the extreme water vulnerability as follows:

- a) Reduced water scarcity – the average annual water supply availability will be at least above 500 m³ per person (WHO Standard).
- b) Reduced water stress based on temporal and spatial (geographical determinations) of water sources and users.
- c) Improved water security whereby communities will safeguard water access points and water catchments.
- d) Improve food security - water access/availability will have dynamic interplay on food security. The project will provide at-least 15 litres/p/day which is regarded as “generally food secure / usually adequate” for any household as per Global Integrated Food Security Phase Classification (IPC) classification. It should be noted that water access is a Key Reference Outcomes on human welfare and livelihoods (IPC⁴⁵, 2008).
- e) Reduced exposure to Sexual Gender Based Violence (SGBV) resulting from inability to afford water; sexual violence (e.g., rape & defilement) risks related to travelling long distances to access water.
- f) Reduced exposure to human-livestock-wildlife conflicts caused by accessing open sources such as rivers, lake, streams, ponds.
- g) Reduced poverty conditions especially reduction in household expenditure on water among all categories including those below poverty line (less than \$2 a day).
- h) Improved climate resilience and adaptive pathways in case of hazards and risks (such as drought, dry spell, pests and diseases, floods) due to availability of piped water among individuals, households, communities and institutions.

The impact will have a medium intensity, permanent (as long as the project is sustainably managed) and direct, with high sensitivity thus a Major positive change (+12).

44 UNICEF Report on Water Security For All 2021

45 Integrated Food Security Phase Classification (IPC) Technical Manual 2008

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

Enhancement Measures

- Integrate gender mainstreaming in water operations.
- Promote climate resilience and other feasible adaptive pathways among host, IDP/refugee communities such as water storage.
- Intensify water network to as many areas as possible including taking water back to where it comes from (Arra West)

9.2.3.6 Rural Transformation Through Improved Living Conditions (Reliable and affordable Piped Water Supply)

The project will contribute to national development goal of Increase Average Household Incomes and Improve the Quality of Life of Ugandans stated under the 3rd National Development Plan (NDPIII). More specifically, the Adjumani distribution will contribute to the following:

- Enhance the productivity and social well-being of the population rural villages of Ciforo, Dzaipi, Pakele, Olua, Boroli, Pachara, Adropi, Nyumanzi among others.
- Strengthen social service infrastructures (health, educational and local administration facilities).
- Rural transformation through appreciated value of property e.g., land.
- Boost local trade, leisure and hospitality sub-sector.
- Increased connection to power grid in villages with new water facilities e.g., Arra West.

The impact will have a medium intensity since it will cover more households, permanent (as long as the project is sustainably managed) and direct, with high sensitivity as it will contribute to NDP III thus a Major positive change (+12).

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

Impact Significance		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
	4 High	4 Minor	8 Moderate	12 Major	16 Major

Enhancement Measures

- NWSC needs to align its proposed developments in line with the physical plans of Adjumani TC and Pakele, Dzaipi and Ciforo RGCs and other mushrooming centers in Adjumani.
- Subsidise water prices to those who want to be water venders in the respective areas of distribution.
- Make sure that all health centres along the pipelines access water e.g. Arra HCII, Dzaipi HCII, Ciforo HCIII, Pakele HCIII, Pagirinya HCIII, Pachara HCII. This is because even those who have water, there is shortage given the patient numbers received per day.
- Endeavour to engage physical planning committees for proper planning at all stages

9.2.3.7 Improved Local Governance and Social Accountability

There will be improved local governance and social accountability between the leaders and communities. The political leaders have been actively involved in lobbying for better water supply systems in Adjumani. The new water system will be a tangible deliverable, and will enhance the social accountability between government and the population. At baseline, water is a critical social need that often fronted as political demand.

Furthermore, this WSSP will generate revenue to the district 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.

The impact will local, permanent, with a low intensity given that not the whole of Adjumani will benefit. The sensitivity is high since political language can change public perception very fast thus a Moderate positive change (+8).

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

Enhancement measures

- The operations and maintenance of new water system should be safeguarded from political undertones arising from the discrepancies between those who are connected and not.

9.2.3.8 Benefits to the Economy Through Increased Investment in the Area

The GoU through NWSC will invest heavily in the construction phase of the proposed project which would involve use of locally available materials. The business community could take advantage of the proposed development to establish businesses that would otherwise be impossible without piped water. Furthermore, benefits to the Ugandan economy are foreseen to accrue during the construction and operational phases. Income will be generated through tax remittances such as With Holding Tax (WHT), Pay as You Earn (PAYE), Local Taxes, etc. The income generated will not only go the National Treasury, but equally to the District Treasury, thus directly benefiting Adjumani District residents.

The likelihood of occurrence of the impacts is certain and direct at local scale. The impact magnitude has been assessed as high as long as the project happens. The sensitivity will be medium since not all people will gain hence a Major significance (+12).

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

Enhancement Measures

- During the construction phase, conditions should be put in place to ensure contractors prioritize use locally produced materials.
- The water distribution network connections should target Small and Medium Enterprises (SMEs).
- During the construction phase, all contractors and sub-contractors should be registered tax payers with the Uganda Revenue Authority (URA) and should pay applicable taxes and remittances in a timely manner.
- The project developer should ensure that engineering designs, architectural drawings and site layout plans for the various project facilities be submitted to the Physical Planning Committee of Adjumani District Local Government for review and approval.
- The Central Government through URA should ensure that project facilities operator makes timely submissions and routinely update their tax bases.

9.3 Negative Impacts and Risks

9.3.1 Pre-Construction Phase

9.3.1.1 Loss of Land and Displacement of Economic Activities

The augmentation of existing water supply in Adjumani district involves construction of a new water treatment plant some distance from the abstraction point at River Nile in Arra village in Pachara Subcounty. It also involves laying of the transmission pipes as well as construction of a water storage tank from which the additional water abstracted will be distributed to the beneficiaries. Similarly, the water supply system will come with reservoir tanks located in Ajugopi, Melijo, Pakele and Dzaipi among other areas. According to the RAP (2022), the Adjumani WSS will require a permanent land take of 9.7584 ac and an easement corridor of 21.336 ac (Table 9-1) and a total of 330 PAPs (Table 9-2) below.

Table 9-1: Project Land Takes

#	Impact	Land Affected in Acres
1	Permanent Land Affected (Intake, Water Treatment Plant, Borehole Sites, Elevated Storage Reservoir Sites, Break Pressure Tanks and Access Roads)	9.7584
2	Permanent Land Restriction (Easement for Transmission and Distribution Pipes)	21.2806
3	Total Land Affected in Acres	31.039

Source: RAP Report

Table 9-2: PAPs per village under the Adjumani WSSP

Subcounty	Parish	Village	No. of PAPs
Adjumani Town Council	Central Ward	Central II Cell	16
	Central Ward	Mbere Cell	1
	Central Ward	Minia West Cell	1
	Central Ward	Molukpwoda Cell	3
	Cesia Ward	Lajopi Cesia Cell	10
Adropi	Lajopi	Mokolo East	23
	Lajopi	Mokolo West	16
	Lajopi	Rende	20
	Palemo	Deri	15
Ciforo	Agojo	Duba	22

Subcounty	Parish	Village	No. of PAPs
	Agojo	Ebiamgba	21
	Agojo	Marila	27
	Loa	Obugo	1
	Mugi	Mocope	2
	Okangali	Kabaoli	1
Dzaipi	Ajugopi	Egge	16
	Ajugopi	Maiaciku	30
	Ajugopi	Ringa	18
	Logoangwa	Pagirinya	22
	Mgbere	Dzaipi Central	3
Pachara	Alere	Robidire	1
	Jihwa	Mijale	2
	Marindi	Marindi Central	13
	Marindi	Rassia West	22
	Omi	Arra West	5
Pakele	Boroli	Liria	2
	Melijo	Gonyilaa	7
	Melijo	Melijo	4
Pakele Town Council	Central Ward	Agalejo Cell	2
	Pereci Ward	Maanyalwa Cell	4
Total	19	31	330

Source: Valuation Report

The proposed location for the proposed new storage tanks has already been identified. The land owners, on whose land the proposed new storage tanks are proposed to be situated, have been consulted by the client and are in agreement in as far as acquisition of that land is concerned. This was confirmed by the land owners during the field work. In general, the loss of land will be direct, permanent and irreversible but non-cumulative. This will be limited to proposed sites and a long-term impact. The intensity will be low since most of the said land is not under intensive agricultural activities and the water pipelines will mainly lie in the road reserve except the areas where access to the tank sites is required. The sensitivity has been assessed as medium because there is no physical displacement of human settlement, physical cultural resources and/or significant economic displacement. Therefore, the overall impact significance is moderate.

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

Mitigation Measures

- Ensure timely and appropriate compensation before construction begins as per the recommendations of the RAP report.
- The RAP should take into consideration local community and household preferences when proposing compensation and/or relocation to the PAP. For instance, a land owner who is partially affected by the project may be willing to relocate part of his property rather than complete relocation from the affected land.
- PAPs should be given training on financial literacy entailing how to use their compensation packages.
- Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses to secure settings. Prior to the construction phase, farmers shall be sensitised on the pending project at least 6 months in advance such that cultivation within the project sites/ components' footprint is stopped or reduced.
- Feasible in-kind compensation can be considered especially for institutional land owners, for instance, provision of individual taps and/or connection of public infrastructure to the piped water system rather than cash payments.
- LGs should be involved in mobilization and sensitizing PAPs, for instance, the client could assign Community Development Officers (CDOs) tasks to register and follow up project affected persons.
- In cases where the landlords object using their land for the water pipelines without any compensation, NWSC shall in line with Section 76 9a) of the Water Act, Cap 152 enter upon any land, take its levels and set it out as the authority thinks necessary, dig, trench and break up the soil, and use or remove any material dug from the land;
- All land acquired for establishment of the water treatment plant, transmission pipes, reservoir tanks and any other activity either by the Client or contractor shall be compensated for in accordance with land Act. 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.

- Institute and maintain an active GRM on site during the construction phase to ensure that any arising issues are promptly and amicably addressed such as property affected but not previously envisaged in the RAP is timely compensated for as applicable.

9.3.2 Construction Phase

9.3.2.1 Loss of Vegetation

The project mostly traverses bushlands and a few seasonal farmlands under cultivation along with settled and built-up areas. Vegetation clearance and removal will take place at the water source sites (intake and boreholes), transmission mains, WTP and reservoir sites. The removal of trees will be minimal (only done when necessary) but will contribute to increase of carbon dioxide in the atmosphere. All these will contribute to the greenhouse effect that causes global warming, thus climate change. The reservoir sites and pipeline routes are mainly covered by short grass that will rejuvenate on completion of construction works.

The impact intensity is considered low since there will be minimal vegetation clearance at the intake, WTP, ESRs, proposed access roads and the transmission/distribution pipelines. However, this will be minimal along the pipelines because they will mainly be laid in the road reserve and this will take a short period. Therefore, the scale of the activities is short term and limited to sites in extent. The trees are located away from the envisaged project components' footprint. Moreover, where natural vegetation exists along the proposed pipeline routes, it exists in a post cultivated form and bushy form. The sensitivity of the receptor is rated low given that most of the areas traversed by the project are bushlands with already disturbed patches by human activities and there are no any vegetation species of conservation concern going to be affected resulting in an overall minor impact significance.

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

Mitigation Measures

- Vegetation clearance should be limited to only localities required for development as proposed in the design.
- The design (during routing/network analysis) tried as much as possible to restrict the project sites and the water transmission and distribution line routes within the road reserves at the pre-construction stage..

- The contractor should restore sites where activities will be carried out at all the project sites. This site restoration and revegetation should be carried with local plant species as the preferred biodiversity upon completion of construction works.
- 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.

9.3.2.2 Loss of Habitat for Fauna

During the surveys, the identified terrestrial habitats identified included the permanent wetlands along the Nile bank (intake and pumping station) and along the small rivers (borehole sites); scrubland/woodland; grassland (all sites) and agricultural land associated by open fallow with remnant trees at all reservoir sites and along TLs/DLs. Irrespective of the degradation levels, wetlands are vital ecosystems for both amphibious and aquatic organisms they have to be given due protection from vandalism. The River Nile wetland (riverine environment) buffer zones need to be protected for ecosystem sustainability. It is anticipated that during project implementation, vegetation clearance, landscaping and excavations will take place at the intake, boreholes, tank sites, pipelines and WTP resulting in habitat modification. This may bring about loss of hiding, feeding, roosting and breeding grounds for fauna species since they are affected by habitat modification and destruction. For instance, butterflies are impacted indirectly when vegetation on which they depend for nutrition is cleared. Likewise, dragonflies are indirectly affected when vegetation on which they patch is cleared. Khan (1990) reports that human intervention in the natural environment affect amphibian fauna in two ways: adversely, by destroying natural habitat, and favourably, by creating new habitats. Birds also occur across a broad geographical range and in a large number of habitat types; and some species specialize within narrow habitat bands and are thus sensitive to habitat change (Davenport, T. and Howard, P. 1996). Mammals have also been observed to be affected by habitat modification and destruction.

Impact intensity is considered low since given the transmission pipeline will be mainly laid in the road reserve and pipeline will not encroach on a large expanse of the swamps (mainly at the intake) and along the a 0.45 km long floodplain (at E366935, N389313 and E366953, N388880) hence minimal vegetation clearance during construction activities especially during excavation of land. The big trees identified along the TLs/DLs are also located away (25 – 100 m) from the road reserve. Moreover, where natural vegetation exists along the proposed pipeline route, it exists in a post cultivated form which includes mixed patches of post cultivated areas and agricultural gardens i.e. already transformed and all-natural vegetation were converted into farm modified environment hence minimal disturbance is expected. Also, there were no tree species at all sites and along the TLs and DLs project area that fall under the IUCN list of threatened species (IUCN 2018). This implies low sensitivity of the receptor and a minor overall impact significance.

Impact Significance		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
Inten sity	1 Very low	1 Negligible	2 Minor	3 Minor	4 Minor

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

Mitigation Measures

- Clearance of fauna habitat (vegetation and soils) should be limited only to localities required for development.
- 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.
- All project workers should be sensitized to minimize damage to vegetation and fauna.
- If any wild or aquatic animals (e.g., crocodiles, hippos, pythons among others) are encountered, the Contractor shall notify UWA so that it is picked and taken to a secure place.
- Trenching, pipework laying as well as backfilling will be done concurrently. The contractor shall ensure that every evening, the pits are covered with timber while being secured with a warning tape in case they are not backfilled.
- Close monitoring and supervision of the construction operations to ensure compliance and avoid causing further damage to undesignated project areas.
- Wetlands/swamps and floodplains along the project alignment should be given due attention during the construction phase to avoid negative impacts by:
 - ✓ Avoiding intentional spilling of petroleum products.
 - ✓ Implementation of the water act and wetlands policy, specifically articles that prohibits pollution and dumping of waste.
 - ✓ Relocate those fauna species that cannot move on their own and this should be done by a trained person in case they are found there;
 - ✓ The Contractor should undertake a confirmatory survey to set out the actual pipeline route based on the Engineers route and alignment. Two (2) pipe supports (pedestals) are normally adopted for a 6m length of a pipe because the risk of bending is at the ends of the pipe;
 - ✓ Once this has been approved by the Engineer, the Contractor pinpoints (identifies) the exact locations for the pedestals;
 - ✓ These locations are excavated and filled with hardcore until settlement ceases;
 - ✓ Formwork (in the shape of a square or rectangle) is placed above the hardcore;

- ✓ Depending on the degree of upward seepage, a moderately dry or wet lean concrete mix is placed above the hardcore and within the confines of the hardcore and left to set for about a day. This acts as the blinding for the base steel reinforcement;
- ✓ Once approved by the Engineer – reinforcement works for the pedestal base and column are undertaken until the pedestal is ready to receive the pipe.

9.3.2.3 Impacts on Land Use/cover

The project mostly traverses farmland e.g., Olia Prison farms (between Pakele and Dzaipi) under cultivation along with settled and built-up areas. The project developer, NWSC, intends to mostly use road reserves of the existing public roads which are government land for the transmission and distribution lines. However, the water source sites (intake and boreholes), WTP and storage reservoir sites shall be located on private land, whose owners will be engaged with NWSC in the process of land acquisition in accordance with the land act and World Bank Environmental and Social safeguard policies as well as relevant national laws. Given the current land use/cover of the key project sites, this will be converted as construction of project facilities occurs on the respective sites. The clearing of corridor, movement of equipment and contractor staff and laying of pipes may lead to spot destruction of crops. According to the baseline, the reservoirs and sources are located on cropland dominated by maize.

Additionally, there will be temporary loss of access to homes and businesses. Excavation works may result into temporary blocking of accesses to social facilities, homes and private properties through cutting, filling, dumping of gravel, heaping of spoil, barricades etc. The practise results into considerable disruption of economic and social activities in the project area and may cause stress and resentment of project activities.

This impact is negative, moderate, short and medium term, reversible. The intensity of the impact will be low considering that the environment is already modified and it will always take short time open access again. Since the scale of the activities is short term and limited in extent, the intensity of impact is considered to be 'low'. The overall impact significance is assessed as minor.

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

Mitigation Measures

- The water transmission line routes should be as much as possible restricted within the road reserves.

- Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the water sources, 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.
- Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses to secure settings. Prior to the construction phase, publication of the compensation processes and eligibility criteria will be done to sensitise farmers on the pending project at least 6 months in advance such that cultivation within the project sites/ components' footprint is stopped or reduced.
- As part of the RAP, a comprehensive impact survey shall be conducted which shall indicate all affected crops within the water transmission corridor/way leave, their owners and the replacement costs. Valuation of such crops shall be conducted by experienced valuers in association with the district land board and local leaders.
- 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 and crops.
- The contractor should always consult and plan with communities on convenient stock piling areas and accesses during construction.
- The contractor should always provide temporary accesses to all affected premises.
- Existing accesses should be restored after works, or convenient alternatives provided.
- NWSC shall acquire a riverbank user permit from NEMA to carry out a regulated activity in along the riverbank of River Nile in Arra West.

9.3.2.4 Decline of Pristine Landscape and Emerging of Vector Breeding Grounds

During construction of the Adjumani WSSS components, sourcing earth construction works materials such as murram and gravel will impact on the landscape through borrow pits and stock-piles of such excavations. In case of non-satisfactory management and restoration of these sites, they can pose considerable visual intrusion and degrade the landscape. Furthermore, according to the baseline, Adjumani areas have high malaria prevalence at 47.1%. Therefore, if poorly or not restored, water impounded in the borrow pits can be breeding grounds for mosquitoes and other disease vectors thereby posing more health risks to local communities and related impacts from such areas. However, the ESIA suggests that the contractor utilises the existing and active burrow pits during construction and he/she will follow the national regulations and guidelines on decommissioning and restoration. Additionally, since the duration of these activities is considered short term and limited in extent, the resultant magnitude of impact is scaled as low and overall, the impact is rated as minor.

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

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

Mitigation Measures

- The contractor should have a restoration/decommission plan in place;
- Construction materials (stone-based products, murram and related fill materials) subsoil will be sourced preferably from relevant licensed and existing (active) sources i.e., extraction and processing of such materials (as applicable) be in accordance with the provisions in such licences. It is suggested that, the contractor(s)/suppliers be asked to provide copies of proof for such licenses before effecting the supply process;
- The sites be fully revegetated with plants species approved by the Supervising Engineer and District Environmental Officer (DEO);
- Excavated soil shall be stock-piled with its edges protected from erosion and such materials can be used during site restoration with the approval of the Supervising Engineer and Adjumani DEO;
- Restoration of materials source sites be approved by both the Supervising Engineer and the DEO before issuance of certificate of works completion; and
- There should be close and routine monitoring of restoration activities in the site by environmentalist from the Contractor and the Engineer.
- If no suitable licensed source of murram/subsoil is available in the area and the contractor plans to obtain the material from a private landowner, then the contractor will:
 - Provide NWSC with a copy of the written agreement between the contractor and the owner of the murram/subsoil source in advance of the beginning of works at the location. The identity of the landowner will be certified by a certificate of ownership or a paper signed by the LC1 Chairperson and/ or Head of Clan. However, depending on volumes that may be required, an ESIA/PB may be mandatory as per the NEA 2019 by NWSC/Contractor.
 - NWSC with a copy of the written agreement between the contractor and the owner of the murram/subsoil source in advance of the beginning of works at the location. The identity of the landowner will be certified by a certificate of ownership or a paper signed by the LC1 Chairperson and/ or Head of Clan;
 - Engage and consult any households and/or communities in close proximity to the identified murram/topsoil source and provide evidence of these consultations to NWSC;
 - Ensure adequate compensation on mutually agreed terms is made to people who are either physically or economically displaced by the activities of the contractor. The contractor will provide documentation of the compensation terms (minutes

- of consultation meetings, signed agreements with affected persons, compensation receipts etc.) to NWSC;
- Assess health and safety risks linked to murram/subsoil extraction and transport, and implement appropriate mitigation measures. The risk assessment will be provided to NWSC ahead of the beginning of works; and
- Provide a restoration plan for review, and ensure that the actions of the restoration plan are implemented to the satisfaction of concerned authorities. Sign-off from the relevant authorities will be required and copies of the sign-off will be provided to NWSC.
- Surface water run-off will be controlled during earthworks. Surface water features down-slope of the earthworks will be identified, and the necessary berms and drainage channels will be installed to ensure that run-off does not collect or pond in excavated areas or quarries.

9.3.2.5 Susceptibility to Soil Erosion and Pollution Risks

The site earthworks during construction of water sources, water transmission and distribution network, water storage reservoirs and the WTP will reduce soil stability and hence make the soils aggregated and more susceptible to erosion especially during the rainy season. Excavation works will take place at the reservoir sites; soils excavated along pipe routes will be used for backfilling. Soils excavated may be stored at the project sites hence exposure to agents of erosion such as wind and storm water. Deterioration of soil quality would arise from erosion where the top and productive soil layer is washed away or from leaching of minerals from the stockpiled soil during rains. In addition, compaction activities would affect soil texture, its transmissivity and ability to hold moisture. Thus, minimal loss of top soil at these localities. Additionally, poor disposal or management of the wastewater generated will lead to land/soil pollution and related drainage problems as construction equipment engaged in activities might cause contaminations of soil due to leakage of fuels and lubricants from equipment. The fuel and lubricating oils required during both construction of the project have the potential to contaminate soil if they leak or are spilled during handling or use.

This impact negative and the stakeholders likely to be affected are nearby community, land and aquatic fauna and flora. Its extent will be mainly local limited within site boundary and communities in its immediate vicinity. The potential impact receptors are assigned a medium sensitivity, given that the soils in the project area consists of mainly sandy loam soils on gentle slopes. Since the scale of the construction activities is short term and limited in extent, the intensity of impact is considered to be 'low'. The overall impact significance is assessed as moderate.

Impact Significance		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
Intensity of	1 Very low	1 Negligible	2 Minor	3 Minor	4 Minor
	2	2	4	6	8

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

Mitigation Measures

- A waste management plan will be developed prior to start of construction activities.
- Vegetation clearance should be limited to localities required for development.
- Construction sites should be hoarded off before excavations and soil barriers put in place 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.
- Topsoil should be removed prior to carrying out excavations and 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.
- A spill kit will be maintained onsite to clean-up any accidental spills.
- The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation.
- Excess excavated soil material which will not be used for construction works shall be removed from the site in a timely manner and deposited at an approved site
- Areas adjacent to the construction site should not be disturbed and care taken to minimize the area of impairment caused by on-site storage of construction materials and equipment.
- NWSC 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-vegetation of excavated sites.
- Contractor will avoid use of old equipment and damaged equipment that is most likely to have oil leakages thus contaminate the soils and the Contractor will ensure that equipment is properly maintained and fully functional to avoid leakages that may contaminate soils. A joint inspection of works and equipment should be done by the consultant, contractors, and the client.
- Throughout reinstatement, the trench back-fill material will be compacted to a level similar to the original surrounding soils to avoid subsidence as a consequence of rain water channelling.
- Upon completion of subsoil and topsoil restoration, disturbed areas will be inspected together by the construction contractor and NWSC personnel for stability, relief, topographic diversity, acceptable surface water drainage capabilities, and compaction.

- All chemicals will be stored in designated, locked storage areas, taking care to ensure segregation of potentially reactive substance (e.g., flammables should not be stored with toxic substances). These areas will have an enclosed drainage system/bund to avoid contamination. Material Safety Data Sheets (MSDS) will be provided for all substances and used in project health and safety assessments. Efforts will be made to avoid and minimise the use of hazardous chemicals during construction where possible;
- The construction sites – Intake, Water Treatment Plant and Reservoir sites will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water.

9.3.2.6 Generation and Improper Management of Waste

During construction, waste will be generated, including vegetation stripped from site, soil excavated from foundation sites, packaging waste (cement bags, paper, polythene sheets, and wood pallets), metal scrap, wire cuttings, wooden planks, polyethene sheets, PET water bottles, empty paint and solvent containers and waste oil from construction equipment or vehicles. Some of the waste materials such as paints, cement, adhesives and cleaning solvents contain hazardous substances, while some including metal cuttings and plastic containers are not biodegradable and can have long-term and cumulative effects on the environment. Other wastes which will be generated by non-construction activities because of the presence of the workers, for example, during construction there will be workers all contributing to wastes like food debris, contaminated water from washing, excreta, wastewater, cleaning equipment, tools and vehicles. Such waste needs to be handled reasonably and must not remain in the road reserves or along the water trenches. Inappropriate disposal of waste or spoil could have medium or long-term environmental and public health impact. Improper managing of these wastes could result in contamination of soil, air, surface water and thereby posing public health risks.

The sensitivity of receptors is assessed as ‘high’ given that some sites for the proposed water source are located close to the banks of R. Nile, R. Nyeguy, R. Adidi and R. Surumu while the water transmission line traverses the floodplains of the same rivers. The impact intensity is assigned ‘low’ rating resulting in a moderate impact significance.

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

Mitigation Measures

- The Contractor shall develop and implement a Waste Management Plan that will ensure that:
 - The wastes are properly segregated and separated to encourage recycling of some useful waste materials, that is, some excavated material can be used as backfills.
 - Solid waste storage bins and/or skips are provided at contractor's sites and at the construction sites and ensure they are collected or emptied in time. Depending on the rate of accumulation, waste collection is made at least once in 24 hours and done in such a way to minimize nuisance of smell and dust during collection.
 - Hazardous wastes such as paints, cement, adhesives are managed through a third-party contractor certified by NEMA. The wastes shall be transported in a NEMA approved box body trucks to the NEMA approved waste disposal facility in Nakasongola.
- All sorts of waste generated during construction such as Ductile, HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and delivered to recycling facilities. Other forms of waste which are inert must be collected by NEMA gazetted waste handlers 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 district landfills for disposal.
- All plastic waste generated during construction, such as mineral water bottles, polyethene bags, jerricans and cups shall be collected and taken for recycling in plastic collectors in for onward transmission to plastic recyclers.
- Human excreta shall be managed using a mobile toilet and then disposed at the existing Faecal Sludge Treatment Plant in Dzaipi.
- The contractor will work with Adjumani district Local government to facilitate sound waste handling and disposal. All wastes must be taken to the approved waste disposal facilities. Proof of delivery and safe disposal of waste will be provided and records maintained at all times.

Implementation of the above mitigation measures will lessen impact intensity to "very low" resulting in a residual impact of minor significance.

9.3.2.7 Noise and Vibration Impact

Noise and vibration will occur both on and off site. This will emanate from movement of truck and front-end loader engine noise, hydraulic pumps, compactors, generators, aggregate delivery to bunkers and hoppers, conveyor belts, air valves, truck air brakes, filters, alarms, amplified telephones etc. Additionally, most parts of Adjumani District mainly along the transmission lines, there are rocky grounds where method of rock blasting may be used, these blasting produce high levels of sound and vibrations that is beyond the standard limits. Exposure of communities and workers to high noise and vibration levels can be a health concern and needs to be mitigated in line with the National Environment (Noise) Control Regulations, 2003.

The receptor sensitivity is considered medium given that most of the proposed project area is located in relatively rural areas as indicated in the baseline, while the intensity of the impact is rated low ultimately resulting in a moderate impact significance.

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

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 should be provided with the necessary personal protective equipment (PPE) such as ear muffs.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.
- Sites must be hoarded to curb noise impacts to neighbouring communities e.g at the intake, WTP, MBR and ESRs.
- Works should be undertaken during day time i.e., from 8am to 6pm.
- Works near schools or health centres should be done in periods like weekends in order for noise and vibrations not to interfere with learning environment.
- Weekly monitoring of noise levels at active sites should be carried out by the contractor.
- Insulation/enclosing of any generators and heavy duty equipment to minimize disrupting ambient noise levels.
- Switching off of equipment when not in use
- Prior notification of residents in the vicinity of construction activities of the contractor's proposed working schedule and the times and duration of any abnormally noisy activity likely to cause concern.
- Restricting speed limits of project vehicles through settlements and trading centres to minimise noise.

9.3.2.8 Air quality and Dust Management

The most significant issues that could potentially impact on air quality and climate during construction are combustion gas emissions and nuisance dust since most roads are murram. Dust

will be generated during excavation works, movement of haulage trucks, grading and levelling of ground surfaces, operation of stone crushers, etc. Construction dust can lead to lung and sight related health risks.

Furthermore, exhaust emissions from vehicles and machinery (e.g., generators) consisting mainly of poorly burnt fuels and oils, including nitrogen oxides, carbon oxides, hydrocarbons, particulate matter, etc., are expected to occur. The potential impacts are nuisance to people in the area, coverage of crops (possibly leading to reduced yields) and deposition on natural vegetation and fauna who feed on the vegetation. Due to the temporary nature of construction, dust emissions are not anticipated to have a long-term impact on local air quality. Dust nuisance will decline as stripped areas of land re-vegetate. Ambient air quality measurements indicate that the environment around the project area is currently devoid of sources of high air pollution except for Ciforo ESR and Melijo ESR (School)

In general, the impact of dust emissions, though minor in magnitude, will be localized, temporary, reversible and is non-cumulative. The manageability of the impact is high since typical impacts are well understood in conventional infrastructure construction industry and the ability to adapt to the impact is high because construction activities have been going on in the project area especially for access roads. Due to the intermittent and short-term nature of the activities, the intensity of impact is assessed as low and sensitivity of the receptors as low. The impact significance is minor.

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

Mitigation Measures

- Travel speeds of construction vehicles along the road especially at trading/ business centres will be controlled and should not exceed 50 km/h on the highway and 40 km/h off the highway to minimise the chances of higher PM in the project areas.
- Trucks will be covered during haulage of construction materials to reduce on spillage of materials and wherever dust suppression is necessary, water will be sprayed over dusty areas.
- Workers will be provided with PPE and the use of PPE shall be enforced.

- All surfaced roads shall be subject to road cleaning and un-surfaced roads to dust suppression, the methodology and frequency of which shall be included in the Contractor's Traffic Management Plan.
- Stockpiles of friable material will be grassed in order to prevent wind erosion.
- A maintenance programme for equipment and vehicles will be implemented, to ensure air emissions like particulates, SO₂ and NO₂ are minimised.
- Construction work will be undertaken by an experienced and duly registered contractor with a verifiable sense of environmental awareness and responsibility

9.3.2.9 Impact on Intake and Pumping Station (Flooding of River Nile)

There are high chances of intake flooding during periods of high flows in R. Nile. Fewer rainfall days with more intense rainfall may lead to increased flooding, landslides, and associated impacts. This puts the raw water intake, raw water pumping station and raw water transmission pipelines on a risk of being affected by floods, sedimentation due to excessive runoff, as well as other climate hazards that can lead to financial losses. The Feasibility Report (hydrological assessment) shows that R. Nile flows ranging between 900 - 1500 m³/s, occasionally cause floods up to 200 m from river channel. The location of intake is adequate in terms of flow velocity distribution but can flood in case of change in water level. Likewise, the streamlines show a steady behaviour parallel to the banks. The river course does not change throughout despite large flood events occurring. However, this possesses a high risk onto the project components though it's localised in extents, temporary, irreversible and permanent. The impact intensity is medium and sensitivity is medium since it may delay the project implementation or stop it in case of the disaster implying a financial loss to the country hence a moderate significance.

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

Mitigation Measures

- Planning of construction of intake works during off dry season period;
- Utilisation of the already installed early warning systems and periodic monitoring flows at different locations of the Nile and when need arises to sustainably manage high variability in river flow rates;
- Sharing of regional climate information among organizations such as ICPAC, EAC, and National Meteorological Departments of the Nile Basin states;

- In open waters, especially during construction of the intake, plastic curtains will be used to contain and confine resuspension of bottom silt to minimize turbidity in surrounding and downstream areas, using longer support spans and restricting construction to dry weather where possible;
- Approach land and road should be raised to allow for storm water drainage from the upstream areas and intake plot into R. Nile above the High Flood Level (HFL);
- Construct a strong storm water open channel around the intake fence to take care of the storm water that would reach the intake and diverted to the R. Nile;
- The intake house (surface infrastructure) should be raised atleast 2 to 4m above the existing ground level (EGL) or the HFL for safety incase of floods in the R. Nile.
- Maintain the proposed e-flow of 473 m³/s in the river (throughout the year) to support aquatic life and social economic activities down stream

9.3.2.10 Impacts on Water Quality

During construction activities, excavated soils at construction sites (especially at the intake and water treatment sites) may be washed off by storm water which will result into pollution and siltation of surface water sources such as streams and River Nile. In other cases, the pipelines will traverse rivers and streams (by both transmission and distribution) e.g., Adidi, Nyeruta, Pagoro, Murei, Leya and Eciya, though, most of these points are already disturbed by the ongoing road construction activities. The principal potential contaminants associated with the construction activities include: sediments, fuels and lubricating oils; domestic wastes; welding wastes; paints and solvents; and hydro-testing chemicals if used (for example, biocides, oxygen scavengers and corrosion inhibitors), etc.

The intake will be constructed in R. Nile, WTP will be constructed at about 750m from a seasonal stream and both transmissions and distribution will cross many rivers and streams. The project will also use materials like sand which are stockpiled at the project sites, the portable water quality for both ground and surface water were within the national standards. The excavations for pipes, water storage tanks may lead to silt loading of surface waters if the spoil soil is not managed well. The spoil soil or wastes if heaped or disposed of in water ways may affect the flow of surface water causing flooding during site preparation or risk of surface water contamination due to erosion and siltation and leaching of wastes. Handling of hazardous materials in this case used oils from construction vehicles, other oils and fuels that is generated during servicing if not well handled may spill and end up polluting water sources.

Oils and greases contain hydrocarbons and/or heavy metals such as lead, chromium and cadmium, which are known drinking water pollutants.

The contribution of wastewater and waste from the labour workforce will also be significant. Large populations of workers generate increased amounts of waste, for which no sufficient local waste management capacities may exist, which would likely lead to improper disposal practices. Project-related activities, along with workers' camps, and a lack of appropriate wastewater discharges may pollute nearby water resources, for example, R Nile (intake). Major health risks

can occur if latrine pits spill over into local streams that are used for drinking water by the host community.

The likelihood of the impact occurring is high. The extent of the impact will be local for the water pipelines but regional for pollutants arising from the operation of the water treatment plant given that River Nile traverses a number of regions and countries. The intensity of the impact is assessed as low given the short-term duration of construction activities and the dilution impact made by the greater River Nile. In addition, NWSC will procure an experienced contractor for the construction activities. The sensitivity of the receptor is medium given the number of users who depend on the River Nile as a source of livelihood. If mitigation measures are implemented, ground water quality will not be affected while impact on surface water quality will be minimal. This results in a moderate impact significance.

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

Mitigation Measures

- The Contractor shall construct a drainage system with silt traps to reduce impacts of storm water from the construction site.
- The contractor shall implement waste management according to good practice to ensure waste does not pollute the surface water resources
- Surface water runoff will be controlled during earthworks. Surface water features downslope of the earthworks will be identified, and the necessary berms and drainage channels will be installed to ensure that runoff does not collect or pond in excavated areas or quarries.
- Stockpile areas for materials such as sand, gravel, stone, and topsoil, as well as overburden dumps will be located away from any water courses and will be surrounded by perimeter or cut-off drains with sediment and other pollutant traps located at drain exits. Cut-off drains will be maintained throughout the subsequent operation phase;
- Replacement of oil / hydraulic fluids in vehicles shall not be undertaken in sensitive areas, and used fluids such as old car engine oil shall be sent back to the service providers for recycling. Where sites for such activities are located within the facility, a separate drainage should be constructed leading into an oil interceptor before release into the environment.
- All construction equipment will be kept in good operating condition to avoid oil or fuel leakages that might contaminate water resources. Poorly maintained machinery will not

be allowed to operate on site. All major vehicle repairs shall be conducted by qualified and experienced personnel at gazetted service centres (garages) away from the water transmission and distribution corridor.

- All hazardous wastes including material soiled with hazardous wastes and empty containers of hazardous materials shall be stored in a designated area on site for regular removal and disposal by a registered contractor in accordance with the National Environment (Waste Management) Regulations, 2020. All other wastes generated during site preparation and construction will be transported by the contractor or a company that has been specifically contracted to an authorized disposal area.
- A spill kit will be maintained onsite to clean-up any accidental spills.
- In open waters, especially during construction of the intake, plastic curtains will be used to contain and confine resuspension of bottom silt to minimize turbidity in surrounding and downstream areas, using longer support spans and restricting construction to dry weather where possible;
- Construction activities will largely be carried out during the dry season to avoid sediment transport to the nearby land, water courses and roads;
- Workers' camp and associated facilities where applicable will be connected to septic tank or other wastewater systems which are appropriate and of sufficient capacity for the number of workers and local conditions. These facilities will be inspected regularly to ensure proper functioning. Camp site selection shall involve several factors, including; the size and conditions of the site and availability of resources; the safety, security and protection it offers and cultural and social considerations. The Contractor shall conduct the necessary environmental and social assessments according to national and World Bank Environment and Social Safeguards Policies and acquire approvals from NEMA and the supervising engineer prior to establishment of new camp sites.
- Water from cleaning and hydrotest activities which could cause contamination of surface (or ground) waters shall be tested and treated as necessary prior to discharge, including debris and sediment removal.
- Water quality testing and monitoring at the intake should be done at least every week by the contractor under the supervision of the Supervising Consultant to ensure compliance with its environmental management policies, ESIA recommendations and national regulations; and
- Fuel handling and oil spill measures will be implemented to prevent, control and address spill or leaks. Fuel storage and dispensing on site shall not be allowed near the intake area. Fuel and oil handling will be assigned to trained personnel and procedures for fuel storage, operation of mobile fuel tankers and refuelling areas will be well defined. Impermeable sheets, spill mats, and drip trays will also be provided in the appropriate areas to curb fuel and oil leakage to the ground. This will be done at designated places at the contractor's camp and in accordance with relevant standards set by the Energy Regulation Board and Uganda Bureau of Standards (UBOS).

9.3.2.11 Loss and Relocation of Structures and Utilities

In the project area, there are existing utilities e.g. the existing water network - as built drawings, underground cables, power lines and transformers, buildings (perimeter walls, houses, etc) and other installations that may be affected during implementation. The RAP (asset survey) indicates that no residential structure will be affected as most of the homesteads are safely distanced away from the road reserve unlike 3 auxiliary structures (such as kitchens and bath enclosures), 1 commercial structure, and 9 other structures and fixtures (including gate, permanent perimeter wall and fence) that are within the 3 m of the easement corridor. However, it was noted that the Project Affected Household (PAPs) have sufficient land remaining outside the easement corridor to enable them to replace their affected structure on their existing plot but outside the easement corridor. Also, upon payment of cash compensations, PAHs will be given sufficient time to salvage building materials from any lost structures. The impact receptors include:

- Owners of the demolished property along the roads/pipelines.
- Utility owners (NWSC, UMEME, NITA-U)
- Dependants/ tenants of property owners.
- Other communities dependent on such property (e.g., when shops or other commercial outlets are demolished and not rebuilt in same locality or replaced quickly enough).

The likelihood of the impact occurring is high and sensitivity of receptors will be low because UNRA has already identified what will be relocated, what to remain and also, if PAPs are duly compensated. The intensity will be low since along UNRA road, all the utilities will already be relocated by the period of project commencement hence minor significance.

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

Mitigation Measures

- Ensure timely compensation before construction begins.
- Timely planning of relocation following and approved utilities relocation plan.
- Timely communication and notification of affected communities regarding planned relocation works.
- Establish visible and transparent Grievance Redress Mechanisms (GRM) (committees and appropriate protocols) so that complaints and dissatisfactions about the resettlement/ compensation process do not unduly delay contractors progressing works.
- Engage all stakeholders especially local leaders in mobilizing / sensitizing communities

- Identify and avoid / relocate existing underground infrastructures that are directly affected by proposed facilities / lines before construction begins.
- Provide adequate vacation notice (according to regulatory requirements, this is three (3) or six (6) months) to affected people before construction commences. This will also allow affected property owners to plan appropriately or take any salvageable material from their demolished structures without delaying contractor's work.

9.3.2.12 Introduction of Invasive Species

The introduction of invasive species, for example on vehicle tyres, in the imported construction materials such as murram, could degrade habitats and crops since invasive species which can spread quickly. Several invasive/alien species of plants were encountered along the project area and if not appropriately handled could be spread further by construction activities. These included such as *Bidens Pilosa*, *Chromolaena odorata*, *Xanthium strumarium*, *Lantana Camara*, etc. These were mainly at the peripheral of the transmission and distribution lines. This impact could mainly occur during the construction phase.

Invasive species can affect the species diversity of the project area especially at the proposed sites for the ESRs, WTP, intake and TLs/DLs given their location in the vicinity of River Nile ecosystem (especially at the intake). However, the sensitivity of the receptor site will be low given the identified species are not in these sites but in the neighborhood implying they can be avoided. A low intensity of impact given vehicles will only be using restricted accesses while ferrying materials from various locations though the number of vehicles for the construction phase is expected to be relatively high. This thus results in a minor impact significance.

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

Mitigation Measures

- Vehicles and equipment entering and leaving the project area will be inspected and cleaned to remove invasive species.
- 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.
- NWSC should ensure that the appointed Contractor put in place and effectively implement an Alien Invasive Species Eradication Plan, as part of implementing the ESMP.

Application of the above mitigation measures will reduce the impact intensity to very low resulting in a minor severity.

9.3.2.13 Health Impact – Contracting and Spreading COVID-19

Construction sites are places where people from different places can meet and interact while executing various construction activities including meetings and trainings such as daily assemblies and toolbox meetings. Such interactions pose the risk to spread COVID-19 and other similar respiratory such as pandemic influenza. COVID-19 is a new virus that had not been previously identified in humans and therefore no population-level immunity exists. While most people with COVID-19 develop mild or uncomplicated illness, approximately 14% develop severe disease requiring hospitalization and oxygen support and 5% require admission to an intensive care unit⁴⁶. Uganda is currently experiencing an outbreak of COVID19. The statistics as of 11th January 2022 were 162,273 confirmed cases (only Ugandans) and 99,412 cumulative Ugandan recoveries (Source: <https://www.health.go.ug/covid/-accessed-11/01/22>). Specifically, for Adjumani district, 1021 cases were reported and these included 156 refugees, 860 nationals and 5 foreigners⁴⁷. From these cases, 19 deaths were recorded, 4 of them from the refugee settlements, 14 from the host community and 1 employee from Plan International one of the implementing partners.

The duration of the Impact will be short-term and the extent of the impact will be local or regional depending on origin of construction workers. The likelihood of the impact occurring is medium if the contractor adequately sensitizes workers about responsible and safe behaviour. The intensity of the impact is medium given that a Covid 19 outbreak would require shutdown of works, possible a local/ regional lockdown with some patients requiring hospitalization. The sensitivity of the receptor is rated high given that Covid 19, if contracted, is has short to mid-term effects. Therefore, significance of the impact is major.

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

Mitigation Measures

- Sensitize all project employees about the signs and symptoms of COVID-19 as well as the ways to control its spread and report in cases of signs and symptoms;
- Screen local employees/contractors for COVID-19 during recruitment;

⁴⁶ Ministry of Health-National Guidelines for Management of COVID-19, 2020

⁴⁷ District Council Surveillance Report, 2021

- Screen all visitors to construction sites using a temperature gun and enforce washing of hands before entry and wearing of approved masks;
- Management of potential COVID-19 cases – in case, any workers develop the above symptoms, isolate them and immediately contact the respective District Health Officer (DHO) to pick and transport the patients for treatment;
- Reduce site traffic – prohibit entry for any non-essential visitors. In addition, utilize staggered start and finish times for workers to limit site congestion and physical contact. Further, restrict the number of people in attendance at any site inductions, and consider holding them outdoors whenever feasible.
- Practice social distancing – Consistently monitor points of worker interactions such as dining areas to ensure social distancing guidelines (2-4 meters apart) are being met.
- Prioritize sanitation – Enforce workers to wash their hands with soap and water for at least 20 seconds or to use sanitizers before entering and after leaving the worksite, as well as before and after handling all goods, materials and equipment. Routinely clean any common contact surfaces on-site (e.g., scanners, turnstiles, screens, telephones and desks). Lastly, be sure to temporarily remove or disable any site entry systems that require skin contact (e.g., fingerprint scanners).
- Limit physical contact – Make sure that the contractor stagger break times to reduce congestion and physical contact in eating areas. Require workers to keep at least 2-3 meters of distance between one another while eating.
- Enhance whole-of-society coordination mechanisms to support preparedness and response, including the health, transport, travel, trade, finance, security and other sectors. Involve public health Emergency Operations Centres and other emergency response systems early.
- Continuously sensitize the workers and pass on any new guidelines by Government and the WHO.

9.3.2.14 Social Conflicts due to Influx of Immigrant Labour

The project will attract immigrant labour into the Adjumani project area. Like any other project with mass recruitments, influx of workers may have adverse impacts on the project communities such as increased demand and competition for local social and health services, as well as for goods and services, which can lead to price hikes and crowding out of local consumers, increased demands on the ecosystem and natural resources, social conflicts within and between communities, increased risk of spread of communicable diseases, and increased rates of illicit behaviour and crime. While most workers may originate from the local community where they have families, there might be others from distant places and working away from their families. The influx of people may bring communicable diseases to the project area, including sexually transmitted diseases (STDs), or the incoming workers may be exposed to diseases to which they have low resistance. This can result in an additional burden on local health resources. Workers with health concerns relating to substance abuse, mental issues or STDs may not wish to visit the project's medical facility and instead go anonymously to local medical providers, thereby placing further stress on local resources. With some disposable income to spend, this might induce illicit

sexual relationships, with attendant risk for spread of HIV/AIDS. Irresponsible sexual relationships in project communities can break families and heighten risk of contracting HIV/AIDS. Illicit sexual relationships can be short-term but have long-term and irreversible effects if HIV were contracted.

Conflicts may arise between the local community (Adjumani) and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources. Tensions may also arise between different groups within the labour force, and pre-existing conflicts in the local community may be exacerbated. Ethnic and regional conflicts may be aggravated if workers from one group are moving into the territory of the other. The influx of workers and service providers into communities may increase the rate of crimes and/or a perception of insecurity by the local community. Such illicit behaviour or crimes can include theft, physical assaults, substance abuse, prostitution and human trafficking. Local law enforcement may not be sufficiently equipped to deal with the temporary increase in local population. Such adverse impacts are usually amplified by local-level low capacity to manage and absorb the incoming labour force, and specifically when civil works are carried out in, or near, vulnerable communities such as refugees and IDPs or in other high-risk situations.

Duration of the impact will be short-term or long-term depending on whether HIV/AIDS is contracted and the extent of the impact will be local or national depending on origin of construction workers. The likelihood of the impact occurring is low if contractor adequately sensitize workers about responsible and safe behaviour. The intensity of the impact is medium given the size of the workforce. Sensitivity of the receptor is rated high given that HIV/AIDS, if contracted, is a long-term effect. Therefore, significance of the impact is major.

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

Mitigation Measures

- The contractor will be required to develop a Labour Influx Management Plan and/or a Workers' Camp Management Plan. These will include sanctions for workers involved in criminal activities.
- As a contractual obligation, contractors shall be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc.) to implement during project execution.
- All construction workers shall be orientated and sensitized about responsible sexual behaviour in project communities.

- The contractors will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).
- Prepare a sexual harassment policy in the event of 20 or more workers
- The contractor will reduce labour influx by tapping into the local workforce. Depending on the size and the skill level of the local workforce, a share of the workers required for the project may be recruited locally. The local labour if trained could be employed afterwards for the operation and maintenance of the new infrastructure. The recruitment criteria should be transparent and fair to local communities to avoid conflicts.
- The contractor will conduct cultural sensitization training for workers regarding engagement with local community.
- Workers will be encouraged to get vaccinated against common and locally prevalent diseases.
- The contractor, where need arises, will engage an HIV service provider to be available on-site who should conduct campaigns on STDs among the workers and local community; educate workers and the community about the transmission of diseases; and implement HIV/AIDS education program and provision of condoms.

9.3.2.15 Risk of Child Labour and Violence Against Children

It is generally anticipated that local labour will be employed especially for casual activities. This anticipation is very high on the side of community leaders and members in the project area. For example, children have often been used in informal sectors like market vending at construction sites, stone quarries, animal grazing, and as domestic house workers because of the harsh environment in the camps. According to the baseline, the Adjumani District Community Services Department revealed that many children have dropped out of school owing to the COVID-19 lockdown and closure of schools and majority are involved in commercial work and supply of labour. The possibility of the contractor triggering child abuse during the project implantation is possible through hiring of child labour. Also, labour force on site might abuse children within the project area through sexual advance that could lead to early pregnancies and school dropout including exposure to communicable diseases such as HIV and AIDS. The sensitivity is therefore very high as abused children can drop out of school, face challenges of early motherhood as well as associated psychological torture. Child labour is condemned by all international conventions including those of the International Labour Organization (ILO) and the United Nations (UN) as well as the Ugandan laws.

This is short term and direct impact but reversible because of the low number of workers expected i.e., not all people in the project area will be involved in the works (most of which are casual workers to be recruited locally). The receptor sensitivity is accessed to be low because the contractor and Local governments are greatly aware of the side effects. The impact intensity is medium especially in the short-run and abused children can drop out of school, face challenges of early motherhood as well as associated psychological torture.. The ultimate impact significance is moderate because it can be handled immediately. The overall impact is moderate.

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

Mitigation measures

- The contractor will develop and implement a Children Protection Strategy (CPS) that will ensure minors are protected against negative impacts associated by the Project including SEA based on NWSC ESMPs;
- Children under the age of 18 years should not be hired on site as provided by Child Act (2016);
- Not invite unaccompanied children to workers' homes, unless they are at immediate risk of injury or in physical danger;
- The contractor should put up notices on work sites (NO CHILD LABOUR) in order to silence agitations;
- The Developer should engage District Education Officer, District Community Development Office (DCDO), Gender Officers, Parish Chiefs among others in monitoring school attendance in the project's area of implementation;
- Reporting mechanisms should be put in place such as a whistleblowing system;
- At the induction of employees, the employer should emphasise that molestation of children especially the girl child is punishable by taking the culprit to court;
- An employer who tries to shield or cover up for the employee caught in the act will equally be prosecuted, according to the penal code;
- Sensitization should be done and continuous throughout the project implementation in schools in the project area, by the DLG together with the Contractor about risk of child labour and VAC; and
- Comply with all relevant local legislation, including labour laws in relation to child labour specifically provisions of Uganda's Employment Act 2006 on protection of children against exploitation.

9.3.2.16 Risk of Gender Based Violence, Sexual Exploitation and Sexual Abuse

Influx of construction workers from outside the Project area pose social risks that can become significant negative impacts such as defilement of minors leading to teenage pregnancies and school drop-outs, social tension in some homes if husbands earn salaries and resort to drinking,

disruption of marriages due to fraternization of contract workers with women in the community triggering gender-based violence. Other related risks include sexual harassment at the workplace that can discourage women from taking up employment opportunities. Use of vulgar language by construction works can affect the social fabric especially children that can copy such behaviour and teach it to fellow pupils. According to UNCHR 2019, 322 (300F/22M) incidents of GBV were reported from the refugee hosting districts of Uganda. Physical assault was the most prevalent incident followed by rape and psychosocial abuse. The majority of the incidents were perpetrated by family and intimate partners. Key drivers of SGBV highlighted include gender inequality, conflict, power imbalances, insufficient food at home and alcoholism, and presence of discos in settlements. Other related risks include sexual harassment at the workplace that can discourage women from taking up employment opportunities. This impact could potentially be triggered during Project Construction Phase due to the potential of the Contractor's failure to comply with the following provisions;

- Gender Inclusivity requirements in hiring of workers and entire Project Management as required by Gender Policy 2007;
- Failure to protect Human Risk Areas Associated with, Disadvantaged Groups, interfering with Participation Rights, and interfering with Labour Rights;
- Ensure clear human resources policy against sexual harassment that is aligned with national law;
- Integrate provisions related to sexual harassment in the employee COC;
- Ensure appointed human resources personnel to manage reports of sexual harassment according to policy

The duration of the impact will be short-term or long-term depending on the nature of violence inflicted. The likelihood of the impact occurring is low if contractor adequately sensitise workers about responsible and safe behaviour. The intensity of the impact is low given the size of the workforce. Sensitivity of the receptor is rated medium regardless the nature of violence some of which may not be bodily harm but may leave the affected person psychologically tortured. Therefore, significance of the impact is moderate.

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

Mitigations Measures

- Develop and implement a SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA 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 Contractor shall require his employees, sub-contractors, sub-consultants, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse, including sanctions for noncompliance (for example, termination).
- The contractor will conduct mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable Code of Conduct toward local community members, specifically women.
- NWSC should ensure that social safeguards personnel are recruited as part of the project implementation personnel to supervise contractors and carry out effective and continuously community engagements 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; etc.;
- Contactor shall ensure adequate referral mechanisms are in place i.e. GBV reporting mechanisms should be put in place by the Client; and
- The contractor, where a case arises, will cooperate with law enforcement agencies in investigating complaints about gender-based violence.

9.3.2.17 Loss of Physical Cultural Resources

During the project implementation phase, certainly, PCRs like graveyards and older-trees may be damaged during site clearance, laying of the transmission mains. Given the excavation works involved in the laying of the transmission and distribution system, the possibility that some cultural features being encountered along the alignment cannot be ruled out. During the assessment, only 2 graves (at E364652, N375542 and E364643, N375514 E) in Rassia West Village, Pachara Subcounty were identified as PCRs to be impacted by the project. Otherwise, there are currently no known archaeological sites within the immediate vicinity of the proposed project area in Adjumani. However, owing to the importance of and sentiments attached to the PCR sites and the fact that only two were discovered, moreover along the distribution line and the sensitivity of the receptors is considered to be 'low'. The impact intensity is considered to be low given that there is no other PCR sites that are most likely going to be affected and the existing ones can be avoided by the project foot print. The overall impact significance is minor.

Impact Significance		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
Intensity of	1 Very low	1 Negligible	2 Minor	3 Minor	4 Minor
	2	2	4	6	8

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

Mitigation Measures

- At the local level, additional consultations will be carried out prior to commencement of works by the contractor at the project sites.
- Re-alignment of the distribution line in Rassia West Village where it crosses the graves by moving the line to the opposite side of the road (Figure 9-2);
- A '**chance find**' procedure will guide actions to be taken in the event that suspected archaeological artefacts or paleontological items are encountered and they should be handed over to Ministry of trade and industry- Department of Museums and Monuments.
- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with the Department of Museums and Monuments (DMM)
- Construction works will be designed to ensure no damage to any cultural sites or medicinal plants that may be encountered including older-trees that are culturally significant. Where such sites cannot be avoided, culturally appropriate measures will be agreed and implemented prior to the construction activities.
- Compensation of the affected sites will be undertaken before construction activities commence in accordance with World Bank requirements.

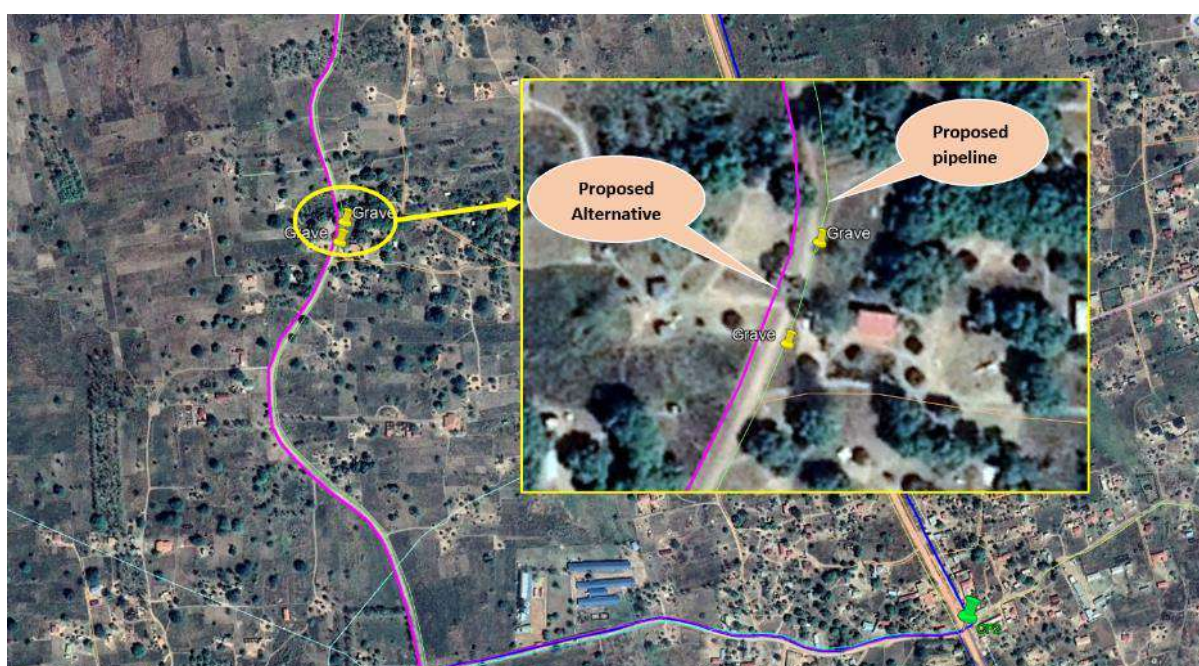


Figure 9-2: Proposed re-alignment of the pipeline

9.3.2.18 Impact on Landing Site at Arra

The proposed water supply system will have 12 MLD surface water abstracted from the River Nile at the proposed intake site located be at E366316, N390090. The construction activities are not expected to interfere with the activities at the small landing site although though it's the same location of proposed intake site. This is because it will compromise of the livelihood activities taking place onsite as it is used as a temporary landing site for fishing by the local fishermen (Figure 9-3). Nevertheless, during consultations (72 fishermen and 99 fishmongers at the river in Arra West village), the community identified another alternative point along the river that can be used as landing sites (Figure 9-4). The conditions of nearby landing site located 180 m downstream can be improved if necessary, as part of the project's corporate social responsibility.



Figure 9-3: Fisherman docking at Arra landing site in Arra village –Adjumani

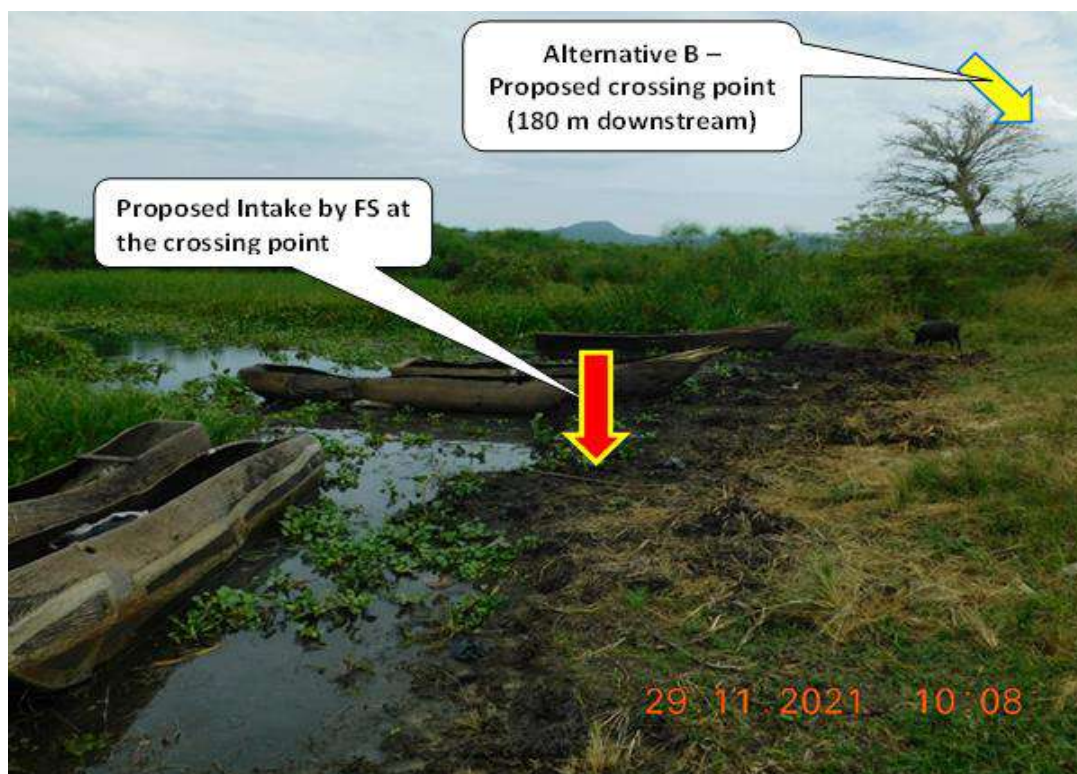


Figure 9-4: Current landing site and the proposed alternative (new) point about 180m downstream of the intake

The impact intensity is assessed low given that there are alternative points nearby the site and sensitivity is low given the population using this point is small and it will only affect the intake area. The overall impact significance is minor.

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

Mitigation Measures

- Maintain the currently proposed intake and open/create a crossing point about 180 m downstream of the intake
- Fence off the project intake and pipework to ensure minimal contact between the community near the abstraction point and the project;

- Notify the public about the construction program and of any construction activities such as transport of large equipment can trigger traffic impacts and congestion.
- Offer a transitional allowance to both fishermen (150,000 each) and fishmongers (200,00 each) to enable them relocate to the newly proposed site.

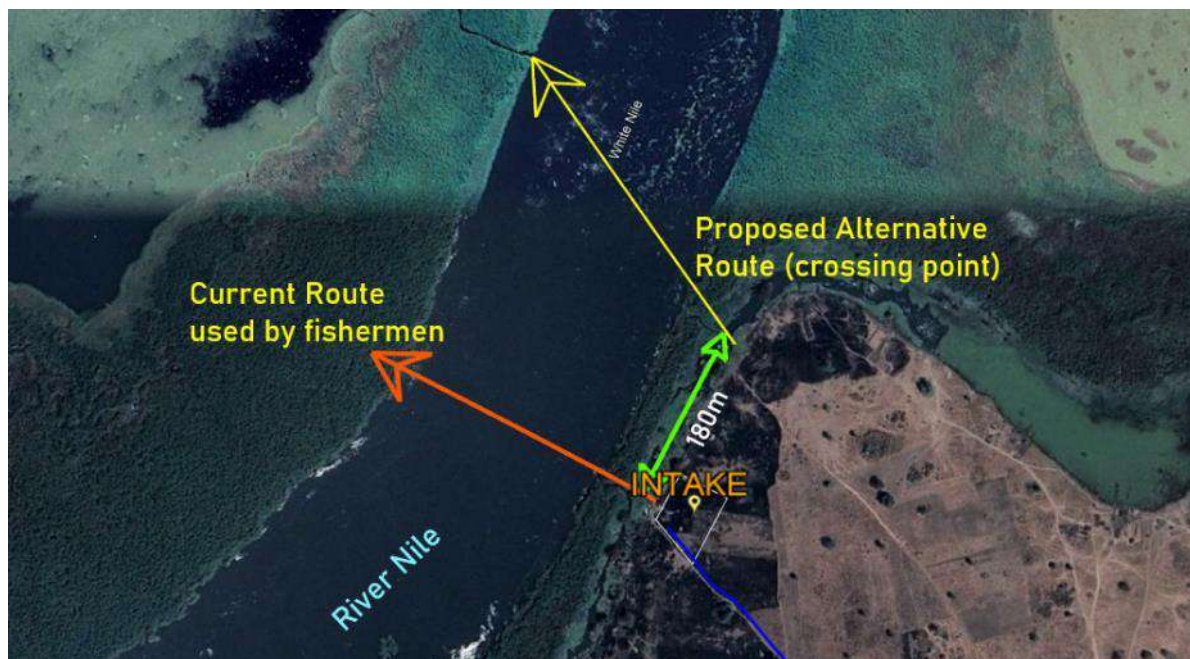


Figure 9-5: Location map of the proposed alternative sites

9.3.2.19 Occupational Health and Safety Risks

Work places have hazards. Construction traffic, heavy excavation machinery, rock blasting, working in water and open trenches, along the transmission and distributions, tank sites, WTP, boreholes, among others may pose accident risk to workers either when equipment is operated by inexperienced workers or when in a poor mechanical condition or falls into the open trenches or deep waters. Inadequate OHS risks or problems could also result from insufficient medical capability at the construction site; or neglect of safety equipment, precautions and procedures. Other hazards may involve slippery walkways, working at heights, energized circuits, and among others

Work at water and sanitation facilities may also involve entry into confined spaces. The increased risks of accidents as a result of careless driving of project vehicles, flying debris, other occupational health hazards among others are also anticipated. Other causes of OHS problem include but not limited to:

- Lifting of heavy and sharp objects;
- Poor transportation of materials for maintenance;
- Inadequate lighting and ventilation in workplaces;
- Lack of adequate training (or neglect of safety precautions/ guidelines) in use of equipment and tools;
- Misuse of equipment and materials for functions they are not designed;

- Lack of safety signage in specific areas;
- Eye hazards such as splashes;
- Lack of adequate PPE; and

Accidents could cause considerable ecological damage, financial loss and harm to human life. Duration of the impact would be long-term lasting entire life of the affected person or short-term depending of the hazard exposed to. While largely reversible, some impacts such as loss of human life and body injury are irreversible, possibly occur but localized (within limited area), temporary and non-cumulative with high magnitude. The receptor sensitivity is considered medium because it may involve loss of life or permanent damage of a person's limb (irreversible). However, NWSC will use a contractor, whose workers have done similar work and have knowledge on how to avoid such incidences. The impact intensity is considered to be medium if NWSC procures a qualified contractor who is aware of OHS measures but workers do not follow OHS requirements hence a moderate significance.

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

Mitigation Measures

- The primary measure to mitigate OHS impacts is prevention which entails identification of risks and instituting pro-active measures to avoid them. In part this can be achieved by following GIIP or national guidelines. For unavoidable risks, personal protective equipment (PPE) should be provided to workers. These should include the following;

Hearing (>80 dBA for 8 hrs a day requires hearing protection)

- Ear Muffs: One size fit all, comfortable, less ear infection risk
- Ear Plugs: Small, lightweight, can get dirty and cause infection
- Face/Eye (Working with any chemical or using any mechanical equipment)

Face Shield: Protect face from splashing and particles

- Safety Glasses: Protection from solids (cutting, sanding, grinding)
- Safety Goggles: Protects eyes from splashing

Hand (Use correct gloves for the job)

- Chemical Gloves: (Nitrile, Latex, PVC)
- Gloves for other use: special gloves for cutting, burning, abrasions/ blisters

Body

- *Overalls: Can protect against dust, vapours, splashes*

Foot Protection

- *If electrical hazard present ensure boots offer protection*
- *Safety Toe/Steel Toe Boots: Always worn when potential for falling hazards exists*
- *Water/Chemical Resistant Boots: Use in a spill situation*
- *Non-slip boots for working on wet/slippery floors.*

Working in water

- *Water rescue apparel*
- *Water proof cardboard element*
- *Life jackets*
- Orient all staff on safe work practices and guidelines and ensure that they adhere to them.
- Training staff on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences.
- Regular safety drills to constantly follow on various possible incidences.
- Develop evacuation procedures to handle emergency situations.
- All working vehicles should have a functioning reverse warning sound.
- While working at R. Nile, workers should be in life jackets
- There should be water rescue apparel in place at all times of work
- Use of water proof cardboard elements during construction
- Those working at heights should put on body harness.
- All excavations should have permit, and excavations exceeding 2 m should be protected with shoring.
- Shoring should be used on all excavations exceeding 2 m, and excavations should be covered before closure of the site each day.
- Workers should undergo toolbox meetings daily.
- Workers should get acquainted with the material safety data sheets (MSDS) for equipment and should use and operate equipment according to manufacturer's instructions.
- A qualified Health and Safety Officer will be recruited by the Contractor to oversee OHS matters on a daily basis.
- Personnel will only undertake tasks for which they are trained/ qualified. A formal 'permit to work' system will be in place and strict instructions will be given for operators of equipment.
- Maintenance of accident logs on site to register all injuries and to investigate their causes to prevent reoccurrence.
- Emergency resources (e.g., fire extinguishers, stocked First Aid kits, Emergency Contacts, Doctor on Call, etc.) will be maintained at all active construction sites.

9.3.2.20 Community Health and Safety Risks

Like any development project brought in an area, it is likely that a considerable number of people will be attracted to the construction site. The Adjumani WSSS is a community project, is also anticipated that the project will expose communities near the intake, WTP, boreholes, ESRs, MBR, along the TLs/DLs to a number of hazards that need to be fully assessed and mitigated. These will include both the job seekers from outside the project area and the local residents in the neighboring villages and towns. There will be increased traffic and population influx and its associated effects. The community health and safety (CHS) risks include falling in pits being dug, knocked by project vehicles, dust, noise from machines and rock blasts e.g. at location E364526, N374781 (1.1km from Ajdumani - Laropi Main Road) where the pipe will meet a rocky surface and blasting may be a requirement or else the pipe will be laid on the surface, vibrations from construction equipment, as contaminated water or spread of disease, sexual or other exploitation, particularly of vulnerable groups such as women, children, and the elderly. Cattle and other domestic animals may also fall in trenches and pits or get nocked by project vehicles. The likely community health and safety hazards include: dust; noise and vibration from construction vehicles, risks of communicable diseases associated with the influx of temporary construction labor; and accidents and injuries;

The impact is likely to occur with low intensity since it will be at specific sites and sensitivity will be low given that NWSC will hire an experience contractor and all the site deadly sites will always be fenced off the community hence a minor significance



Figure 9-6: Cattle along the Adjumani – Laropi Road

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

Impact Significance		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
	High	Minor	Moderate	Major	Major

Mitigation Measures

- Instituting speed limits on project vehicles,
- Use of signs and barriers to show the dangerous areas;
- Identify and clearly mark all areas with restricted accessibility to the public;
- Enforce restrictions on unnecessary entry into the project site or any protected zone
- Follow the mitigation measures prescribed to reduce any dust or noise impacts.

9.3.2.21 Risk of Seismic Activity

The site is located on a fairly stable geological unit. However, numerous faults exist within the country and tremors due to earthquakes do occur. Adjumani district (project area) is largely located on a fairly stable geological unit with medium seismic hazard (risk levels) along the Albertine environment (western rift valley). Although, numerous faults exist within the country and tremors due to earthquakes that do occur, the project area is located within the shield area, along the western rift and about 20 km south of the Aswa Fault Zone. The sites are located in Zone 2 of the Seismic Zoning of Uganda, implying a medium risk (Figure 7-46). It is therefore susceptible to the medium potential effect of major tectonic features of regional scale. This is a cross-cutting risk from pre-construction to construction and then to operation and maintenance phases.

The intensity of the impact will be medium given the location of the project area and failure due to seismic hazard (earthquake). The sensitivity of the receptors is rated medium due to its effects in case it occurs e.g. it may lead to huge financial losses. Therefore, significance is predicted to be moderate.

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

Mitigation Measures

- i) The structures should be designed to exhibit some amount of ductility to tolerate dynamic loads generated from seismic activity. Reinforced concrete structures are recommended for such purposes. Pre-stressed concrete structures are also useful, but do not perform as well as reinforced concrete under earthquake conditions.
- ii) Appropriate design codes have been followed to reduce risks of damage to health and property. Appropriate design of seismic acceleration values consistent with Contract Technical Specifications and National standards should be adopted during structural designs. These should be in line with the US 319:2003 Uganda Standard for Seismic code of practice for structural designs (UNBS, 2003) which categorises project region to be in seismic zoning that needs the structural design factor of 0.8 (Z_{max}).

Implementation of the above mitigation strategies will reduce the impact intensity to very low hence a minor impact significance.

9.3.3 Operation and Maintenance Phase

9.3.3.1 Decrease in Water Resources

Surface water abstraction from River Nile beyond the recommended 12 MLD (138 l/s) could result into decrease of water level, which will affect the river's ecology and other water uses. The motorized abstraction of groundwater has the potential to deplete the groundwater resources if the abstraction rate exceeds the aquifer recharge rates. To alleviate this, test pumping of the three boreholes (T1, T3 and T4) will be conducted after drilling for a duration of not less than 72 hours to estimate the safe well (borehole) yields. Additionally, pumping should not exceed the recommended number of hours in a day the boreholes are designed to pump water for. The recharge of the aquifer which depend on the rainfall regime of the area among others factors and the infiltration of part of the same can be affected by human activities⁴⁸ that impact the amount of rainfall received in the area and the amount of infiltration.

This is long-term and wide impact. The sensitivity of the receptors is considered to be high as unregulated abstraction can lead to change in the hydrology of the area while the impact intensity is considered to be very low since it can be observed that the lowest ever recorded flow in River Nile (from 2000 to 2020) is approximately 959 m³/s in 2009 and the proposed abstraction is 12MLD (0.139 m³/s) (0.015 % of the lowest flow). This equivalent to 0.017% of flow that is exceeded 90% of the time which is approximately 810 m³/s. Additionally, there are other surface water sources that exist in the area i.e., R. Nyeguy hence the overall impact significance is minor.

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

⁴⁸ Such activities include land use changes like deforestation, wetland drainage for agriculture

Impact Significance		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
	4 High	4 Minor	8 Moderate	12 Major	16 Major

Mitigation Measures

- To ensure that the ground water resources are not depleted, the abstraction rate should not exceed the rates determined during the test pumping exercise.
- The water levels should continuously be monitored to ascertain any impact on the water level – with guidance from DWRM.
- Water levels should be accompanied by monitoring of the water quality to ascertain any trend in water quality change with continued abstraction.
- The developer should apply/acquire the abstraction permits which will facilitate adherence to agreed rates of abstraction on one side and also guide the DWRM while issuing abstraction permits in the vicinity, to other competing users.
- NWSC and all the stakeholders should utilise the catchment/source protection plan in Annex 16 for proper water resources management.

9.3.3.2 Air Pollution

According to the baseline findings, the ambient air quality of all proposed sanitation facility sites in Adjumani conforms to the WHO standards. However, obnoxious smells may arise from poor handling and management of sludge at the water treatment plant. This will affect public health, especially for the staff and people residing close to the water treatment plant. This will affect public health, especially for the staff and people residing close to WTP. The odours may attract flies and breeding of disease vectors.

This is a direct negative impact, long-term, at local extent since it can only take place around the WTP and neighbouring communities. The likelihood of the impact occurring is high if waste management is not considerate. The intensity of the impact is low once not well handled while sensitivity of the receptor is rated high due to the discomfort experienced people around, hence resulting in a moderate impact significance.

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

Mitigation Measures

- Odour neutralizing chemicals (e.g., Metazene) should be used where the smell is persistent
- An odour complaint procedure should be established to ensure that complaints of odour from the public and project staff are recorded. Information such as date, time, weather conditions, and characteristics of the odour can help to trace the cause of odour and manage it.

9.3.3.3 Failure of the Water Supply Equipment/Components

There could local incapacity/ inexperience to operate and maintain specific water supply equipment/ component. This will result into the collapse or poor performance of the equipment/components, including resulting into supply of drinking water of unacceptable standards. This issue has been observed in other areas. Poor maintenance of the water description network may result into cross-contamination, which may expose water consumers to water-borne diseases, among others.

This will be a long-term, reversible and wide scale impact. The intensity is medium as the supply will cover a wide area. The sensitivity is medium since water supports very many activities in human daily activities and failure will need more capital input. This results into a moderate significance.

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

Mitigation Measures

- The Developer (NWSC) should employ qualified staff to operate and maintain the project equipment/components.
- The equipment/components should be regularly inspected to detect and malfunctions.

9.3.3.4 Solid Waste Generation

During the operation of the project, solid waste will be generated from the activities of the water office as well as activities of maintaining the water transmission and distribution lines. The wastes that will be generated include food remains, polythene bags, plastic bottles, papers, containers

for treatment chemicals such as chlorine, wrappings for spare parts, etc. Wrappings/cylinders for treatment chemicals can be hazardous to humans and the environment if not safely disposed.

The sensitivity of receptors is assessed as 'low' given that the solid waste will be generated at already established sites with waste disposal facilities from the construction phase while the impact intensity is assigned 'medium' rating since the impact of solid wastes, though localized, temporary and largely reversible, can be immense in magnitude and cumulative in effect. This ultimately results in a moderate impact significance.

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

Mitigation measures

- A waste management plan for the operation phase of the project will be developed and implemented.
- Waste collection bins will be provided at strategic positions at the water offices, water source sites and reservoirs sites for temporary waste storage. The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes.
- The water supply system operator will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA.
- Engage waste handlers including the nearest Town Council;
- Re-usable wastes be sold or given away to interested parties; hazardous/toxic wastes (e.g. chlorine and alum containers be returned to supplier or given to a NEMA approved waste handler;
- other wastes be disposed of at only NEMA approved sites or sites approved by local authorities.



Figure 9-7: Waste collection bins (labelled) for sorted waste

9.3.3.5 Water and Soil Pollution

Improved water supply comes with an increase in the amount of wastewater generated by households and industrial or commercial facilities. Poor disposal or management of the wastewater generated will lead to land and/ or water pollution and related sanitation problems if proper treatment systems such as septic tanks are not utilized. In cases where household are connected to water and not to sewerage system, they may use septic tanks whose cesspool or soak pit overflow may lead to contamination of soil and/or groundwater. Sludge and effluent generated at the water treatment plant may pollute soil and water in the seasonal stream which is located downstream of the water treatment plant, if not managed well. Water and soil pollution may also occur due to poor storage and handling of water treatment chemicals

This is a direct negative impact, long-term and local in extent. The likelihood of the impact occurring is high if water users are not educated on techniques for safely disposing of wastewater or sullage from their households especially in informal settlements. The intensity of the impact is low, and sensitivity of the receptor is rated medium resulting in a moderate impact significance.

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

Mitigation Measures

- Sensitize households to construct proper septic tank systems;

- NWSC to provide toll free numbers where they can be reached for customer support and emergency notifications

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

9.3.3.6 Impacts from Damage of the Pipe Network

The water distribution system is a critical component in delivery of safe potable water. Even if water is effectively treated to remove contaminants and destroy pathogens, waterborne disease outbreaks can occur because of deficiencies in the water distribution system. Activities like construction of commercial buildings and roads within close vicinity/on the transmission lines could result in damaging of pipes thereby causing pollution and loss of water. This was evidenced with bush burning practices which in the project area which is dangerous to water pipes (Figure 9-8). Therefore, measures to prevent or minimize losses and potential community health risks associated with damaging of water distribution system need to be undertaken. These impacts can be caused by leakage of or brokerage of pipes etc.



Figure 9-8: Bush burning practice in Arra West along the transmission line from the intake

The sensitivity of the receptors is considered to be medium although the pipeline corridors will always be demarcated, while the impact intensity is considered to be medium since the pipeline repairs cost NWSC a lot. The overall impact significance moderate.

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

Impact Significance		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
	4 High	4 Minor	8 Moderate	12 Major	16 Major

Mitigation Measures

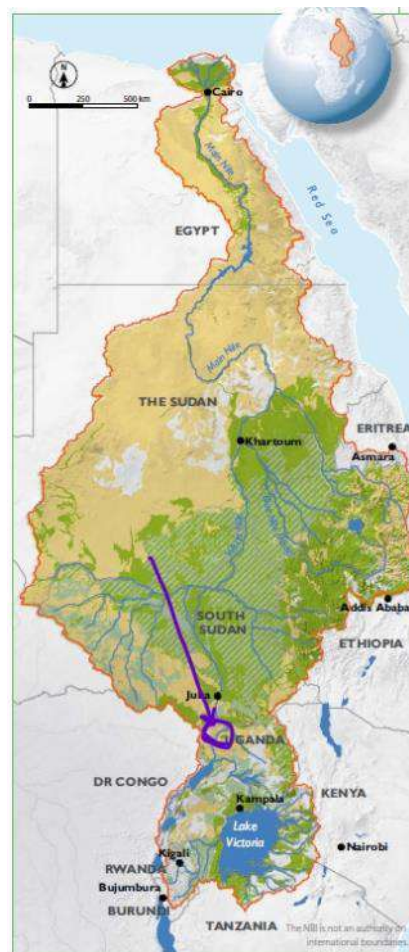
- The contractor should clearly mark the transmission line with visible landmarks. The local authorities should encourage its people to respect road reserves and avoid building on water transmission lines;
- Design and implementing a leak detection and repair program;
- Prevent introduction of contamination from the distribution system itself, for example by:
 - Minimizing microbial growth and biofilm development (e.g., by ensuring adequate residual disinfection levels and pressures). Collect samples from several locations throughout the distribution system, including the farthest point, and test for both free and combined chlorine residual to ensure that adequate chlorine residual is maintained;
 - Choosing residual disinfectant (e.g., chlorine or chloramines) to balance control of pathogens and formation of potentially hazardous disinfection by products;
 - Using construction materials that do not contribute to release undesirable metals and other substance or interact with residual disinfectants.
 - Constant monitoring of water quality

9.3.3.7 Transboundary Issues

River Nile drains about 9 countries before pouring its waters in the Mediterranean Sea and due to its immense water quantity, the project raw water intake for this water stressed region has to be located on the river. However, the Nile being a Trans-Boundary water body shared by several state including Uganda, it may present a precarious situation that water abstraction has to be allowed and negotiated by the governments under the auspicious of international law on the use of shared river resources, the East African Community Protocol and the Nile Basin Initiative. Transboundary water resources management⁴⁹ presents both opportunities and challenges – countries working together can often reap greater benefits than working alone, but historical

⁴⁹ The State of the River Nile Basin 2012

tensions, issues of sovereignty, and difficulty in determining reasonable and equitable use must all be overcome. The Nile Basin has a number of stress factors including; untreated wastes, water hyacinth, unrecorded abstraction of water from the river while stresses on littoral zones include construction and farming on the riverbanks, conversion of wetlands, poor solid wastes management. Stresses from the basin include land degradation, deforestation, inflow of water hyacinth, pollution from agrochemicals, sediment loads and poor solid waste management. These stresses require regional cooperation and efforts. Despite the challenges, Nile basin holds significant opportunities for win-win development that could enhance food production, energy availability, transportation, industrial development, environmental conservation and other related sustainable development activities. Cooperative water resources management offers unique opportunities as catalysts for greater regional integration both social-economic and political with potential benefits exceeding those derived from the river itself. This requires a basin-wide approach to management through a framework for sustainable transboundary development and management of the water resources.



The sensitivity of the receptors is considered to be medium since there many states depending on the same water body or hydrological setup while the impact intensity is considered to be very low given the proposed abstraction amount of 0.139 m³/s compared to the entire basin and mean flow of 810 m³/s River Nile. The overall impact significance is moderate.

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

Mitigation Measures

- Involvement of stakeholders from the onset of project identification till implementation helps in creating interest, sense of ownership and sustainability of the entire process;

- Disclose the detailed design report and the ESIA to countries downstream of the proposed project area and other regional bodies such as the Nile Basin Initiative (NBI), NELSAP, L. Victoria Basin Commission and the secretariat of the East African Community (EAC) for review and input;
- Create a forum for regional participation during construction works by inviting representatives of the partner states to be part of project supervision teams;
- The ministry should notify all the Nile partner states on the proposed development and subsequent acknowledgement of receipt of that notification. Everything done must be in conformity to the cooperative framework agreement for the Nile. Sharing progress reports to partner states and regional bodies should be considered;
- In case grievances arise, the states shall follow guidance on conflict mediation as detailed in the UN Convention on the Law of the Non-Navigational Uses of International Watercourses. The MWE/NWSC has an International Transboundary Water Affairs Department which can work closely with the Ministry of Foreign Affairs to address any conflicts that may arise in future;
- Utilize the cooperative framework to facilitate basin cooperation in water resources developed under the Nile Basin Initiative;
- Utilize regional programs such as the World Bank supported Cooperation in International Waters in Africa (CIWA) program assists riparian governments in Sub-Saharan Africa in unlocking the potential for sustainable, climate-resilient growth by addressing constraints to cooperative water resources management and development. CIWA funds a variety of organizations – governments, river basin organizations, regional economic communities, civil society organizations, and African regional or national organizations – to address the constraints of cooperative transboundary water management. Managed by the World Bank, CIWA is uniquely poised to provide neutral third-party facilitation, technical support, and critical analysis to better understand transboundary water issues and inform decisions.

9.3.3.8 Climate Change Risks and Impacts

There is overwhelming scientific evidence of a warming trend in the Earth's temperature, and consensus about the movement towards intensified extreme events such as floods and droughts. The Nile Basin is highly vulnerable to the impacts of global warming owing to a multiplicity of factors, and the basin communities have limited ability to cope with the negative impacts of climate variability. This is because according to evidence in large parts of the Nile Basin, there has been increase in the temporal variability of rainfall in recent years (State of the River Nile Basin, 2012). Climate and water resources interact in two obvious ways: (i) rainfall drives run-off and recharge; and (ii) temperature, wind, humidity, and other climatic factors drive evapotranspiration and water demand. Changes in precipitation patterns will automatically affect each source and the consequences could be devastating depending on the magnitude.

Impact on water quality: Water quality in rivers, lakes, and wetlands is influenced by both temperature and flow regime and is therefore vulnerable to climate change. Because oxygen solubility in water has an inverse relationship with water temperature, this, together with

increased BOD of water systems, could lead to depressed levels of DO in many water systems. Increases in heavy rainfall and temperature are projected to change soil erosion and sediment yield, although the extent of these changes is highly uncertain and depends on rainfall seasonality, land cover, and soil management practices. Surface water resources are more vulnerable to climate change, as lower flows will imply less volume for dilution and, hence, higher concentrations of nutrients and other pollutants downstream of discharge points. Low levels of precipitation and increased temperatures in the Nile Basin will result in drought.

Impact on water infrastructure: Fewer rainfall days with more intense rainfall may lead to increased flooding, landslides, and associated impacts. The Adjumani WSSP infrastructure, including raw water intake, raw water pumping station and raw water transmission pipelines can be affected by floods, sedimentation due to excessive runoff, as well as other climate hazards that can lead to financial losses. The Feasibility Report (hydrological assessment) shows that R. Nile flows ranging between 900 – 1500 m³/s, occasionally cause floods up to 200 m from river channel. The location of intake is adequate in terms of flow velocity distribution but can floods in case of change in water level. Likewise, the streamlines show a steady behaviour parallel to the banks. The river course does not change throughout despite large flood events occurring.

Impact on aquatic ecosystems: Change in precipitation due to climate change is of concern, as water sustains both terrestrial and aquatic biodiversity, fish reproductive patterns, distribution of macro-invertebrates and amphibians, and migration patterns for migratory water birds. Negative changes in R. Nile water availability may have undesirable consequences for the rich biodiversity, both flora and fauna in the river ecosystem. According to the e-flow analysis, the 40% of Monthly Average Flow (MAF) is 473.5 m³/s and recommended e-flow of 473.48 m³/s. The proposed abstraction of 0.139 m³/s is just 0.03% of the e-flow and MAF values. Thus, this amount is enough for the downstream competing water needs (ecosystem) through the year.

Risk of conflicts: Owing to the decrease of the water supply for domestic use, livestock and crop production, hydropower production, and industrial use, water-use conflicts may occur at different levels. Water stress will result in increased, protracted, and complex water allocation. This will give rise to conflicts between farmer and pastoralist communities, domestic and industrial users, users upstream and downstream within and between basins, states sharing transboundary water resources, and the public and private sectors among others. Therefore, water allocation and rights in the Nile Basin should be carefully managed to minimize conflicts between communities, basins, economic sectors, and states. The periods of increased annual and seasonal (JF and OND) runoff may produce benefits for a variety of both in-stream and out-of-stream water users by increasing available water resources. However, this may simultaneously increase flood risk and pollution in low-lying areas of the Nile e.g., location of the intake in Arra West.

Impact on groundwater abstractions: Climate variability and change is likely to influence groundwater systems both directly (through replenishment by recharge) and indirectly (through changes in groundwater use such as increased use of groundwater) in times of drought and non-availability of surface water in the Nile Basin.

Mitigations and Enhancement Measures

National Initiatives: The National Adaptation Programme of Action (NAPAs) for the EAC countries mention projects that conserve the catchments, from reforestation and planting riparian vegetation to sustainable land management and Integrated Watershed Management e.g., reforestation projects in Tanzania on Mount Kilimanjaro, Land degradation management projects in Uganda among others. Provision and promotion of alternative sources of fuel, such as charcoal briquettes made from charcoal dust, water, and a binding agent such as soil, paper, or starch. This would save trees that would have been otherwise cut down. Agricultural inputs, such as phosphate and nitrogen fertilizers, need to be used appropriately to avoid eutrophication of the lake. This will be achieved through adaptation and implementation of some of the developed tools and instruments such as:

- EAC - Climate change Policy;
- EAC - Climate change Master Plan;
- EAC - Climate change Strategy; and
- LVB - Climate Change Vulnerability Impact Assessment.

Since the NBI activities contribute to building resilience to climate change in the Nile Basin in a number of interlinked ways, understanding variability in river flows is one of the first steps in understanding climate change impacts and planning how to respond to them.

High level stakeholder meetings/consultations i.e., Ministerial meetings, guided by the presidents of the partner states, discussing the challenges along the common borders should be held.

Establish a Joint Expert Group to continuously develop holistic and integrated basin/catchment management plans for Nile Basin.

Monitoring water quality and flows: Climate adaptation strategies and policies should focus strongly on managing sustained high variability in river flow rates and coping with frequent severe droughts, floods, and pollution of waterways during floods. Most of the rivers and watercourses are not gauged, and the rural and peri-urban water supply is not considered an essential part of most water treatment systems. Therefore, MWE/NWSC should consistently monitor levels and quality of R. Nile.

Sharing of climate information: Regional climate organizations such as ICPAC, EAC, and National Meteorological Departments of the Nile Basin states need to share annual, monthly, and seasonal climate projections to various stakeholders of the R. Nile to enable evidence-based decision-making. This information can be used to develop scenarios of possible future climate conditions (and the respective impacts and adaptation decisions of the various water systems) with stakeholders involved with management of water resources. This will allow decision makers to contemplate uncertainties associated with climate change.

9.3.3.9 Reduced Affordability (Inability to Access Water)

The project area has very many people with low levels of income, including refugees. Such people/households may fail to pay for water connection charges or water utility fees. The currently proposed cost per unit for Adjumani WSS is higher than the prevailing level of water affordability in other water service areas in Adjumani with the majority of the households willing

to pay about UGX 1,000 per month as borehole fees and a range of UGX1700 to UGX3700 per unit for piped water. Assessment shows that 36% of the households would opt for house connection, 32% for yard taps, 31% for PSP and 1% for piped water. The willingness to pay show that 85% heads of household pay for water and 15% heads of household do not pay for water. Also, 53% uses more than 50 ltrs/day, 25% uses 21 – 49 ltrs/day while 12% uses 10 – 20 ltrs/day. In case the newly proposed Adjumani WSS increases the charge per jerry can/per unit as proposed in Table 9-3, it will hinder affordability and utilization. This is because 53% of the HHs is willing to pay a maximum fee of UGX100 per jerry can (20 ltrs) of safe water, hence increased fees will escalation substitutability as the target population may prefer alternative sources of water e.g. boreholes, which may affect the usability and the willingness to pay for the improved water system.

Table 9-3: Proposed water tariff for metered customer category under Adjumani WSS

Customer Categories	Current Metered Tariff	Proposed Tariff Phase 1	Proposed Tariff Phase 2	Proposed Average Metered Tariff (UGX)/m ³
Domestic:	3,516	4,728	3,075.48	3,902
Institution	3,558	4,785	3,112.22	3,949
Commercial up to 1,500 m ³	4,220	5,675	3,691.28	4,683
Commercial > 1,500 m ³	3,373	4,536	2,950.40	3,743
Public Standpipes	1,060	1,426	927.19	1,176

The sensitivity of the receptors is considered to be low since household can access alternative sources (deep boreholes, rivers, no matter the distance), while the impact intensity is considered to be medium given that the project developer put into consideration the economic situation of the project area when developing the project and ultimately when setting water prices for the project beneficiaries. The overall impact significance is moderate.

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

Mitigation measures

- UNHCR should provide subsidies for internally displaced people (IDP) / Refugee communities.
- NWSC should consider population's willingness to pay of UGX100 per 20 ltrs of safe water (based on the project area's economic profile and vulnerability) in Adjumani.

- NWSC should subsidise water connection charges for low-income communities.
- Public standard pipes, which have subsidized water charges should be provided in low-income communities where people cannot afford private connections.

9.3.3.10 Loss of Jobs for Water Vendors

In Adjumani District and particularly in the proposed project area, due to the great distance to traditional water source waters, fetching water is done by water vendors. They often carry 20-litre jerry cans on motorcycles, bicycles, wheel barrows, any other bulk carriers. They sell jerry cans of 20 litre capacity each UGX 500 or more based on prevailing circumstances (low in the rainy season and high in the dry season). The vendors are likely to have their livelihoods undermined following project implementation. By introduction of piped potable water supply, water vendors will lose their source of income within the project area as water will be accessible at homesteads and at nearby public posts.

The sensitivity of the receptors is considered to be medium since the vendors can put their effort and investments into other sources of income, while the impact intensity is considered to be low given that the water vendors can extend their services to areas not covered by the project. The overall impact significance is moderate.

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

Mitigation measures

- NWSC 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 based on the SEP.
- The community Development officer (CDO) should mobilise the local people (including water vendors) and sensitise 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.
- Vendors should be encouraged to be involved in casual work in the course of the construction works.

9.3.3.11 Occupational Health and Safety Aspects

Worker places have hazards. In operation of the WTP, reservoirs and piped water network, workers may drown at the intake works, they may falling/tripping, and they will be exposed to electrical hazards. Also, depending on the maintenance equipment used, they may be caught-in-/between, or be struck by objects or equipment. Workers at the facilities might experience negative health impacts, particularly during operation of deep water treatment units like clarifiers, filters and poor operation of the chemical equipment like chlorine gas or calcium hypochlorite powder. Fatal falls, suffocation and injury while working in confined places. Other causes of OHS issues may include ;

- Lifting of heavy and sharp objects;
- Poor transportation of materials for maintenance;
- Improper storage as well as handling and use of dangerous substances/ chemicals;
- Inadequate lighting and ventilation in workplaces;
- Lack of adequate training (or neglect of safety precautions/ guidelines) in use of equipment and tools;
- Misuse of equipment and materials for functions they are not designed;
- Lack of safety signage in specific areas;
- Electrical hazard;
- Eye hazards such as splashes;
- Lack of adequate PPE; and
- Biological hazards (vermin, mosquitos, pathogens, etc.).

This will be a long-term and limited scale but reversible. The intensity and sensitivity are rated medium resulting into a moderate significance.

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

Mitigation Measures

- Workers need to be protected from work related hazards by providing them with PPEs following the guidelines below;

Hearing (>80 dBA for 8 hrs a day requires hearing protection)

- Ear Muffs: One size fit all, comfortable, less ear infection risk
- Ear Plugs: Small, lightweight, can get dirty and cause infection
- Face/Eye (Working with any chemical or using any mechanical equipment)

Face Shield: Protect face from splashing and particles

- Safety Glasses: Protection from solids (cutting, sanding, grinding)
- Safety Goggles: Protects eyes from splashing

Hand (Use correct gloves for the job)

- Chemical Gloves: (Nitrile, Latex, PVC)
- Gloves for other use: special gloves for cutting, burning, abrasions/ blisters

Body

- Overalls: Can protect against dust, vapours, splashes

Foot Protection

- If electrical hazard present ensure boots offer protection
- Safety Toe/Steel Toe Boots: Always worn when potential for falling hazards exists
- Water/Chemical Resistant Boots: Use in a spill situation
- Non-slip boots for working on wet/slippery floors.

Working in water

- Water rescue apparel
- Water proof cardboard element
- Life jackets
- Training on LOTO (Lock-out-tag-out procedures when working with electrical gadgets).
- All working vehicles should have a functioning reverse warning sound.
- Working at R. Nile, workers should be in life jackets. Those working at heights should put on body harness.
- Use signage and posters to warn staff and/ or visitors about restricted areas e.g., the laboratories, among others in order to keep people out of danger.
- Continuous occupational risks management plan, registration and inspection of workplace, equipment and vehicle inspection and servicing, among others
- Machinery should continuously and regularly be well serviced and should be in good working condition. Servicing of equipment's should be done at camps far off the project area.
- For fuel dispensers at camps, workshops and equipment areas, the fuel tanks shall be kept in bunded walls to contain any spills and dispensing areas paved with drainage fitted with

oil interceptors. Oil spill kits shall be kept at active construction sites, workshops to handle and accidental spills.

- Where applicable, equipment should be fitted with silencers to reduce noise mainly backup generators.

9.3.3.12 Community Health and Safety

During the operational phase, there is likely to be risk of drowning by both children and adults near the intake area. The children or adults may be enticed to swim in the Nile or while doing and may end up drowning or may drown accidentally while fishing. Furthermore, domestic animals may also drown in the river while trying to drink from it since the intake area will be an open environment without much vegetation. The risk of drowning can be long-term and irreversible when it involves death/loss of life.

The impact intensity will be low since the deadly sites eg the intake will be fenced off. The sensitivity will be low as NWSC will apply its vast experience from other operating sites to minimise the occurrence hence a minor impact significance.

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

Mitigation measures

- Sensitization of the community on the risks/dangers of swimming in the R. Nile especially for the children since it's a very deep river;
- Provide watering points for livestock (about 180m) downstream of the intake where a new crossing point was proposed by the community;
- NWSC together with Local community should form a Project Management Committee which should address issues of operations of the intake at Arra West village.
- Impacts on community safety and downstream activities will be mitigated by i) community announcements and advertisements in case of change in water levels, as well as in the Emergency Preparedness Plan (EPP) which should periodically be updated.

9.4 Cumulative Impacts

Cumulative effects manifest when socio-environmental conditions are already or will be affected by past or on-going infrastructure development projects or activities. In the case of the Adjumani

Water Supply Project, there is Construction of Atiak – Adjumani – Laropi Road (by UNRA) already on-going in the project area, the proposed Laropi – Umi Bridge (by UNRA). The cumulative impacts (CIs) that will originate from the proposed Adjumani WSSP e.g., water pollution, disruption to traffic flow and communication routes and over abstraction effects.

9.4.1 Construction Phase

9.4.1.1 Disruption to Traffic Flow and Communication Routes

The proposed project will cut across several roads within the project area including the Atiak – Adjumani – Laropi Highway (connecting Northern Uganda and West Nile areas) which is being tarmacked. Construction activities will involve trenching mainly in the road reserve, however, with concern about the points where the trenches cross major roads and trading centres.

There will be major road crossings by both the transmission and distribution lines (Table 9-4 and Figure 9-9) hence road diversion may arise but alternatives are available. Furthermore, diversions, relocations and anticipated damages along the ongoing Atiak - Adjumani - Laropi Road have already catered for (Figure 9-10). For example, most road crossings by the pipeline have been catered for by the Contactor/UNRA and incorporated in the road design with the guidance from the design team.

At these points, there is an anticipated risk of reduced traffic safety on the road thus, increased road accidents. It is therefore necessary that key precautions be undertaken at such road crossing to avoid accidents and impairing traffic activities. The movement of project vehicles while dropping workers and delivering materials may also compromise the safety of the road. Furthermore, the use of project vehicles and equipment on community access roads will expose road users to more traffic accidents.

Table 9-4: Major Road crossings by both main and feeder roads

Crossing Point (CP)	Easting	Northing
CP1 (Nyeu – Pachara)	367261	386427
CP2 (Adjumani TC)	365558	374959
CP3 (Adjumani TC)	364203	374552
CP4 (Adjumani TC)	364508	373772
CP5 (Adjumani TC)	365702	373750
CP6 (Dzaipi)	383876	375011



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

- The Contractor shall develop and implement a traffic management plan
- Disruptions to public access shall be identified in the Contractor's Traffic Management Plan, under which suitable notice of intending delays and closures are given to all

concerned parties and approved prior to commencing work. All road closures shall be separately notified and agreed with the subcounty administration.

- Where access to or from an individual property is closed for a period of 2 hours or more, the owner shall be informed at least 7 days in advance.
- Vehicular access to and from hospitals, police stations, and other public institutions shall be maintained through the use of steel road plates over open trenches. Pedestrian access to schools, health facilities, and other premises frequently accessed by the public will be maintained with the use of walking boards.
- To minimize interference with traffic, half of the road shall be closed to enable vehicles use one half as the other half is being excavated and installed with pipe work. The excavated soil shall be temporarily consolidated on the sides of the road and re-used for backfilling immediately the laying of pipework is completed.
- Road safety and site safety training should be done involving construction workers, police and local community.
- Conspicuous signage shall be well placed on roads and the Contractor's Traffic guides on ground shall direct traffic in case of diversions or open trenches.
- 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 before usage.
- All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits.
- The vehicle speed shall be limited to a maximum of 30km/hr areas near sensitive facilities.
- Works near sensitive facilities like schools and health centres shall only be limited to day time (7am to 6pm).
- MOU between UNRA and NWSC to designate this responsibility regarding any claims to ownership of land within the road reserves especially in Adjumani, or any proposed UNRA road (if any) should be done
- Adopt the crossing sections provided by the contractor on Atiak - Adjumani - Laropi road.
- The Design Team will continue to discuss with UNRA to assess the designs and any other feasible options (tunnelling Vs trenching across the tarmac road) and to secure UNRA permission secured for road crossings.
- The trenchless technology should be used at major crossings like roads to avoid disruption of traffic flow.
- Appropriate signage should be used and impacted owners will be informed ahead of disruption.
- Vehicular access to and from hospitals, police stations, and other public institutions shall be maintained through the use of steel road plates over open trenches. Pedestrian access to schools, health facilities, and other premises frequently accessed by the public will be maintained with the use of walking boards.
- The laying of pipelines, backfilling and temporary reinstatement shall follow trench excavation as quickly as possible and trenches will not be left open for extended periods.



Figure 9-10: Structures for pipe crossings provided by the Contractor on Atiak – Adjumani – Laropi

9.4.2 Operation and Maintenance Phase

9.4.2.1 Water and Land Pollution

The presence of the proposed water supply project will induce establishment of other projects, especially in Adjumani Town Council. These projects may include food processing factories, unplanned settlements, and recreation facilities. The activities of these projects may contribute to water and pollution in the long run in case their discharges are not regulated.

Duration of the impact will generally be long-term and the extent of the impact will be regional. The intensity of the impact is low given that NWSC is operating similar or even bigger projects to the proposed one in other several areas and is well versed with process to avoid pollution. Also, for these new developments, the regulation of NEMA and Adjumani DLG will always apply to minimise pollution. Sensitivity of the receptor is rated low. Therefore, significance of the impact is minor.

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

Impact Significance		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
	4 High	4 Minor	8 Moderate	12 Major	16 Major

Mitigation Measures

- Adjumani District Local Government should ensure that all projects are regulated and licensed, and monitor their activities.
- Make sure that new developments are approved by the Adjumani Town Council technical team
- In case of any development that will discharge waste on land or in water, effluent exiting the should be treated to meet the National Environment (Standards for the discharge of effluent into water or land), Regulations (2020).

9.4.2.2 Over Abstraction of Water

Similar with water pollution, the existence of the proposed water supply project may induce the establishment of other projects that will draw large amounts water from the river. These may include food processing plants, steel rolling mills, etc.

Duration of the impact will generally be long-term and the extent of the impact will be regional. The intensity of the impact is low given that the regulation of DWRM and Adjumani DLG will always apply to regulate abstraction. Sensitivity of the receptor is rated low. Therefore, significance of the impact is minor.

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

Mitigation Measures

- Adjumani DLG should ensure that all projects are regulated and licensed, and monitor their activities.
- All proposed establishments with aim of abstracting higher amounts of water should acquire permits from DWRM/MWE.

10 ENVIRONMENT AND SOCIAL AND MONITORING MANAGEMENT PLAN (ESMMP)

10.1 Overview of ESMMP

This chapter describes how the Project proposes to manage the environmental and social impacts and risks that will arise during the pre-construction, construction and operation phases of the proposed Adjumani WSSP. It 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 during all project phases.

Monitoring will begin immediately and will continue through both the construction and operation phases. One important aspect of monitoring will be to assess the effectiveness of the mitigation measures suggested, where they are found lacking, appropriate new actions to mitigate any adverse effects will be undertaken.

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

10.2 Objectives of the ESMMP

The objectives of the ESMMP include:

- (i) Assist in ensuring continuous compliance with national laws and regulations, international agreements and requirements of the WB;
- (ii) Provide a framework for NWSC's compliance, auditing and inspection programs;
- (iii) Provide a mechanism for ensuring that measures identified in the ESIA are implemented to mitigate potentially adverse impacts and enhancement of positive ones; and
- (iv) Provide assurance to regulators and stakeholders that their requirements with respect to environmental and socio-economic performance will be complied with.

10.3 Phases of Implementation

Implementations of these measures will be carried out at different stages of the construction and operation phases. During the design stage, the feasibility and design consultant will incorporate proposed mitigation measures in the design and tender documents. The contractual agreement will also include clauses to enforce the management of environmental aspects. 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 the civil works will also include the implementation of the relevant environmental and social mitigation measures.

10.4 Integration of Safeguards into Procurement Process (Contracts)

Implementation of mitigation measures during construction is key to managing short- and long-term impacts and risks. They should be included in technical specifications in all contract documents related to the civil works. Safeguards clauses should be prescriptive and specify: what needs to be done, where it needs to be done, when and how the actions will take place, who is responsible, the monitoring and reporting requirements, and what sanctions or legal recourse are available for work that does not meet the required specifications. The indicative costs of implementing safeguards should be clearly provided as a provisional sum in the Bills of Quantities.

10.4.1 Bidding

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

10.4.2 Bill of Quantities (BoQs)

The BoQs must capture all relevant safeguards aspects. The indicative costs of implementing safeguards extracted from the ESMP budget should be clearly provided as a provisional sums or billable items in the Bills of Quantities. These should include safeguards staffing, documentation (CESMP, etc.), waste management, HIV/AIDS, grievance redress, gender awareness, site clean-up and landscaping, monthly ESMP reporting among others. Laxity in the provision and use of personal protective equipment is a risk to the safety of workers. The BoQs should provide a sum for PPE and supervision be done to ensure that all workers undertake works while in full PPE.

10.4.3 Safeguards Clauses

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

10.4.4 Procurement of the Contractor

Implementation of mitigation measures during construction is key to managing short- and long-term impacts and risks. As a best practice, the contracts for the civil works should include clauses on management of environment and social aspects. Sometimes, the clauses are weak and cannot be used to hold the contractors accountable. There is need to strengthen the clauses and to tailor them to the specific project safeguards aspects and management needs. The contractual agreement will also include clauses to enforce the implementation of the relevant mitigations. The clauses should be included in technical specifications in all contract documents related to the civil works. Safeguards clauses should be prescriptive and specify: what needs to be done, where

it needs to be done, when and how the actions will take place, who is responsible, the monitoring and reporting requirements, and what sanctions or legal recourse are available for work that does not meet the required specifications.

10.4.5 Staffing

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

10.4.6 ESMP Monitoring and Reporting

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

10.4.7 Project Reporting Commitments

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

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

10.4.8 Decommissioning and Restoration of Disturbed Areas

At the end of the construction period, the Contractor must ensure restoration of all disturbed areas including materials sites through proper landscaping, backfilling and restoring topsoil, (re-) introduction of genetic species (e.g., natural re-grassing) similar to those destroyed in order to re-establish the natural local ecology. The final payment must be tagged to successful restoration activities.

10.5 Contractor Management Plans and Method Statements

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

10.5.1 Labour Force Management Plan

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

10.5.2 Quality Management Plan

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

10.5.3 Erosion and Pollution Control Plan

Soil erosion is a very important aspect given the location of the construction site along the banks of the R. Nile, at the WTP, TL, DL, and ESRs. 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. There is need to lay special strategies for managing the soil erosion, because the project footprint is located into area with riverbed soils mainly at the intake, characteristically loose and can be easily eroded in the river and it results in major impacts of siltation.

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

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

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

Erosion prevention practices like stabilization are generally less costly and more effective than sediment control measures, which involve settling or filtering mobilized soil particles before they are transported by runoff to surface waters. Various practices can be used for sediment removal from dewatering discharge. Sedimentation is primarily effective at removing larger sized particles, while filtration and chemical treatment can also remove the fine particles. These approaches are less effective for dissolved nutrients and metals that are non-adsorbed. Effectiveness of chemical treatment depends greatly on the pH and temperature of the water being treated. The Contractor should ideally include a comprehensive Erosion, Sedimentation and Pollution Control Plan Checklist.

10.5.4 Waste Management Plan

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

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

The Contractor shall undertake measures to respond to all generated categories of wastes. The Contractor should be aware that large quantities of cut to spoil may be generated which will require disposal. Therefore, the contractor is expected to identify potential sites for waste

disposal before excavation works commence in order to secure the requisite approvals in a timely manner.

10.5.5 Occupational Health and Safety Management Plan

The Contractor will have to prepare a document that presents the framework for occupational health and safety management and monitoring measures to undertake. The OHS plan should typically cover safety programs that will be applied for promoting health and safety, preventing harm, fatality and hazards to the employees, sub-contractors, properties and the general public. The contractor should be aware of the presence of hippos in the area which usually move out in the night to graze and crocodiles being a river bank with riverine and floating vegetation. These can be dangerous if approached and disturbed.

10.5.6 Emergency Preparedness and Response Plan

An emergency event is an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons, including failure to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning. The main purpose of an Emergency Response Plan (ERP) is to provide a systematic approach to the protection of employees, assets and the environment from impact of serious incidents. The plan encompasses organizing, coordinating and implementing a range of procedures to prevent, mitigate, respond to and recover from the consequences of an emergency event. The ERP covers the required actions for all situations that could generate emergency situations during the project's construction phase. The ERP guided on management of emergency events during the stages of construction for example: earthworks, traffic management, casting, relocation of utilities and among others.

It will be developed to establish general guidelines and response procedures for the management of emergency events on the Project. It will also establish an emergency management command structure and mechanisms for review, oversight and accountability. The contractor shall establish procedures to ensure that all personnel have the skills to report environment incidents. The contractor shall keep records of all incidents, investigation, and analysis and counter measures taken.

The ERP will also set out the means by which these measures will be communicated to affected communities in a culturally appropriate manner. The EPRP should have Best Practices, which include working with local and national agencies like the fire brigade, police, hospitals, counter terrorism units etc.

10.5.7 Security Management Plan

The purpose of the Security Management Plan is to assure a safe and secure project environment for staff, visitors and its service providers alike and to mitigate any risk of loss/damage to project property, equipment or its infrastructure. It identifies potential security risks present in the construction phase, methods and policies 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. The Plan will specifically deal with:

- a) Security issues in the project i.e., being safe from attacks from thugs and ill motivated persons;
- b) Being prepared for insecurity incidents; and
- c) Decisively responding to and managing the insecurity circumstances and incidents.

10.5.8 Community Health and Safety Management Plan

The Plan applies to project construction activities and the associated risks and potential impacts that these activities may have on community health and safety. The risks and potential project impacts to community health and safety can emerge from both within and outside the so-called project area of influence. Therefore, the scope of this plan focuses on the management of aspects associated with the interaction of construction activities, the workforce, and the community as well as mitigation of contagious diseases (e.g., COVID-19; etc). The Plan should include control measures designed to avoid, minimize or mitigate the adverse effects of project activities on the health and safety of the community, while at the same time, enhancing the beneficial effects and capitalize on opportunities that may contribute to improving overall community well-being.

10.5.9 HIV/AIDS and STIs 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.

10.5.10 Gender and Social Equity Management Plan

A gender and social equity management plan is a set of actions, which spell out a strategic view aimed at achieving gender equality in a work environment. In a bid to achieve this in a work environment, the contractor should have such a plan to guide the assignment of roles for both men and women equally, creating gender awareness amongst all categories of stakeholders, ensuring women's participation and local communities during project implementation process to achieve the intended gender and social outcomes. The social equity component should explicitly bring out issues of disability, elderly and other vulnerable categories of the communities.

10.5.11 Child Protection and Management Plan

Contractors should be cognizant of the importance of child protection issues and their responsibility to uphold the rights of children at all times. A child protection plan should spell out measures to prevent any form of abuse of children such sexual violence, exploitative labour and sexual exploitation which include children. Additionally, the plan should have stringent punitive

measures properly defined for potential perpetrators of child related abuse. This should also be signed by contractor workers as part of their contractual obligations to guard against child abuse.

The Child protection Plan shall include the following:

- a) Brief Overview of Child Concerns
- b) Policy, Legal and Regulatory framework governing child protection issues
- c) Child Protection Risks at each site
- d) Contractor's Policy on Children and Codes of Conduct
- e) Child Protection Services by contractor (Prevention & Mitigation)
- f) Arrangements for Referral & Linkage to Other Child protection services in area
- g) Support Offered to Children to access justice
- h) Mentorship & Training
- i) Monitoring & Reporting
- j) Schedule of Engagements such as Community Meetings and Joint Stakeholder Meetings.

10.5.12 Cultural Heritage Management Plan

This plan will include measures to manage risks and impacts on cultural heritage during construction. There could be other unknown physical cultural resources (PCRs) within the construction areas. If any chance finds are made, measures must be taken to ensure 'conservation' in accordance with legislation and to contact the Department of Monuments. Detailed Chance Finds Procedure (CFP) has been provided in Annex 5.

10.5.13 Decommissioning/ Site Restoration Plan

At the end of construction activities, the Contractor shall ensure restoration of the disturbed natural sites through environmental rehabilitation, backfilling and restoring topsoil, (re-) introduction of genetic species (e.g., natural re-grassing) e.g., at the intake, WTP and ESR sites 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:

- a) Workers' camps
- b) The parking yards
- c) Material stockpile areas
- d) Makeshift roads within the site premises
- e) Immediate surroundings of the access roads whose vegetation will be cleared during construction

Specifically, the process of rehabilitating and restoring the site shall follow the following sequential approach:

- a) All facility structures shall be demolished; the rubble/debris shall be used for fill purposes or taken to an approved disposal site;
- b) All obsolete equipment, vehicles, trucks and machinery shall be removed from sites;
- c) Makeshift access roads shall be closed, scarified and revegetated
- d) Backfilling all openings with soil and leftover overburden
- e) Planting fast-growing trees and grasses to stabilize excavated areas with native species;

- f) 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, the Client (NWSC), Resident Engineer and the District Environment Officer.

10.5.14 Auxiliary Sites Acquisition and Management Plan

Pursuant to set standards and guidelines for construction, a contractor is supposed to have auxiliary sites such as dump sites for depositing of solid waste and borrow pits for extraction of raw material. And as such a contractor should have a strategy in place to manage these sites, carry out environmental impact assessments for each in accordance to national environmental laws, standards and international best practices to ensure the social and environmental safeguards are upheld. This can only be achieved through having robust auxiliary sites acquisition and management plan which serves as a guiding and management tool for auxiliary sites.

10.5.15 Biodiversity Management Plan

The biodiversity management plan shall outline actions and measures necessary for the effective monitoring of the flora, fauna, water sources, aquatic and wetlands within camp site, quarry, borrow pits and along the bridge and access roads being constructed. The plan shall consider the following;

- a) Covers identified impacts on biodiversity;
- b) Details specific control measures to be implemented by contractors (and subcontractors), to achieve biodiversity protection;
- c) Protection of the river banks, agricultural land, and control of erosion when there will be temporary interference with vegetation cover and natural drainage of the area.
- d) Compliance with slope protection, erosion Control and soil conservation measures
- e) Minimization vegetation clearance and protection of biodiversity rich sections of the river including fish breeding areas.
- f) Rehabilitate the cleared areas with re-grassing, turfs and tree planting

10.5.16 Traffic and road safety Management plan

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

10.5.17 Method Statement for Intake Structure

According to the Detailed Design Report (2021), a DN 600mm pipe for the intake is required however to take care of functional requirement of cleaning/desilting, two pipes of DN 1000mm

pipes are proposed. Therefore, for abstraction of water into the intake structure, the design team proposed two methods i.e., the trenchless technology with **Tunnel Boring Machine** (TBM) or using **cofferdam** for temporary diversion of the river and construct the intake structure inside the river.

The reports states that trenchless technology is good though Horizontal Directional Drilling (HDD) may not be suitable i.e., using the TBM due to; i) challenge of pulling of pipes from river-side using machinery/equipment on a raft; and gushing of water from River Nile in to the jacking pit area. Alternatively, considering the cofferdam would be the best method if there was decrease in water levels in the river during summer. However, a constant 8-10m normal depth of water level in River Nile throughout the year is challenging.

Precisely, an option will be given to the Contractor to adopt suitable method for construction of intake and a method statement will be sought during tendering stage of the project.

Therefore, the contractor should prepare a method statement with clear environment protection measures to be implemented during the construction of the intake structure. This should entail the controls for silt such as use of a silt fence to minimize turbid conditions in the river. In addition, wastewater will be generated during dewatering and casting works which must be pumped out of river. This must be treated in settling tanks and corrected for pH before discharge. The contractor may have to secure a wastewater discharge permit.

10.6 Stakeholder Engagement Plan (SEP)

The World Bank's OP 4.01 requires the stakeholders and communities to be informed of the ESIA implementation process. All stakeholders need to be kept informed during project implementation so as to accord the necessary support and advice. This consultation and public participation will be on-going process that will continue throughout the implementation of the ESIA. In pursuit of timely, meaningful and appropriate stakeholder engagement, the contractor is expected to have a clear strategy for stakeholder engagement to assist in managing and facilitating future engagement through the various stages of the Project's life cycle from mobilization up to handover. The SEP shall detail the key stakeholders to be engaged and the schedule of engagements throughout the various stages of construction, decommissioning and the defects liability period.

10.6.1 Purpose of SEP

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

10.6.2 Stakeholder Categorization

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

- a) **Primary level stakeholders** considered to have high influence and power in respect to the project, project area and potential impacts and project implementation. These require regular engagements and consultations throughout the project life.

- b) **Secondary level stakeholder** considered to have either high influence but low power or high power but low influence. These will require to be initially consulted and regularly kept informed. These will require to be initially consulted and regularly kept informed.
- c) **Tertiary stakeholders** considered to have low power and low influence.

10.6.3 Information Needs

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

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

10.6.4 Disclosure Mechanisms

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

- i) Scheduled public hearings at community level (village and parish) for initial disclosure, disclosure of draft reports and final reports including their implementation
- ii) Dedicated and select meetings with institutional stakeholders at the central regional, district and sub-county levels at different project phases
- iii) Dedicated meetings with select social groups like livelihoods groupings and vulnerable social groups including women, youth, PWDs and local leaders.
- iv) Project Background Information Document (PBID) summaries will be prepared, translated and shared alongside other strategies described herein
- v) Non-Technical Summaries (NTS) of the ESIA will also be developed for public disclosure through print media and info-shops for the regulators, funder and project proponent.

Table 10-1: Stakeholder Engagement Plan template

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

10.6.5 Monitoring, Evaluation and Reporting

Monitoring of the stakeholder engagement activities is important and two levels of monitoring are anticipated:

- a) Process monitoring during the engagement activities: short-term monitoring of stakeholder engagement activities to ascertain whether SEP is being followed and expected outcomes are being realized; necessary resources have been deployed and are being used efficiently; routine reporting is being undertaken and reports used to make improvements in the SEP and its implementation; and whether necessary support supervision for the stakeholder engagement team is being realized.
- b) At the completion of all planned engagement activities, a review of activities, outputs and outcomes will evaluate the efficiency and effectiveness of the SEP.

The SEP should include key performance indicators (KPIs) that reflect the objectives of the SEP and the specific engagement activities, and make it possible to both monitor and evaluate the stakeholder engagement processes undertaken.

Reporting in respect to this SEP is anticipated at several levels:

- a) Internal reporting within the stakeholder engagement team.
- b) External reporting by NWSC to stakeholders and WB.

Table 10-2: Environmental and Social Mitigation Plan

Project Phase	Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
Positive Impacts				
Pre-construction	Social Acceptability, Community Involvement and Ownership for the Project	Ensure meaningful public disclosure of design and other information before and during project implementation to avoid misinformation among communities especially in areas where the project is not covering (non-beneficiary areas)	NWSC/ District Local Governments of Project Area	5,000,000
		Increase respectful engagement among those from diverse cultures and decrease intolerant practices by community members.	NWSC District Local Governments of Project Area Contractor	
		Encourage respectful engagement by workers and other members	NWSC/Contractor	
		Maintain a strict level of sensitivity to cultural concerns and differences between workers and members of the community.	NWSC/ District Local Governments of Project Area	
Construction	Employment Opportunities	To manage social conflicts and negative politics that could arise, the Client should coordinate with the appointed contractor to ensure that priority for employment is given to the local qualified people within the project zones depending on their skills and training.	NWSC/Contractor	
		Adequate occupational health and safety standards should be provided to ensure the work environment is conducive.	Contractor	Within contractor's bid budget
		Conduct Labour Inspections on contractor's workplaces by District Labour Officer (DLO).		4,000,000
		Contractor should adhere to national labour laws, policies and regulations more so on remuneration and worker grievance management.	Contractor	
		The provision of jobs to local people should be properly handled in terms of transparency and openness. Involve LC1 village leaders in identifying casual and semi-skilled workers (Offer Identification / registration forms). The same should apply to refugee settlement with the help of the camp commandant. However, the contractor has jurisdictions over recruitment process and eligibility requirements.	NWSC/ District Local Governments of Project Area/ Contractor	
		Where possible, the Adjumani WSSP should integrate social protection mechanisms such as offering casual jobs to vulnerable and marginalized people. These include the PAPs e.g., displaced households, women, youth, disabled persons, lactating mothers, widows, and older persons. In case of employment of vulnerable members from child headed households, the person employed should be at least 18 years of age in line with the Employment Act.	NWSCContractor	
		Women should be given preferential opportunities and employees should be issued appointment letters and contracts with clearly spelt out and understandable terms of employment. The GBV , HIV/AIDs risk mitigation measures must be put in place.	NWSC/Contractor	

	Human Capacity Building in Form of Skills Training and Technology Transfer	The contractor must also ensure that workers are paid on time. Vulnerable groups like the youth and disabled should be given priority.	Contractor	
		Contractors will be encouraged to pay a “living wage” to all workers	Contractor	
		Foreign companies should be required to have a joint venture with local companies to build their capacity.	NWSC/Contractor	
		In addition, terms of agreement as per the Contracts terms for construction works Contractor for the project’s construction and O&M phase should emphasize knowledge transfer and the project developer (NWSC) should monitor and ensure that the objectives are met.	NWSC/Contractor	8,000,000
		O&M manual and standard operating procedures must be handed over to the operators (NWSC).	Contractor	
Operation and Maintenance	Improved / Increased Access to Safe and Clean Water by Communities	Conduct customer education and sensitize water users and communities about operations of new water system, especially on how to access new connections to minimise on the possible misconception and negative attitudes.	NWSC/ District Local Governments of Project Area	Within jurisdiction NWSC
		Scale-up the intensification of lines, especially in areas where the trunk mains are too far away for the customers to be able to connect at reasonable cost.	NWSC	Within jurisdiction NWSC
		Ensure effective customer relations and customer care	NWSC	Within jurisdiction NWSC
		Ensuring that water is affordable and available all the time	NWSC	Within jurisdiction NWSC
		Need for continuous customer satisfaction surveys in order to obtain customer feedback and improve performance within new and old service areas. Additionally, NWSC Commercial Services Unit (CSU) should revise its customer education action plan to include aspects of catchment protection, mainstreamed with climate change adaptation and mitigations.	NWSC	15,0000,000
		Provide several communal water points will be provided for the community water needs, the locations of these water kiosks will be identified in consultation with the local residents and will be chosen bearing in mind the close proximity to the people they intend to serve.	NWSC	
		The amount of water dispensed by the kiosks should vary depending on the number of residents in that area.	NWSC	
	Improved Public Health Conditions and Health Security	Provide piped water connections to most health facilities (institutional connection) in Adjumani district i.e., Ciforo, Dzaipi, Pakele, Adjumani Towns, among others as part of the intensification lines.	NWSC	Within jurisdiction NWSC
		Ensuring that most of the communities in the project foot print are connected or have access to the piped water i.e., extend water to as many households as possible	NWSC/ District Local Governments of Project Area	Within jurisdiction NWSC
		Ensuring that operations and maintenance are properly done to avoid issues of water contamination and shortage.	NWSC	20,000,000
		Ensuring that water is affordable and available all the time	NWSC/ District Local Governments of Project Area	Within jurisdiction NWSC

		Sensitize the communities about the dangers of using unsafe water	Within NWSC jurisdiction	6,000,000
Gender Empowerment and Equality		Ensuring that women and girls are also given priority while recruiting personnel for the project.	NWSC/Contractor	
		Ensuring the all the households within the project footprint are either connected or have access to clean and safe water.	NWSC	
		Mainstreaming gender into government policy and programming, together with Gender Focal Persons	NWSC	
		Create water programs that reflect the integral roles of women and girls as providers, users and managers of water supply services	NWSC	10,000,000
		Increase capacity of the district and service providers to address gender and water.	NWSC/ District Local Governments of Project Area	5,000,000
Improved Education Outcomes due to Access to Safe Water		Provide intensified lines / piped water connections to all 9 ECD centres, 12 primary schools and 1 seed secondary schools.	NWSC	
		Extend the distribution network to cover as many communities as possible	NWSC	
Abridged Water Vulnerabilities Among Rural & Urban Host and Refugee Communities		Integrate gender mainstreaming in water operations.	NWSC	
		Promote climate resilience and other feasible adaptive pathways among host, IDP/refugee communities such as water storage.	NWSC/ District Local Governments of Project Area	25,000,000
		Intensify water network to as many areas as possible including taking water back to where it comes from (Arra West)	NWSC	
Rural Transformation Through Improved Living Conditions (Reliable and affordable Piped Water Supply)		NWSC needs to align its proposed developments in line with the physical plans of Adjumani TC and Pakele, Dzaipi and Ciforo RGCs and other mushrooming centres in Adjumani.	NWSC	Within NWSC jurisdiction
		Subsidise water prices to those who want to be water vendors in the respective areas of distribution.	NWSC	
		Make sure that all health centres along the pipelines access water e.g. Arra HCII, Dzaipi HCII, Ciforo HCIII, Pakele HCIII, Pagirinya HCIII, Pachara HCII. This is because even those who have water, there is shortage given the patient numbers received per day.	NWSC	
		Endeavour to engage physical planning committees for proper planning at all stages		
Improved Local Governance and Social Accountability		The operations and maintenance of new water system should be safeguarded from political undertones arising from the discrepancies between those who are connected and not.		
Benefits to the Economy Through Increased Investment in the Area		During the construction phase, conditions should be put in place to ensure contractors prioritize use locally produced materials.	NWSC/Contractor	
		The water distribution network connections should target Small and Medium Enterprises (SMEs).	NWSC	
		During the construction phase, all contractors and sub-contractors should be registered tax payers with the Uganda Revenue Authority (URA) and should pay applicable taxes and remittances in a timely manner.	NWSC	

		The project developer should ensure that engineering designs, architectural drawings and site layout plans for the various project facilities be submitted to the Physical Planning Committee of Adjumani District Local Government for review and approval.	NWSC/Contractor	
		The Central Government through URA should ensure that project facilities operator makes timely submissions and routinely update their tax bases.	Government of Uganda	
Negative Impacts				
Pre-Construction	Loss of Land and Displacement of Economic Activities	Ensure timely and appropriate compensation before construction begins as per the recommendations of the RAP report.	NWSC	RAP Report
		The RAP should take into consideration local community and household preferences when proposing compensation and/or relocation to the PAP. For instance, a land owner who is partially affected by the project may be willing to relocate part of his property rather than complete relocation from the affected land.	NWSC	585,770,084 as determined in the RAP Valuation Report.
		PAPs should be given training on financial literacy entailing how to use their compensation packages.	NWSC	RAP Report
		Feasible in-kind compensation can be considered especially for institutional land owners, for instance, provision of individual taps and/or connection of public infrastructure to the piped water system rather than cash payments.	NWSC	
		LGs should be involved in mobilization and sensitizing PAPs, for instance, the client could assign Community Development Officers (CDOs) tasks to register and follow up project affected persons.	DLG	5,000,000
		Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses to secure settings. Prior to the construction phase, farmers shall be sensitised on the pending project at least 6 months in advance such that cultivation within the project sites/ components' footprint is stopped or reduced.	NWSC	Already covered
		In cases where the landlords object using their land for the water pipelines without any compensation, NWSC shall in line with Section 76 9(a) of the Water Act, Cap 152 enter upon any land, take its levels and set it out as the authority thinks necessary, dig, trench and break up the soil, and use or remove any material dug from the land;	NWSC DLG Contractor	
		All land acquired for establishment of the water treatment plant, transmission pipes, reservoir tanks and any other activity either by the Client or contractor shall be compensated for in accordance with land Act. 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.	NWSC DLG	
Construction	Loss of Vegetation	Institute and maintain an active GRM on site during the construction phase to ensure that any arising issues are promptly and amicably addressed such as property affected but not previously envisaged in the RAP is timely compensated for as applicable.	Contractor	Within Contractor's bid budget
		Vegetation clearance should be limited to only localities required for development.	Contractor	Within contractor's bid budget
		The design (during routing/network analysis) tried as much as possible to restrict the project sites and the water transmission and distribution line routes within the road reserves at the pre-construction stage.	Contractor	

		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	Contractor	Within contractor's bid budget
	Loss of Habitat for Fauna	Clearance of fauna habitat (vegetation and soils) should be limited only to localities required for development.	Contractor	
		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.	Contractor	Within contractor's bid budget
		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.	Contractor	10,000,000
		All project workers should be sensitized to minimize damage to vegetation and fauna.	Contractor	Responsibility of EHS under the contractor
		If any wild or aquatic animals (e.g., crocodiles, hippos, pythons among others) are encountered, the Contractor shall notify UWA so that it is picked and taken to a secure place.	UWA	5,000,000
		Trenching, pipework laying as well as backfilling will be done concurrently. The contractor shall ensure that every evening, the pits are covered with timber while being secured with a warning tape in case they are not backfilled.	Contractor	
		Close monitoring and supervision of the construction operations to ensure compliance and avoid causing further damage to undesignated project areas.	NWSC/Supervising Consultant	
		Wetlands/swamps and floodplains along the project alignment should be given due attention during the construction phase to avoid negative impacts by: <ul style="list-style-type: none"> Avoiding intentional spilling of petroleum products; Implementation of the water act and wetlands policy, specifically articles that prohibits pollution and dumping of waste. Undertaking a confirmatory survey to set out the actual pipeline route based on the Engineers route and alignment. Two (2) pipe supports (pedestals) are normally adopted for a 6m length of a pipe because the risk of bending is at the ends of the pipe; Once this has been approved by the Engineer, the Contractor pinpoints (identifies) the exact locations for the pedestals; Excavation and filling these locations with hardcore until settlement ceases; Formwork (in the shape of a square or rectangle) is placed above the hardcore; Once approved by the Engineer – reinforcement works for the pedestal base and column are undertaken until the pedestal is ready to receive the pipe. 	Contractor	
	Impacts on Land Use/cover	The water transmission line routes should be as much as possible restricted within the road reserves.	NWSC/Contractor	
		Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the water sources, 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.	NWSC	585,770,084 as determined in the RAP Valuation Report.
		Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses to secure settings. Prior to the construction phase, farmers shall be sensitised on	NWSC	30,000,000

		the pending project at least 6 months in advance such that cultivation within the project sites/ components' footprint is stopped or reduced.		
		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 and crops.	Contractor	
		The contractor should always consult and plan with communities on convenient stock piling areas and accesses during construction.	Contractor	10,000,000
		The contractor should always provide temporary accesses to all affected premises.	Contractor	Within Contractor's bid budget
		Existing accesses should be restored after works, or convenient alternatives provided.	Contractor	Within Contractor's bid budget
		NWSC shall acquire a riverbank user permit from NEMA to carry out a regulated activity in along the riverbank of River Nile in Arra West	NWSC/Contractor	Within NWSC jurisdiction
	Decline of Pristine Landscape and Emerging of Vector Breeding Grounds	Construction materials (stone-based products, murram and related fill materials) subsoil will be sourced preferably from relevant licensed and existing (active) sources i.e., extraction and processing of such materials (as applicable) be in accordance with the provisions in such licences. It is suggested that, the contractor(s)/suppliers be asked to provide copies of proof for such licenses before effecting the supply process;	Contractor	Contractor's bid budget
		The sites be fully revegetated with plants species approved by the Supervising Engineer and District Environmental Officer (DEO)	Supervising Engineer/DLG	
		Excavated soil shall be stock-piled with its edges protected from erosion and such materials can be used during site restoration with the approval of the Supervising Engineer and Adjumani DEO;	Supervising Engineer/DLG	
		Restoration of materials source sites be approved by both the Supervising Engineer and the DEO before issuance of certificate of works completion; and	Supervising Engineer/DLG	
		There should be close and routine monitoring of restoration activities in the site by environmentalist from the Contractor and the Engineer.	Contractor/Supervising Consultant	
		If no suitable licensed source of murram/subsoil is available in the area and the contractor plans to obtain the material from a private landowner, then the contractor will: <ul style="list-style-type: none"> • Provide NWSC with a copy of the written agreement between the contractor and the owner of the murram/subsoil source in advance of the beginning of works at the location. The identity of the landowner will be certified by a certificate of ownership or a paper signed by the LC1 Chairperson and/ or Head of Clan. However, depending on volumes that may be required, an ESIA/PB may be mandatory as per the NEA 2019 by NWSC/Contractor. • Engage and consult any households and/or communities in close proximity to the identified murram/topsoil source and provide evidence of these consultations to NWSC; • Ensure adequate compensation on mutually agreed terms is made to people who are either physically or economically displaced by the activities of the contractor. The contractor will provide documentation of the compensation terms (minutes of consultation meetings, signed agreements with affected persons, compensation receipts etc.) to NWSC; 	Contractor	

		<ul style="list-style-type: none"> Assess health and safety risks linked to murram/subsoil extraction and transport, and implement appropriate mitigation measures. The risk assessment will be provided to NWSC ahead of the beginning of works; and Provide a restoration plan for review, and ensure that the actions of the restoration plan are implemented to the satisfaction of concerned authorities. Sign-off from the relevant authorities will be required and copies of the sign-off will be provided to NWSC. 		
		Surface water run-off will be controlled during earthworks. Surface water features down-slope of the earthworks will be identified, and the necessary berms and drainage channels will be installed to ensure that run-off does not collect or pond in excavated areas or quarries.	Contractor	
	Susceptibility to Soil Erosion and Pollution Risks	A waste management plan will be developed prior to start of construction activities.	Contractor	
		Vegetation clearance should be limited to localities required for development.	Contractor	
		Construction sites should be hoarded off before excavations and soil barriers put in place 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.	Contractor	
		Topsoil should be removed prior to carrying out excavations and 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.	Contractor	
		A spill kit will be maintained onsite to clean-up any accidental spills.	Contractor	
		The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation.	Contractor	Within Contractor's bid budget
		Excess excavated soil material which will not be used for construction works shall be removed from the site in a timely manner and deposited at an approved site	Contractor	Within Contractor's bid budget
		Areas adjacent to the construction site should not be disturbed and care taken to minimize the area of impairment caused by on-site storage of construction materials and equipment.	Contractor	
		NWSC 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-vegetation of excavated sites.	NWSC	5,000,0000
		Contractor will avoid use of old equipment and damaged equipment that is most likely to have oil leakages thus contaminate the soils and the Contractor will ensure that equipment is properly maintained and fully functional to avoid leakages that may contaminate soils. A joint inspection of works and equipment should be done by the consultant, contractors, and the client.	Contractor	
		Throughout reinstatement, the trench back-fill material will be compacted to a level similar to the original surrounding soils to avoid subsidence as a consequence of rain water channelling.	Contractor	
		Upon completion of subsoil and topsoil restoration, disturbed areas will be inspected together by the construction contractor and NWSC personnel for stability, relief, topographic diversity, acceptable surface water drainage capabilities, and compaction.	NWSC/Contractor	Already covered
		All chemicals will be stored in designated, locked storage areas, taking care to ensure segregation of potentially reactive substance (e.g., flammables should not be stored with toxic substances). These areas will have an enclosed drainage system/bund to avoid contamination. Material Safety Data Sheets (MSDS) will be	Contractor	

		provided for all substances and used in project health and safety assessments. Efforts will be made to avoid and minimise the use of hazardous chemicals during construction where possible;		
		The construction sites – Intake, Water Treatment Plant and Reservoir sites will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water.	Contractor	
	Generation and Improper Management of Waste	The Contractor shall develop and implement a Waste Management Plan	Contractor	Within Contractor's bid budget
		All sorts of waste generated during construction such as Ductile, HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and delivered to recycling facilities. Other forms of waste which are inert must be collected by NEMA gazetted waste handlers and taken to a NEMA gazetted waste disposal facilities for disposal.	Contractor	
		All organic waste generated at eating places during construction such as food stuffs shall be collected and transported by the contractor to designated district landfills for disposal.	Contractor	
		All plastic waste generated during construction, such as mineral water bottles, polyethene bags, jerrycans and cups shall be collected and taken for recycling in plastic collectors in for onward transmission to plastic recyclers.	Contractor	
		Human excreta shall be managed using a mobile toilet and then disposed at the existing Faecal Sludge Treatment Plant in Dzaipi.	Contractor	
		The contractor will work with Adjumani district Local government to facilitate sound waste handling and disposal. All wastes must be taken to the approved waste disposal facilities. Proof of delivery and safe disposal of waste will be provided and records maintained at all times.	Contractor	
	Noise and Vibration Impact	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.	Contractor	Within Contractor's bid budget
		Workers should be provided with the necessary personal protective equipment (PPE) such as ear muffs.	Contractor	
		Periodic medical hearing checks should be performed on workers exposed to high noise levels.	Contractor	
		Sites must be hoarded to curb noise impacts to neighbouring communities especially at the intake, WTP, MBR and ESRs.	Contractor	
		Works should be undertaken during day time i.e., from 8 am to 6 pm.	Contractor	
		Works near schools or health centres should be done in periods like weekends in order for noise and vibrations not to interfere with learning environment.	Contractor	
		Weekly monitoring of noise levels at active sites should be carried out by the contractor.	Contractor	
		Insulation/enclosing of any generators and heavy-duty equipment to minimize disrupting ambient noise levels.	Contractor	
		Switching off of equipment when not in use	Contractor	

	Air quality and Dust Management	Prior notification of residents in the vicinity of construction activities of the contractor's proposed working schedule and the times and duration of any abnormally noisy activity likely to cause concern.	Contractor	
		Restricting speed limits of project vehicles through settlements and trading centres to minimize noise.	Contractor	
		Travel speeds of construction vehicles along the road especially at trading/ business centres will be controlled and should not exceed 50 km/h on the highway and 40 km/h off the highway to minimise the chances of higher PM in the project areas.	Contractor	
		Trucks will be covered during haulage of construction materials to reduce on spillage of materials and wherever dust suppression is necessary, water will be sprayed over dusty areas.	Contractor	
		Workers will be provided with PPE and the use of PPE shall be enforced.	Contractor	Within Contractor's bid budget
		All surfaced roads shall be subject to road cleaning and un-surfaced roads to dust suppression, the methodology and frequency of which shall be included in the Contractor's Traffic Management Plan.	Contractor	
		Stockpiles of friable material will be grassed in order to prevent wind erosion.	Contractor	
		A maintenance programme for equipment and vehicles will be implemented, to ensure air emissions like particulates, SO ₂ and NO ₂ are minimised.	Contractor	Within Contractor's bid budget
		Sprinkling water where there is a lot of dust during working hours	Contractor	Within Contractor's bid budget
		Construction work will be undertaken by an experienced and duly registered contractor with a verifiable sense of environmental awareness and responsibility	NWSC	
	Impact on Intake and Pumping Station (Flooding of River Nile)	Planning of construction of intake works during dry season	Contractor	
		Utilisation of the already installed early warning systems and periodic monitoring flows at different locations of the Nile and when need arises to sustainably manage high variability in river flow rates	NWSC/DWRM	
		Sharing of regional climate information among organizations such as ICPAC, EAC, and National Meteorological Departments of the Nile Basin states;	DWRM	
		In open waters, especially during construction of the intake, plastic curtains will be used to contain and confine resuspension of bottom silt to minimize turbidity in surrounding and downstream areas, using longer support spans and restricting construction to dry weather where possible;	Contractor	
		Approach land and road should be raised to allow for storm water drainage from the upstream areas and intake plot into R. Nile above the High Flood Level (HFL);	Contractor	Within Contractor's bid budget
		Construct a strong storm water open channel around the intake fence to take care of the storm water that would reach the intake and diverted to the R. Nile;	Contractor	Within Contractor's bid budget
		Maintain the proposed e-flow of 473 m ³ /s in the river (throughout the year) to support aquatic life and social economic activities down stream	Contractor	
		The intake house (surface infrastructure) should be raised at least 2 to 4 m above the existing ground level (EGL) or the HFL for safety in case of floods in the R. Nile.	Contractor	Within Contractor's bid budget

	Impacts on Water Quality	The Contractor shall construct a drainage system with silt traps to reduce impacts of storm water from the construction site.	Contractor	Within Contractor's bid budget
		The contractor shall implement waste management according to good practice to ensure waste does not pollute the surface water resources	Contractor	
		Surface water runoff will be controlled during earthworks. Surface water features downslope of the earthworks will be identified, and the necessary berms and drainage channels will be installed to ensure that runoff does not collect or pond in excavated areas or quarries.	Contractor	
		Stockpile areas for materials such as sand, gravel, stone, and topsoil, as well as overburden dumps will be located away from any water courses and will be surrounded by perimeter or cut-off drains with sediment and other pollutant traps located at drain exits. Cut-off drains will be maintained throughout the subsequent operation phase;	Contractor	
		Replacement of oil / hydraulic fluids in vehicles shall not be undertaken in sensitive areas, and used fluids such as old car engine oil shall be sent back to the service providers for recycling. Where sites for such activities are located within the facility, a separate drainage should be constructed leading into an oil interceptor before release into the environment	Contractor	
		All construction equipment will be kept in good operating condition to avoid oil or fuel leakages that might contaminate water resources. Poorly maintained machinery will not be allowed to operate on site. All major vehicle repairs shall be conducted by qualified and experienced personnel at gazetted service centres (garages) away from the water transmission and distribution corridor.	Contractor	Within Contractor's bid budget
		All hazardous wastes including material soiled with hazardous wastes and empty containers of hazardous materials shall be stored in a designated area on site for regular removal and disposal by a registered contractor in accordance with the National Environment (Waste Management) Regulations, 2020. All other wastes generated during site preparation and construction will be transported by the contractor or a company that has been specifically contracted to an authorized disposal area.	Contractor	Within Contractor's bid budget
		A spill kit will be maintained onsite to clean-up any accidental spills.	Contractor	Within Contractor's bid budget
		In open waters, especially during construction of the intake, plastic curtains will be used to contain and confine resuspension of bottom silt to minimize turbidity in surrounding and downstream areas, using longer support spans and restricting construction to dry weather where possible; and	Contractor	Within Contractor's bid budget
		Construction activities will largely be carried out during the dry season to avoid sediment transport to the nearby land, water courses and roads	Contractor	
		Workers' camp and associated facilities where applicable will be connected to septic tank or other wastewater systems which are appropriate and of sufficient capacity for the number of workers and local conditions. These facilities will be inspected regularly to ensure proper functioning. Camp site selection shall involve several factors, including; the size and conditions of the site and availability of resources; the safety, security and protection it offers and cultural and social considerations. The Contractor shall conduct the necessary environmental and social assessments according to national and World Bank Environment and Social	Contractor	

		Safeguards Policies and acquire approvals from NEMA and the supervising engineer prior to establishment of new camp sites.		
		Water from cleaning and hydrotest activities which could cause contamination of surface (or ground) waters shall be tested and treated as necessary prior to discharge, including debris and sediment removal.	Contractor	
		Water quality testing and monitoring at the intake should be done at least every week by the contractor under the supervision of the Supervising Consultant to ensure compliance with its environmental management policies, ESIA recommendations and national regulations; and	Contractor	
		Fuel handling and oil spill measures will be implemented to prevent, control and address spill or leaks. Fuel storage and dispensing on site shall not be allowed near the intake area. Fuel and oil handling will be assigned to trained personnel and procedures for fuel storage, operation of mobile fuel tankers and refueling areas will be well defined. Impermeable sheets, spill mats, and drip trays will also be provided in the appropriate areas to curb fuel and oil leakage to the ground. This will be done at designated places at the contractor's camp and in accordance with relevant standards set by the Energy Regulation Board and Uganda Bureau of Standards (UBOS).	NWSC Contractor	
	Loss and Relocation of Structures and Utilities	Ensure timely compensation before construction begins.	NWSC DLG	
		Timely planning of relocation following and approved utilities relocation plan.	NWSC Contractor	RAP Report
		Timely communication and notification of affected communities (under the SEP) regarding planned relocation works.	NWSC	
		Establish visible and transparent Grievance Redress Mechanisms (GRM) (committees and appropriate protocols) so that complaints and dissatisfactions about the resettlement/ compensation process do not unduly delay contractors progressing works.	NWSC DLG Contractor	10,000,000
		Engage all stakeholders especially local leaders in mobilizing / sensitizing communities	NWSC Contractor	7,000,000
		Identify and avoid / relocate existing underground infrastructures that are directly affected by proposed facilities / lines before construction begins.	Supervising Consultant Contractor	Within Contractor's bid budget
		Provide adequate vacation notice (according to regulatory requirements, this is three (3) or six (6) months) to affected people before construction commences. This will also allow affected property owners to plan appropriately or take any salvageable material from their demolished structures without delaying contractor's work.	NWSC	
	Introduction of Invasive Species	Vehicles and equipment entering and leaving the project area will be inspected and cleaned to remove invasive species.	Contractor	

		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.	Contractor	
		NWSC should ensure that the appointed Contractor put in place and effectively implement an Alien Invasive Species Eradication Plan, as part of implementing the ESMP.	NWSC	
	Health Impact – Contracting and Spreading COVID-19	Sensitize all project employees about the signs and symptoms of COVID-19 as well as the ways to control its spread and report in cases of signs and symptoms;	Contractor	Within Contractor's bid budget
		Screen local employees/contractors for COVID-19 during recruitment;	Contractor	10,000,000 but based on the situation by then
		Screen all visitors to construction sites using a temperature gun and enforce washing of hands before entry and wearing of approved masks;	Contractor	Within Contractor's bid budget
		Management of potential COVID-19 cases – in case, any workers develop the above symptoms, isolate them and immediately contact the respective District Health Officer (DHO) to pick and transport the patients for treatment;	Contractor	Already covered
		Reduce site traffic – prohibit entry for any non-essential visitors. In addition, utilize staggered start and finish times for workers to limit site congestion and physical contact. Further, restrict the number of people in attendance at any site inductions, and consider holding them outdoors whenever feasible.	Contractor	
		Practice social distancing – Consistently monitor points of worker interactions such as dining areas to ensure social distancing guidelines (2-4 meters apart) are being met.	Contractor	
		Prioritize sanitation – Enforce workers to wash their hands with soap and water for at least 20 seconds or to use sanitizers before entering and after leaving the worksite, as well as before and after handling all goods, materials and equipment. Routinely clean any common contact surfaces on-site (e.g., scanners, turnstiles, screens, telephones and desks). Lastly, be sure to temporarily remove or disable any site entry systems that require skin contact (e.g., fingerprint scanners).	Contractor	5,000,000
		Limit physical contact – Make sure that the contractor stagger break times to reduce congestion and physical contact in eating areas. Require workers to keep at least 2-3 meters of distance between one another while eating.	Contractor	
		Enhance whole-of-society coordination mechanisms to support preparedness and response, including the health, transport, travel, trade, finance, security and other sectors. Involve public health Emergency Operations Centres and other emergency response systems early.	Contractor DLG	1,000,000
		Continuously sensitize the workers and pass on any new guidelines by Government and the WHO.	Contractor	Already covered

	Social Conflicts due to Influx of Immigrant Labour	The contractor will be required to develop a Labour Influx Management Plan and/or a Workers' Camp Management Plan. These will include sanctions for workers involved in criminal activities.	Contractor	Within Contractor's bid budget
		As a contractual obligation, contractors shall be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc. to implement during project execution.	Contractor	Within Contractor's bid budget
		All construction workers shall be orientated and sensitized about responsible sexual behaviour in project communities.	Contractor	Within Contractor's bid budget
		The contractors will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).	Contractor DLG	10,000,000
		The contractor will reduce labour influx by tapping into the local workforce. Depending on the size and the skill level of the local workforce, a share of the workers required for the project may be recruited locally. The local labour if trained could be employed afterwards for the operation and maintenance of the new infrastructure. The recruitment criteria should be transparent and fair to local communities to avoid conflicts.	Contractor	
		Prepare a sexual harassment policy in the event of 20 or more workers	Contractor	
		The contractor will conduct cultural sensitization training for workers regarding engagement with local community.	Contractor	5,000,000
		Workers will be encouraged to get vaccinated against common and locally prevalent diseases.	Contractor	10,000,000
		The contractor, where need arises, will engage an HIV service provider to be available on-site who should conduct campaigns on STDs among the workers and local community; educate workers and the community about the transmission of diseases; and implement HIV/AIDS education program and provision of condoms.		
	Risk of Child Labour and Violence Against Children	The contractor will develop and implement a Children Protection Strategy that will ensure minors are protected against negative impacts associated by the Project including SEA based on NSWC ESMPs;	Contractor	Within Contractor's bid budget
		Children under the age of 18 years should not be hired on site as provided by Child Act (2016);	Contractor	
		Not invite unaccompanied children to workers' homes, unless they are at immediate risk of injury or in physical danger;	Contractor	
		The contractor should put up notices on work sites (NO CHILD LABOUR) in order to silence agitations;	Contractor	
		The Developer should engage District Education Officer, District Community Development Office (DCDO), Gender Officers, Parish Chiefs among others in monitoring school attendance in the project's area of implementation;	NWSC DLG	5,000,000
		Reporting mechanisms should be put in place such as a whistleblowing system;	NWSC DLG Supervising Consultant	6,000,000
		At the induction of employees, the employer should emphasise that molestation of children especially the girl child is punishable by taking the culprit to court;	Contractor	Within Contractor's bid budget
		An employer who tries to shield or cover up for the employee caught in the act will equally be prosecuted, according to the penal code;	NWSC	5,000,000

			DLG Supervising Consultant	
		Sensitization should be done and continuous throughout the project implementation in schools in the project area, by the DLG together with the Contractor about risk of child labour and VAC; and	DLG	4,000,000
		Comply with all relevant local legislation, including labour laws in relation to child labour specifically provisions of Uganda's Employment Act 2006 on protection of children against exploitation.	Contractor	
	Risk of Gender Based Violence, Sexual Exploitation and Sexual Abuse	Develop and implement a SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA 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).	Contractor	Within Contractor's bid budget
		The Contractor shall require his employees, sub-contractors, sub-consultants, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse, including sanctions for noncompliance (for example, termination).	Contractor	
		The contractor will conduct mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable Code of Conduct toward local community members, specifically women.	Contractor	
		NWSC should ensure that social safeguards personnel are recruited as part of the project implementation personnel to supervise contractors and carry out effective and continuously community engagements and consultation, particularly with women and girls;	NWSC	8,000,000
		Review of specific project components that are known to heighten GBV risk at the community level, e.g. compensation schemes; employment schemes for women; etc.;	NWSC Contractor	9,000,000
		Contractor shall ensure adequate referral mechanisms are in place i.e. GBV reporting mechanisms should be put in place by the Client; and	NWSC DLG	
		The contractor, where a case arises, will cooperate with law enforcement agencies in investigating complaints about gender-based violence.	Contractor	
	Loss of Physical Cultural Resources	At the local level, additional consultations will be carried out prior to commencement of works by the contractor at the project sites.	NWSC Contractor	5,000,000
		Re-alignment of the distribution line in Rassia West Village where it crosses the graves by moving the line to the opposite side of the road	NWSC Contractor - Design Team	Within Contractor's budget
		A 'chance find' procedure will guide actions to be taken in the event that suspected archaeological artefacts or paleontological items are encountered and they should be handed over to Ministry of trade and industry- Department of Museums and Monuments.	Contractor	
		Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with the Department of Museums and Monuments (DMM)	Contractor	Within Contractor's bid budget

		Construction works will be designed to ensure no damage to any cultural sites or medicinal plants that may be encountered including older-trees that are culturally significant. Where such sites cannot be avoided, culturally appropriate measures will be agreed and implemented prior to the construction activities.	Contractor	
		Compensation of the affected sites will be undertaken before construction activities commence in accordance with World Bank requirements.	NWSC	Already covered under RAP
	Impact on Landing Site at Arra	Maintain the currently proposed intake and open/create a crossing point about 180 m downstream of the intake	NWSC	
		Fence off the project intake and pipework to ensure minimal contact between the community near the abstraction point and the project	Contractor	Within Contractor's bid budget
		Notify the public about the construction program and of any construction activities such as transport of large equipment can trigger traffic impacts and congestion.	Contractor	Within Contractor's bid budget
		Offer a transitional allowance to both fishermen (150,000 each) and fishmongers (200,00 each) to enable them relocate to the newly proposed site.	NWSC	30,600,000 as established by the RAP
	Occupational Health and Safety Risks	The primary measure to mitigate OHS impacts is prevention which entails identification of risks and instituting pro-active measures to avoid them. In part this can be achieved by following GIIP or national guidelines. For unavoidable risks, personal protective equipment (PPE) should be provided to workers.	Contractor	Within Contractor's bid budget
		Orient all staff on safe work practices and guidelines and ensure that they adhere to them.	Contractor	Within Contractor's bid budget
		Training staff on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences.	Contractor	Within Contractor's bid budget
		Regular safety drills to constantly follow on various possible incidences.	Contractor	
		Develop evacuation procedures to handle emergency situations.	Contractor	
		All working vehicles should have a functioning reverse warning sound.	Contractor	
		While working at R. Nile, workers should be in life jackets.	Contractor	
		There should be water rescue apparel in place at all times of work	Contractor	
		Use of water proof cardboard elements during construction	Contractor	
		Those working at heights should put on body harness.	Contractor	
		All excavations should have permit, and excavations exceeding 2 m should be protected with shoring.	Contractor	
		Shoring should be used on all excavations exceeding 2 m, and excavations should be covered before closure of the site each day.	Contractor	
		Workers should undergo toolbox meetings daily.	Contractor	
		A qualified Health and Safety Officer will be recruited by the Contractor to oversee OHS matters on a daily basis.	Contractor	

		Personnel will only undertake tasks for which they are trained/ qualified. A formal 'permit to work' system will be in place and strict instructions will be given for operators of equipment.	Contractor	
		Maintenance of accident logs on site to register all injuries and to investigate their causes to prevent reoccurrence.	Contractor	
		Emergency resources (e.g., fire extinguishers, stocked First Aid kits, Emergency Contacts, Doctor on Call, etc.) will be maintained at all active construction sites.	Contractor	
		Workers should get acquainted with the material safety data sheets (MSDS) for equipment and should use and operate equipment according to manufacturer's instructions.	Contractor	
	Community Health and Safety Risks	Instituting speed limits on project vehicles,	Contractor	
		Use of signs and barriers to show the dangerous areas;	Contractor	
		Identify and clearly mark all areas with restricted accessibility to the public;	Contractor	
		Enforce restrictions on unnecessary entry into the project site or any protected zone	Contractor	
		Follow the mitigation measures prescribed to reduce any dust or noise impacts.	Contractor	
Operation and Maintenance	Decrease in Water Resources	To ensure that the ground water resources are not depleted, the abstraction rate should adhere to approved e-flows and recommended abstraction rates after the borehole test pumping exercises.	NWSC MWE/DWRM	
		The water levels should continuously be monitored to ascertain any impact on the water level – with guidance from DWRM.	MWE/DWRM	Mandate of DWRM
		Water levels should be accompanied by monitoring of the water quality to ascertain any trend in water quality change with continued abstraction.	MWE/DWRM	Mandate of DWRM
		The developer should apply/acquire the abstraction permits which will facilitate adherence to agreed rates of abstraction and also guide the DWRM while issuing abstraction permits in the vicinity, to other competing users.	NWSC	As prescribed by DWRM
		NWSC and all the stakeholders should utilise the catchment/source protection plan in Annex 16 for proper water resources management.	NWSC	
	Air Pollution	Odour neutralizing chemicals (e.g., Metazene) should be used where the smell is persistent	NWSC	
		An odour complaint procedure should be established to ensure that complaints of odour from the public and project staff are recorded. Information such as date, time, weather conditions, and characteristics of the odour can help to trace the cause of odour and manage it.	NWSC	
	Failure of the Water Supply Equipment or Components	The Developer (NWSC) should employ qualified staff to operate and maintain the project equipment/components.	NWSC	
		The equipment/components should be regularly inspected to detect and malfunctions.	NWSC	
	Solid Waste Generation	A waste management plan for the operation phase of the project will be developed and implemented.	NWSC	Operation costs

		Waste collection bins will be provided at strategic positions at the water offices, water source sites and reservoirs sites for temporary waste storage. The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes.	NWSC	
	Water and Soil Pollution	Sensitize households to construct proper septic tank systems	NWSC	
		NWSC to provide toll free numbers where they can be reached for customer support and emergency notifications	NWSC	
	Impacts from Damage of the Pipe Network	The contractor should clearly mark the transmission line with visible landmarks. The local authorities should encourage its people to respect road reserves and avoid building on water transmission lines;	Contractor	
		Design and implementing a leak detection and repair program;	NWSC	40,000,000
		Prevent introduction of contamination from the distribution system itself through; Minimizing microbial growth and biofilm development, choosing residual disinfectant, using construction materials that do not contribute to release undesirable metals and other substance or interact with residual disinfectants and Constant monitoring of water quality	NWSC	
	Transboundary Issues	Involvement of stakeholders from the onset of project identification till implementation helps in creating interest, sense of ownership and sustainability of the entire process;	NWSC	
		Disclose the detailed design report and the ESIA to countries downstream of the proposed project area and other regional bodies such as the Nile Basin Initiative (NBI), NELSAP, L. Victoria Basin Commission and the secretariat of the East African Community (EAC) for review and input;	MWE/DWRM NBI/NELSAP	Mandate
		Create a forum for regional participation during construction works by inviting representatives of the partner states to be part of project supervision teams;	MWE/DWRM NWSC	10,000,000
		The ministry should notify all the Nile partner states on the proposed development and subsequent acknowledgement of receipt of that notification. Everything done must be in conformity to the cooperative framework agreement for the Nile. Sharing progress reports to partner states and regional bodies should be considered;	MWE/DWRM	
		In case grievances arise, the states shall follow guidance on conflict mediation as detailed in the UN Convention on the Law of the Non-Navigational Uses of International Watercourses. The MWE/NWSC has an International Transboundary Water Affairs Department which can work closely with the Ministry of Foreign Affairs to address any conflicts that may arise in future;	NWSC	
		Utilize the cooperative framework to facilitate basin cooperation in water resources developed under the Nile Basin Initiative;	MWE/DWRM NWSC	
		Utilize regional programs such as the World Bank supported Cooperation in International Waters in Africa (CIWA) program assists riparian governments in Sub-Saharan Africa in unlocking the potential for sustainable, climate-resilient growth by addressing constraints to cooperative water resources management and development.	MWE/DWRM NWSC	
		Implementation of the National Adaptation Programme of Action (NAPAs) for the EAC countries	NWSC	

	Climate Change Risks and Impacts		All countries under NELSAP/NBI/EAC DLG NGOs	
		MWE/DWRM and NWSC should consistently monitor levels and quality of R. Nile.	MWE/NWSC	7,000,000
		Sharing of climate information by regional climate organizations such as ICPAC, EAC, and National Meteorological Departments of the Nile Basin to know the annual, monthly, and seasonal climate projections of the R. Nile to enable evidence-based decision-making.	ICPAC EAC National Meteorological Departments of the Nile Basin	
	Reduced Affordability (Inability to Access Water)	UNHCR should provide subsidies for internally displaced people (IDP) / Refugee communities.	UNHCR NGOs	
		NWSC should consider population's willingness to pay of UGX100 per 20 ltrs of safe water (based on the project area's economic profile and vulnerability) in Adjumani.	NWSC	
		NWSC should subsidise water connection charges for low-income communities.	NWSC	
		Public standard pipes, which have subsidized water charges should be provided in low-income communities where people cannot afford private connections.	NWSC	
	Loss of Jobs for Water Vendors	NWSC 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 based on the SEP.	NWSC DLG	3,000,000
		The community Development officer (CDO) should mobilise the local people (including water vendors) and sensitise 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.	DLG	5,000,000
		Vendors would be encouraged to become scheme or kiosk operators; vendors would be encouraged to tender for public water points a livelihood restoration initiative following stakeholder consultations.	NWSC DLG	
	Occupational Health and Safety Aspects	Workers need to be protected from work related hazards by providing them with PPEs e.g. gloves, gum boots, overalls, helmets, hard hats and reflector jackets.	NWSC	30,000,000
		Training on LOTO (Lock-out-tag-out procedures when working with electrical gadgets).		
		All working vehicles should have a functioning reverse warning sound.		
		Working at R. Nile, workers should be in life jackets. Those working at heights should put on body harness.		
		Continuous occupational risks management plan, registration and inspection of workplace, equipment and vehicle inspection and servicing, among others		
		Use signage and posters to warn staff and/ or visitors about restricted areas e.g., the laboratories, among others in order to keep people out of danger		

		Continuous occupational risks management plan, registration and inspection of workplace, equipment and vehicle inspection and servicing, among others		NWSC operational costs
		Machinery should continuously and regularly be well serviced and should be in good working condition. Servicing of equipment’s should be done at camps far off the project area.		
		Where applicable, equipment should be fitted with silencers to reduce noise e.g. backup generators		
	Community Health and Safety	Sensitization of the community on the risks/dangers of swimming in the R. Nile especially for the children since it’s a very deep river;	NWSC	
		Provide watering points for livestock (about 180m) downstream of the intake where a new crossing point was proposed by the community;		
		NWSC together with Local community should form a Project Management Committee which should address issues of operations of the intake at Arra West village.		
		Impacts on community safety and downstream activities will be mitigated by i) community announcements and advertisements in case of change in water levels, as well as in the Emergency Preparedness Plan (EPP) which should periodically be updated.		
Cumulative Impacts				
Construction and Operation	Disruption to Traffic Flow and Communication Routes	The Contractor shall develop and implement a traffic management plan	Contractor	
		Disruptions to public access shall be identified in the Contractor’s Traffic Management Plan, under which suitable notice of intending delays and closures are given to all concerned parties and approved prior to commencing work. All road closures shall be separately notified and agreed with the subcounty administration.	Contractor DLG	
		Where access to or from an individual property is closed for a period of 2 hours or more, the owner shall be informed at least 7 days in advance.	Contractor	
		Vehicular access to and from hospitals, police stations, and other public institutions shall be maintained through the use of steel road plates over open trenches. Pedestrian access to schools, health facilities, and other premises frequently accessed by the public will be maintained with the use of walking boards.	Contractor	
		To minimize interference with traffic, half of the road shall be closed to enable vehicles use one half as the other half is being excavated and installed with pipe work. The excavated soil shall be temporarily consolidated on the sides of the road and re-used for backfilling immediately the laying of pipework is completed.	Contractor	
		Road safety and site safety training should be done involving construction workers, police and local community.	Contractor DLG	
		Conspicuous signage shall be well placed on roads and the Contractor’s Traffic guides on ground shall direct traffic in case of diversions or open trenches.	Contractor	
		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 before usage.	Contractor	

		All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits.	Contractor	
		The vehicle speed shall be limited to a maximum of 30km/hr areas near sensitive facilities.	Contractor	
		Works near sensitive facilities like schools and health centres shall only be limited to day time (7am to 6pm).	Contractor DLG	
		MOU between UNRA and NWSC to designate this responsibility regarding any claims to ownership of land within the road reserves especially in Adjumani, or any proposed UNRA road (if any) should be done.	NWSC UNRA	
		Adopt the crossing sections provided by the contractor on Atiak - Adjumani - Laropi road.	UNRA Contractor	
		The Design Team will continue to discuss with UNRA to assess the designs and any other feasible options (tunnelling Vs trenching across the tarmac road) and to secure UNRA permission secured for road crossings.	NWSC UNRA Contractor	
Operation and Maintenance	Water and Land Pollution	Adjumani District Local Government should ensure that all projects are regulated and licensed, and monitor their activities.	DLG	5,000,000
		Make sure that new developments are approved by the Adjumani Town Council technical team	NWSC DLG	
		In case of any development that will discharge waste on land or in water, effluent exiting the should be treated to meet the National Environment (Standards for the discharge of effluent into water or land), Regulations (2020).	NWSC DLG	NWSC Operation costs
	Excessive Abstraction of Water	Adjumani DLG should ensure that all projects are regulated and licensed, and monitor their activities.	DLG	
		All proposed establishments with aim of abstracting higher amounts of water should acquire permits from DWRM/MWE	DWRM/MWE	
ESTIMATED GRAND TOTAL COST				UGX 498,000,000 (equivalent to 138,333.33 USD) excluding the RAP costs

Table 10-3: Environmental and Social Monitoring Plan

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
Positive Impacts – Construction Phase								
Employment Opportunity	<ul style="list-style-type: none"> Percentage of local construction labourers 	<ul style="list-style-type: none"> Quarterly 	<ul style="list-style-type: none"> Project site 	<ul style="list-style-type: none"> Percentage of local people employed in the project 	<ul style="list-style-type: none"> Employment Records, inquiries and observation 	<ul style="list-style-type: none"> At least 50% of Casual workers At least 30% Women 	<ul style="list-style-type: none"> NWSC LCs Contractor 	<ul style="list-style-type: none"> Contract

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
Negative Impacts - Construction Phase								
Loss of Vegetation	<ul style="list-style-type: none"> Area (extent) cleared; Species type 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> Project sites and source of materials 	<ul style="list-style-type: none"> Ha No. species 	<ul style="list-style-type: none"> Progress Reports Site inspection and consultations with stakeholders RAP report approved by CGV 	<ul style="list-style-type: none"> Restricted to TL & DL Restored area that had been disturbed. 	<ul style="list-style-type: none"> NWSC Contractor 	<ul style="list-style-type: none"> 6,000,000 Contract
Loss of Habitat for Fauna	<ul style="list-style-type: none"> No. of species Species type 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> Project sites and source of materials 	<ul style="list-style-type: none"> Type No. species 	<ul style="list-style-type: none"> Progress Reports Site inspection and consultations with stakeholders 	<ul style="list-style-type: none"> Project Area 	<ul style="list-style-type: none"> NWSC Contractor DLG 	<ul style="list-style-type: none"> 5,000,000 Contract
Decline of Pristine Landscape and Emerging of Vector Breeding Grounds	<ul style="list-style-type: none"> Copy of license(s) Copy of Agreement Evidence of compensation and Reinstatement Plan Signs of ponding of water Borrow pits restored to pre-project condition with native vegetation and vegetation growing well 	<ul style="list-style-type: none"> After extraction of materials or construction activities 	<ul style="list-style-type: none"> Affected Person and Contractor's office Project sites and Sources of materials 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Check for agreement Consult with landowner Inspection of sites and source 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> NEMA NWSC DLG 	<ul style="list-style-type: none">
Susceptibility to Soil Erosion and Pollution Risks (Wetland Pollution)	<ul style="list-style-type: none"> Siltation Turbidity Number of complaints from communities and authorities Extent of site clearance Sites area hoarded off Covered stockpiles of loose soils Any gullies of soil erosion 	<ul style="list-style-type: none"> Monthly throughout construction 	<ul style="list-style-type: none"> Wetland Project sites 	<ul style="list-style-type: none"> TSS 	<ul style="list-style-type: none"> Sample & lab test During Construction whenever it rains Review of records or reports Direct observations Site and project office inspection 	<ul style="list-style-type: none"> National Standards Baseline 	<ul style="list-style-type: none"> NWSC Supervising Consultant Contractor 	<ul style="list-style-type: none"> 10,000,000 Contract Contract

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
	<ul style="list-style-type: none"> Signs of siltation in nearby water bodies Extent of landscaping 							
Generation and Improper Management of Waste	<ul style="list-style-type: none"> Amount of Solid waste Presence of waste bins at all workstations Presence of mobile toilets at workstations Presence of delivery notes for all forms of waste generated and disposed during construction. Waste Management Plan in place Collection and disposal records 	<ul style="list-style-type: none"> Weekly 	<ul style="list-style-type: none"> Project site 	<ul style="list-style-type: none"> Kg for Solid waste, Litres for Liquid waste No. of mobile toilets 	<ul style="list-style-type: none"> Observations and Measurements 	<ul style="list-style-type: none"> 0 Legal disposal 	<ul style="list-style-type: none"> NWSC DLG Contractor 	<ul style="list-style-type: none"> 8,000,000 5,000,000 Contract
Noise pollution and Vibration	<ul style="list-style-type: none"> Record of noise levels Site hoarding in place Silencers installed in noise emitting machines Earmuffs used by workers on site Record of complaints from recipients 	<ul style="list-style-type: none"> Weekly 	<ul style="list-style-type: none"> Project sites 	<ul style="list-style-type: none"> dBa mm/s 	<ul style="list-style-type: none"> Noise Level Meter Vibration meter 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC NEMA/DLG Contractor 	<ul style="list-style-type: none"> 5,000,000 3,000,000 Contract
Air Quality and Dust management	<ul style="list-style-type: none"> Dust (PM₁₀ and PM_{2.5}) Complaints from the local community 	<ul style="list-style-type: none"> Once per month Daily inspection to be made to detect and remedy excessive dust generation). 	<ul style="list-style-type: none"> Project site Project communities 	<ul style="list-style-type: none"> ppm 	<ul style="list-style-type: none"> Micro-dust Pro Direct Observation 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> Contractor NWSC/Sup. Consultant 	<ul style="list-style-type: none"> Contract 10,000,000

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
	<ul style="list-style-type: none"> Visible dust emissions Records of frequency of water sprinkling on dusty areas Tarpaulins on tracks carrying loose soils. Records of automobile maintenance Visible gaseous emission from vehicles, equipment & machinery Records of complaints from onsite workers & neighbouring communities Hoarded off sites Evidence of PPE issuance Sign posts in the project area limiting speed 							
Impact on Intake and Pumping Station (Flooding of River Nile)	<ul style="list-style-type: none"> Prevailing Season at the time of construction Water levels 	<ul style="list-style-type: none"> Daily When need arises After every rainfall event 	•	•	<ul style="list-style-type: none"> Records of flow rates Records of climate data Flood frequency analysis records Early warning system/gaging station at the intake 	<ul style="list-style-type: none"> Low flows 	<ul style="list-style-type: none"> NWSC MWE/DWRM Contractor 	<ul style="list-style-type: none"> 5,000,000 10,000,000 Contract

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
Water Quality	<ul style="list-style-type: none"> All parameters 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> Intake, BHs, Wetland 	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Lab. Analysis 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC Contractor 	<ul style="list-style-type: none"> 30,000,000 Contract
Loss of Land and Displacement of Economic Activities	<ul style="list-style-type: none"> PAPs 	<ul style="list-style-type: none"> Before commencement & continuous throughout implementation 	<ul style="list-style-type: none"> All project sites and their affiliated facility sites 	<ul style="list-style-type: none"> No. of PAP Compensated Land consent agreements 	<ul style="list-style-type: none"> RAP Implementation Report/ Grievance Log CGV approved RAP report Sensitization and engagement reports Notices to the PAPs Land agreement forms 	<ul style="list-style-type: none"> 100% compensation 	<ul style="list-style-type: none"> NWSC/ RAP Consultant 	<ul style="list-style-type: none"> RAP Budget
Loss and Relocation of Structures and Utilities	<ul style="list-style-type: none"> PAPs 	<ul style="list-style-type: none"> Before commencement & continuous throughout implementation 	<ul style="list-style-type: none"> All project sites and their affiliated facility sites 	<ul style="list-style-type: none"> No. of PAPs Compensated Land consent agreements 	<ul style="list-style-type: none"> RAP Implementation Report/ Grievance Log CGV approved RAP report Sensitization and engagement reports Notices to the PAPs Land agreement forms 	<ul style="list-style-type: none"> 100% compensation Agreements 	<ul style="list-style-type: none"> NWSC DLG UMEME Telecommunication Agencies 	<ul style="list-style-type: none"> RAP Budget
Health Impact – Contracting and Spreading COVID-19 and risk of HIV spread	<ul style="list-style-type: none"> Covid 19 patients Signs of COVID-19 Hand washing facilities Deaths New HIV/AIDS Patients 	<ul style="list-style-type: none"> Daily When need arises/On standby Monthly 	<ul style="list-style-type: none"> Campsites Project sites 	<ul style="list-style-type: none"> °C No. of Covid-19 patients No. of HIV/AIDS Patients 	<ul style="list-style-type: none"> Covid 19 tests records Death records HIV test records 	<ul style="list-style-type: none"> No patients Normal human temperature No deaths 	<ul style="list-style-type: none"> MOH Contractor 	<ul style="list-style-type: none"> 8,000,000 Contract
Social Conflicts due to Influx of Immigrant Labour	<ul style="list-style-type: none"> Labour conflicts Immigrants 	<ul style="list-style-type: none"> Throughout the construction phase 	<ul style="list-style-type: none"> Project area 	<ul style="list-style-type: none"> No. of immigrant workers No. of local workers 	<ul style="list-style-type: none"> Employment records No. of grievances received % of grievances resolved 	<ul style="list-style-type: none"> 100% harmony 	<ul style="list-style-type: none"> NWSC/Supervising Consultant DLG MoGLSD Contractor 	<ul style="list-style-type: none"> 9,000,000 5,000,000 3,000,000 Contract

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
					<ul style="list-style-type: none"> Grievance Redress Committees 			
Risk of Child Labour and Violence Against Children	<ul style="list-style-type: none"> Workers below 18yrs 	<ul style="list-style-type: none"> Quarterly 	<ul style="list-style-type: none"> Project area 	<ul style="list-style-type: none"> No. of young employees No. of VACs 	<ul style="list-style-type: none"> National identification records of workers indicating age Records of requirements for employment Records of trainings on child abuse Complaints from local leaders Site Visits 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> NWSC/Supervising Consultant DLG MoGLSD Contractor 	<ul style="list-style-type: none"> As per budget on awareness raising campaigns Contract
Risk of Gender Based Violence, Sexual Exploitation and Sexual Abuse Risks of inadequate stakeholder engagement	<ul style="list-style-type: none"> Nature of GBV Case Types of grievances received, 	<ul style="list-style-type: none"> Daily by contractor Weekly by Consultant Quarterly by NWSC. 	<ul style="list-style-type: none"> Project site 	<ul style="list-style-type: none"> No. Reported Cases Frequency of stakeholder engagements and feedback received 	<ul style="list-style-type: none"> Grievance Log Police Case Files Engagements 	<ul style="list-style-type: none"> 0 As many as planned 	<ul style="list-style-type: none"> NWSC Consultant Contractor 	<ul style="list-style-type: none"> 26,000,000 Contract Contract
Loss of Physical Cultural Resources	<ul style="list-style-type: none"> Destroyed PCRs Chance finds 	<ul style="list-style-type: none"> At stage of project excavation 	<ul style="list-style-type: none"> Project sites 	<ul style="list-style-type: none"> No. of PCRs/Chance finds 	<ul style="list-style-type: none"> RAP Report Chance Finds Reports 	<ul style="list-style-type: none"> 0 destroyed 100% report of CFs 100% compensation 	<ul style="list-style-type: none"> NWSC Local Leadership Contractor Department of Museums and Monuments (DMM) 	<ul style="list-style-type: none"> 10,000,000 2,000,000 Contract 5,000,000
Impact on Landing Site at Arra	<ul style="list-style-type: none"> New site downstream of the intake Fence at the intake 	<ul style="list-style-type: none"> Once 	<ul style="list-style-type: none"> Intake 	<ul style="list-style-type: none"> No. of fishermen No. of fisher mongers 	<ul style="list-style-type: none"> CGV approved RAP report Notices to the PAPs Newly established site downstream 	<ul style="list-style-type: none"> 100% compensation 	<ul style="list-style-type: none"> NWSC Local Leadership Contractor 	<ul style="list-style-type: none"> RAP Budget

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
Occupational Health and Safety Risks	<ul style="list-style-type: none"> Number and type of PPE. Health and sanitation facilities in site. 	<ul style="list-style-type: none"> Daily by contractor Weekly by Consultant Quarterly by NWSC. 	<ul style="list-style-type: none"> Project site 	<ul style="list-style-type: none"> Number of safety measures provided 	<ul style="list-style-type: none"> Incidents/Acc. Log, injuries and inspection 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> NWSC Consultant Contractor 	<ul style="list-style-type: none"> 12,000,000 Contract Contract
Negative Impacts - Operation stage								
Decrease in Water Resources (Quantity)	<ul style="list-style-type: none"> Abstraction permits (rates) Water levels 	<ul style="list-style-type: none"> Daily by NWSC Monthly by DWRM 	<ul style="list-style-type: none"> Intake and BHs 	<ul style="list-style-type: none"> Ltrs/day 	<ul style="list-style-type: none"> Groundwater abstraction permit Groundwater abstraction logs Complaints from communities 	<ul style="list-style-type: none"> Test pumping recommended rates Surface flow recommendation abstraction rate 	<ul style="list-style-type: none"> NWSC MWE/DWRM DLG 	<ul style="list-style-type: none"> Operational Cost 20,000,000 10,000,000
Air Pollution	<ul style="list-style-type: none"> Complaints from the local community Odour neutralizing chemicals Waste on site 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> WTP 	<ul style="list-style-type: none"> Odour/Smell 	<ul style="list-style-type: none"> <i>Neutralizing Chemicals at the WTP</i> <i>Measurements</i> 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC/Sup. Consultant 	<ul style="list-style-type: none"> Operational Costs
Solid Waste Generation	<ul style="list-style-type: none"> Amount of Solid waste Presence of vermin free bins and/ or skips at the water treatment plant 	<ul style="list-style-type: none"> Once a week 	<ul style="list-style-type: none"> Project site NWSC Area Office WTP 	<ul style="list-style-type: none"> Kg for Solid waste, Litres for Liquid waste 	<ul style="list-style-type: none"> Observations and Measurements 	<ul style="list-style-type: none"> 0 Legal disposal 	<ul style="list-style-type: none"> NWSC DLG 	<ul style="list-style-type: none"> 10,000,000 3,000,000
Water and Soil Pollution	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> BHs, WTP 	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Lab. Analysis Hydrogeological analysis 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> 40,000,000
Impacts from Damage of the Pipe Network	<ul style="list-style-type: none"> Leakages due busted pipes Water quality at distribution points Complaints from public 	<ul style="list-style-type: none"> Daily 	<ul style="list-style-type: none"> Entire systems 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Records of leakages due busted pipes Water quality records at distribution points Complaints from public 	<ul style="list-style-type: none"> No leakage 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> Operational costs

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
					<ul style="list-style-type: none"> Presence of the leakage and repair program 			
Transboundary Issues	<ul style="list-style-type: none"> Involvement of stakeholders Disclose the detailed design report and the ESIA Forum for regional participation 	<ul style="list-style-type: none"> Before construction, during construction and operation phase 	<ul style="list-style-type: none"> Intake 	<ul style="list-style-type: none"> Abstraction rates 	<ul style="list-style-type: none"> Records of involvement of stakeholders Involvement in the entire project Feedback from other states about the impact of the project Level of cooperation 	<ul style="list-style-type: none"> Full cooperation 	<ul style="list-style-type: none"> NWSC MWE/DWRM All countries under NELSAP/NBI/EAC e.t.c 	<ul style="list-style-type: none"> 25,000,000
Climate Change Risks and Impacts	<ul style="list-style-type: none"> Implemented National Adaptation Programme of Action (NAPAs) Level of monitoring of levels and quality of R. Nile. Climate information 	<ul style="list-style-type: none"> Throughout 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Climate patterns 	<ul style="list-style-type: none"> Active or ongoing or already established NAPAs projects Reports on reduced levels of climate in the Nile Basin specifically the EAC 	<ul style="list-style-type: none"> No Climate variability and change 	<ul style="list-style-type: none"> NWSC All countries under NELSAP/NBI/EAC e.t.c DLG NGOs 	<ul style="list-style-type: none"> 30,000,000
Reduced Affordability (Inability to Access Water)	<ul style="list-style-type: none"> Connections in the project area Cost of unit of water (bill) Alternative water sources PSPs Complaints from customers Incentives and subsidies 	<ul style="list-style-type: none"> Quarterly 	<ul style="list-style-type: none"> Project area 	<ul style="list-style-type: none"> No. of alternative sources No. of customers getting connected or disconnected No. of taps and PSP No. of complaints from customers No. Of HHs given incentives, subsidies 	<ul style="list-style-type: none"> <i>Connections and disconnection reports</i> <i>Other water sources and their performance reports</i> Records of complaints from customers 	<ul style="list-style-type: none"> Fully affordable 0 complaints 	<ul style="list-style-type: none"> NWSC DLG 	<ul style="list-style-type: none"> Operational and meantime costs 5,000,000
Loss of Jobs for Water Vendors	<ul style="list-style-type: none"> Water vendors 	<ul style="list-style-type: none"> Before and during operation phase 	<ul style="list-style-type: none"> Project area 	<ul style="list-style-type: none"> No. of water vendors 	<ul style="list-style-type: none"> Records of former water vendors 	<ul style="list-style-type: none"> As many as possible 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> Operational and

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
					<ul style="list-style-type: none"> Records of current water vendors Complaints from the public 			meantime costs
Occupational Health and Safety Aspects	<ul style="list-style-type: none"> Accidents Complaints PPE 	<ul style="list-style-type: none"> Daily 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> No. of accidents No. of minors, near misses, fatalities No. of safety equipment No. of trainings and meetings 	<ul style="list-style-type: none"> Approved occupational safety and health plan at sites Records of health & safety cases at work place Firefighting equipment in place First aid kits and eye washing stations. Records of Health and safety training and site drills. Material safety and data sheets 	<ul style="list-style-type: none"> 0 accidents, minors, near misses and fatalities 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> 30,000,000
Cumulative Impacts – Construction Phase								
Disruption to Traffic Flow and Communication Routes	<ul style="list-style-type: none"> Accidents Traffic along the road 	<ul style="list-style-type: none"> Daily When 	<ul style="list-style-type: none"> Roads in the project area mainly road crossing points by the pipes 	<ul style="list-style-type: none"> No. of accidents 	<ul style="list-style-type: none"> Traffic management plan and Records of accidents Signage along the roads Records of vehicle maintenance Complaints from the public Restored portions of the road affected Notices to traffic police 	<ul style="list-style-type: none"> No accidents No traffic 	<ul style="list-style-type: none"> Uganda Traffic Police Contractor NWSC/Supervising Consultant 	<ul style="list-style-type: none"> Mandate of police Contract 2,000,000

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/Standard	Responsibility	Annual Costs Estimates (UGX)
Cumulative Impacts – Operation Phase								
Water and Land Pollution	<ul style="list-style-type: none"> All soil and water parameters 	<ul style="list-style-type: none"> Quarterly 	<ul style="list-style-type: none"> BHs, WTP 	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Lab. Analysis Hydrogeological analysis 	<ul style="list-style-type: none"> National Standards 	<ul style="list-style-type: none"> NWSC 	<ul style="list-style-type: none"> 50,000,000
Excessive Abstraction of Water	<ul style="list-style-type: none"> Abstraction rates Reducing water levels 	<ul style="list-style-type: none"> Daily by NWSC Monthly by DWRM 	<ul style="list-style-type: none"> Intake and BHs 	<ul style="list-style-type: none"> Ltrs/day 	<ul style="list-style-type: none"> Groundwater abstraction permit Groundwater abstraction logs Complaints from communities 	<ul style="list-style-type: none"> Test pumping recommended rates Surface flow recommendation abstraction rate 	<ul style="list-style-type: none"> NWSC MWE/DWRM DLG 	<ul style="list-style-type: none"> Operational Cost 10,000,000 5,000,000
Total Estimated Monitoring Costs								UGX 417,000,000 (Equivalent to 115,833.33 USD)

10.7 Environmental and Social Monitoring and Reporting Arrangements

10.7.1 Overview

The general approach to effect monitoring is to compare the pre- and post- project situations, measuring relevant environmental impacts against baseline conditions. Baseline data already in place establishes a reference basis for managing environmental impacts throughout the life of the project. The monitoring process will be instituted to check progress and the resultant effects on the environment arising from infrastructure works of the project.

The Contractor and Developer (NWSC) will undertake the necessary monitoring measures for short- and long-term monitoring programme respectively. However, during monitoring, close links should be maintained with other relevant lead agencies (NEMA), and the Local Government. Much of the work during the construction stage can form part of the Contractor's routine inspection activities that will be included in the construction contract. The planned mitigation measures should, therefore, be included on the list of contractual items. These should be planned and checked against their effectiveness in reducing the negative impacts/or enhancing the benefits identified in this report. NEMA and DOSH (MGLSD) will periodically monitor the project as per their constitutional, legal and regulatory mandate.

Monitoring will be done through site inspection, review of site records (Accident Log, issuance of PPE, waste records, trainings and inductions, permits and approvals, etc.), review of grievances logged by stakeholders and ad hoc discussions with potentially affected persons (construction workers, residents near the project facilities). At each monitoring, a discussion with chairpersons of environment committees of the areas' local councils (LC) particularly the Chairman of the Environmental committee should provide be involved during each site inspection and insight into views and grievances communities have about the project since they regularly interact with their community members.

As part of the evaluation strategy, two (02) types of environmental audits are recommended i.e., internal and external audits. The Contractor with the supervision of the NWSC should carryout quarterly internal environmental audits while an external annual environmental audit should be carried out by a NEMA registered and certified Environmental Auditor. During the operational phase environmental audits will be commissioned by NWSC the Operator. This should be in accordance with the Environmental Audit Regulations 2020.

During the construction phase, the Construction Supervision Team (the Design Consultants) will compile concise monthly monitoring reports. At the end of each quarter, the Contractor will write an Internal Quarterly Environmental Audit Report. The NWSC will review the reports and approve them. The NWSC (Developer) should commission the annual external environmental audit report. It will be submitted to NEMA for a Compliance Certificate. During the operational phase, the NWSC should submit annual environmental audit reports to NEMA for approval.

10.7.2 Purpose of Monitoring

A monitoring program aims to ensure that proposed mitigation and enhancement measures are implemented to generate intended results, otherwise the measures need to be modified, ceased

or replaced when inappropriate. Moreover, monitoring allows assessing compliance with national standards as well as with the French Development Agency policies and guidelines.

Section 122 (2) of NEA 2019 states, “A developer shall monitor the project and any environmental phenomena of the project

- (a) to assess and mitigate its possible impacts on human health or the environment;
- (b) to ensure conformity with environmental laws, environmental standards and conditions in permits, licences and other approvals;
- (c) to ensure the effectiveness of mitigation measures; and
- (d) to ensure delivery of conservation outcomes required to achieve either a no net loss or a net gain when a biodiversity or other offset or compensation mechanism has been implemented to address residual impact.

10.7.3 Scope of Environmental and Social Monitoring

Environmental monitoring will be undertaken at different levels as described below

- **Surveillance:** Undertaken by the Supervision Engineer on behalf of NWSC.
- **Quarterly Monitoring:** Joint by all relevant stakeholders at various levels.
- **Audit activities:** To be done by a NEMA registered Environmental Auditor.
- **Spot checks:** By Supervising Engineer, NWSC, Contractor, District Leadership, NEMA.

10.7.4 Construction Phase Monitoring Activities and Processes

10.7.4.1 Weather Forecasts

Weather monitoring and forecast is important to ensure that the Contractor plans for activities and provides mitigation where weather especially rainfall may pose challenges. This will be critical during excavation works.

10.7.4.2 Site Inspection

Routine inspections will be carried out to cover all aspects of environmental and social management on the site. Daily inspection aims to identify any environmental issues and rectify them without delay whereas weekly, monthly and quarterly inspections will verify that the daily inspections are identifying any maintenance requirements and that these requirements are being completed in an appropriate time frame. Site inspections will be carried out by the Contractor with instructions from the Supervision Consultant. Some of the critical issues to monitor daily include compliance of construction wastewaters with the stipulated effluent discharge standards or discharge permit conditions.

10.7.4.3 Meetings

Monthly site meetings are to be held to discuss project progress and, in such meetings, safeguards issues shall be sufficiently discussed and minutes recorded and filed. That shall include a review of the effectiveness of the mitigation measures, successes, and non-compliances. This will be a platform for the Engineer, the client (NWSC) and WB to raise any environmental issues arising from the joint inspection and as a reaction to the contractor’s presentation.

10.7.4.4 Water Quality, Fisheries, Water Levels and Riverbed

The trenchless technology with Tunnel Boring Machine (TBM) or/and cofferdam works and intake works within the river section pose water quality risks. Due to these risks, the Contractor is advised to undertake daily or weekly water quality monitoring as appropriate at selected monitoring locations to be agreed with NWSC. The in-situ measurements should be done for pH, Dissolved Oxygen, Turbidity, Conductivity, E. coli and Total Dissolved solids. Monitoring of the status of aquatic ecology including fisheries is recommended on a quarterly or bi-annual basis. In case, there are risks to the riverbed, bathymetry surveys (typically using an Acoustic Doppler Current Profiler) are strongly recommended to monitor the riverbed profile to detect any deformations associated with construction works. National water should establish a river gauging station to monitor water levels at the intake.

10.7.4.5 Monthly Environmental and Social Report

Concise monthly monitoring reports should be compiled by the Contractor. The report will highlight the 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 Safeguard policies. The report will be discussed during the monthly progress meetings. The Supervising Engineer guided by the Environmental and Social Specialist will approve the Contractor's monthly environmental and social monitoring report that will then be transmitted to NWSC for final approval. NWSC's Environmental Management and Social Specialist will also independently monitor the implementation of the ESMP and/or verify the accuracy and content of the Contractor's monitoring report and then report to the client. The report will also be shared with The World Bank and other relevant stakeholders. Strictly it will be the contractor's compliance with the contract requirements (whether BOQ items or items considered part of other BOQ items) that will enable the Resident Engineer or Supervising Engineer to approve payment.

Construction and post construction phase auditing should culminate in reports that NWSC shall share with World Bank, NEMA or other interested stakeholders. Note that while NWSC is under no obligation to disclose construction phase audits, annual post-construction audits must be submitted to NEMA as a regulatory requirement as per Section 31(2) of National EIA Regulations, 1998.

Therefore, Contractor's Monthly Report is expected to summarize the following:

- a) Progress in implementing the C-ESMP and the standalone management plans;
- b) Status of key approvals and documentation for the project;
- c) Compliance with legal obligations and specifications;
- d) Findings of the monitoring programmes, with emphasis on any breaches of the control standards, action levels or standards of general site management;
- e) Summary of any complaints by the community and actions taken/to be taken; and
- f) Key environmental activities for the next month.

10.7.4.6 Record Keeping

NWSC shall ensure that all relevant monitoring and compliance records are readily available. Section 122 (6) of NEA states, “A developer shall maintain proper records of the monitoring undertaken under subsection (2), which shall be made available to the Authority or lead agency upon request” while subsection (7) states, “A lead agency or the Authority may require the developer to submit monitoring reports in a prescribed form”.

10.7.4.7 Stakeholder Engagement/ Communication Strategy

Given the project’s geographical scope, NWSC will develop an engagement plan and communication strategy; and recruit or assign a Communications Specialist to manage their implementation throughout the project cycle.

10.7.5 Environmental and Social Management Plan Reviews

The ESMP is a living/dynamic document subject to similar influences and changes from variations to the provisions of the project specifications. It will be reviewed at an interval of 6 months in order to identify any required amendments.

10.7.6 Approval of the ESMP Activities

Implementation of ESMP activities will be approved by NWSC and safeguards compliance will be one of the bases for payment. Final payment to the contractor shall be tagged to successful implementation of the ESMP activities and restoration of all disturbed areas/sites and clean-up of all construction sites.

10.7.7 Enforcement of Compliance

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

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

10.7.8 Environmental Compliance Audit

NWSC will take the responsibility to fulfil the requirements for an environmental and social audit, not less than 12 nor more than 36 months after project implementation completion or commencement of operations respectively in line with the National Environment Act 2019 and

the Audit Regulations of 2020. NWSC shall submit the environmental compliance audit report to NEMA and undertake mitigation measures to address and rectify any non-compliance detected.

10.7.9 Operation Phase Monitoring and Processes

10.7.9.1 Water Supply Plan

NWSC should develop, implement, and maintain a water safety plan taking into consideration the potential risks to the safety of the water from the supply catchment area to the consumer. A water safety plan should consist of three key components:

- a) System assessment to determine whether the drinking-water supply chain (up to the point of consumption) as a whole can deliver water of a quality that meets health-based targets;
- b) Identifying control measures in a drinking water system that will collectively control identified risks and ensure that the health-based targets are met; and
- c) Management plans describing actions to be taken during normal operation or incident conditions and documenting the system assessment (including upgrade and improvement), monitoring and communication plans and supporting programmes.

A water safety plan should include:

- a) Measures to protect the source of drinking water from risks of pollution;
- b) Measures to ensure all installations intended for the production of drinking water exclude any possibility of contamination. For this purpose and in particular:
 - the installation for collection, the pipes and the reservoirs should be made from materials suited to the water and in such a way as to prevent the introduction of foreign substances in water; and
 - the equipment and its use for production should meet hygienic requirements;
- c) Measures to ensure an appropriate treatment such as pre-treatment processes, coagulation, flocculation, sedimentation, filtration and disinfection are undertaken to assure the safety of water for the consumers;
- d) Appropriate operational monitoring system including monitoring parameters that can be measured and for which limits have been set to define the operational effectiveness of the activity; frequency of monitoring and procedures for corrective action that can be implemented in response to deviation from limits. If, during production it is found that the water is polluted, the producer shall stop all operations until the cause of pollution is eliminated; and
- e) A verification plan to ensure that individual components of a drinking-water system, and system as a whole is operating safely.

Drinking-water suppliers should ensure, at all times, the quality and safety of the water that they produce. Public health surveillance (that is, surveillance of health status and trends) contributes to verifying drinking-water safety. Adequate infrastructure, proper monitoring and effective planning and management; and a system of independent surveillance are basic and essential requirements to ensure the safety of drinking-water. Surveillance should cover the total supply network from the source of untreated water to the consumer delivery points.

10.7.9.2 Water Quality Monitoring Plan

NWSC will undertake water quality tests before use of the water by the communities to determine if water is safe to drink and to establish a baseline so that any future degradation can be detected. The Uganda Drinking Water Standards are as follows:

Table 10-4: Uganda Drinking Water Quality Standards and WHO Drinking Water Standards

Parameter	Unit	National Standards	WHO (2011)
Colour Apparent**	Hazen units, max. Pt scale	15	No Guideline
Turbidity**	NTU	5	1
Dissolved Solids**	mg/l	700	No Guideline
Electrical Conductivity (EC)**	μS/cm	1500	250
TDS**	mg/l	1200	1200
Total Suspended Solids (TSS)**	mg/l	0	No Guideline
pH**		6.5 – 8.5	6.5 – 8.5
Total Alkalinity (as CaCO ₃) **	mg/l	500	No Guideline
Total Hardness (as CaCO ₃) **	mg/l	< 300	< 300
Bicarbonate**	mg/l	300	300
Calcium (as Ca) **	mg/l	150	No Guideline
Sodium (as Na)	mg/l	200	200
Magnesium	mg/l	50	No Guideline
Arsenic (as As)	mg/l	0.05	0.01
Copper (as Cu)	mg/l	1.0	2.0
Chloride (as Cl) **	mg/l	250	250
Chromium (as Cr 6+)	mg/l	0.05	0.05
Fluoride (as F) **	mg/l	1.0	1.5
Total Iron (as Fe) **	mg/l	<0.30	No Guideline
Manganese (as Mn)	mg/l	0.1	0.1
Nitrates (as NO ₃) **	mg/l	5	50 (Total Nitrogen)
Barium	mg/l	1.0	0.7
Aluminium (as Al)	mg/l	0.1	0.2

Parameter	Unit	National Standards	WHO (2011)
Sulphates**	mg/l	400	250
Zinc (as Zn)	mg/l	5.0	3.0
Lead (as Pb)	mg/l	0.05	0.01
Selenium (as Se)	mg/l	0.01	0.01
Cadmium (as Cd)	mg/l	0.01	0.003
Phenolic substances (C ₆ H ₅ OH)	mg/l	0.001	No Guideline
Mercury (as Hg)	mg/l	0.001	0.001
Cyanide	mg/l	0.01	0.07
Poly nuclear aromatic substances	mg/l	nil	No Guideline
Residual free chlorine	mg/l	0.2	0.2
Mineral oil	mg/l	0.01	No Guideline
Anionic detergents	mg/l	0.2	No Guideline
Pesticides		Trace	Trace
Carbon chloroform extract (CCE, Organics pollutants)	mg/l	0.2	No Guideline
Faecal coliform **	CFU/100ml	0	0
E. coli **	CFU/100ml	0	0

Source: Uganda Bureau of Standards, WHO Guidelines, 2011

** - parameter must be tested

The frequency of sampling and surveillance will be as detailed in Table 10-5 below:

Table 10-5: Minimum frequency of sampling of water for surveillance

Population served (P)	Frequency (minimum) of sampling
P > 100,000	10 samples every month per 100,000 of population served
25,001 – 100,000	10 samples every month
10,001 – 25,000	3 samples every month
2500 – 10,000	2 samples every month
P < 2500	1 sample every month

A sampling programme that takes into consideration appropriate international recommendations should be established and implemented by NWSC. The sampling should be regular and its frequency should mainly depend on the following factors:

- a) quality of water harnessed including effects on the water from climatic, human and industrial activities;
- b) type of treatment for drinking worthiness;
- c) volume of water processed;
- d) risks of contamination;
- e) background of public water supply network;
- f) population served; and
- g) Capabilities of the analytical facility (both in terms of capacity and in terms of analytical performance).

10.7.9.3 Water Source and Catchment Protection Plan

For long term management of the river, the project should consider planting water conservation trees, within about 200m from the riverbanks (buffer zone). It is important also to enhance collaboration between the sectors of Water and Environment, Agriculture, Forestry and Nature conservation in order to intensify monitoring to ensure that activities within buffer zone of 200m are restricted. A wider stakeholder engagement should be pursued to engage in activities to maintain the riverine ecosystem. Stakeholder engagements, monitoring and enforcement should be ongoing activities, which should continue during pre-construction, construction, operation and maintenance as well as decommissioning.

NWSC is now diversifying into water source protection through planting trees. Since the inception of the campaign in October 2017, NWSC has planted more than 500,000 trees in various areas of NWSC operation including Kampala, Kamuli, Jinja, Bushenyi. This is through the 'NWSC One Million Tree Campaign. Seedlings are obtained from NFA and NEMA. It has been observed that the interventions on water source protection is are not adequate. This is mainly because they seem to be top-down. For instance, the varieties of trees planted are selected by NWSC management not the catchment communities around the water resources. From a socio-ecological perspective, there is need improve catchment protection planning and implementation mechanisms with emphasis on inclusiveness, gender and cultural sensitivity, restoration of indigenous biodiversity within the water catchments, and lastly developing and funding implementation of a Water Source Protection Plans (WSPP) for the proposed 3 Boreholes and Catchment Management Plans (CPP) for R. Nile.

10.7.9.4 Stakeholder Engagement/Communication Strategy

There is need to engage the relevant stakeholders during the operation phase including sharing information. This will be in line with the overarching NBI Communication and Stakeholder Engagement Strategy 2018 - 2023 builds on a predecessor document of 2012 – 2016. The Strategy directly contributes towards the achievement of NBI's six Strategic Goals by fulfilling the cross-cutting strategic direction 6.5 which seeks to "build consensus among the countries' public and stakeholders for cooperative basin development and management".

10.7.9.5 Operation Phase Annual Compliance Audit

During the operation period, NWSC will take the responsibility to fulfil the requirements for an environmental and social audit in line with the National Environment Act (2019) and the Audit Regulations of 2020. NWSC shall submit the environmental compliance audit report to NEMA and undertake mitigation measures to address and rectify any non-compliance detected.

10.7.10 Institutional Arrangement, Roles and Responsibilities

According to the IWMDP Environmental and Social Management Framework, (March 2018), the Project will be implemented by an autonomous entity (NWSC) under the oversight of the Water Sector and Environment Sector Working Groups and relevant governing bodies in close collaboration with Adjumani DLG and their partners (e.g., private sector operators). To facilitate integration within the sector, MOUs outlining joint responsibilities will be signed between the NWSC, the district local government and entities responsible for specific activities (e.g., Town councils).

The NWSC currently has adequate Environmental (05) and Social Safeguards (02) staffing/specialist. Adjumani District Local Government has an Environmental Officer and Community Development Officer who will be involved in project monitoring and supervision.

During the construction phase, the parties involved with the ESMP include: the client NWSC with ultimate responsibility for Environmental & Social performance on the project; the Supervising Engineer (with an Environment and Social Specialist on their team) responsible for monitoring and supervising the implementation of the ESMP and contract requirements by the contractor(s); and the Contractor (with an Environmental Specialist, Social Development Specialist and Health & Safety Specialist) who has responsibility for implementing the ESMP. NWSC will ensure that both the Supervising Engineer and Contractor are doing their jobs effectively and that the ESMP is delivering the necessary environmental and social protection measures.

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:

10.7.10.1 NWSC (Project Developer)

NWSC's activities are aimed at expanding service coverage, improving efficiency in service delivery and increasing labour productivity. Key among its objectives is to plough back generated surpluses for infrastructure improvements and new investments.

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

The Project Developer will:

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

10.7.10.2 Project Engineer/Supervising Consultant

The Supervising Consultant should have in his team at least an Environment Specialist who will have overall responsibility of issuing guidance and instructions to the contractor including review and approval of the contractor's documentation (technical and contractual). The Environmental Specialist will work closely with NWSC Safeguards Team in supervising the contractor including the following;

- i) Check that the required management and monitoring measures identified in the ESMMP are incorporated into the C-ESMP;
- ii) Monitor the implementation of the ESIP;
- iii) Regularly review and cause updating of the ESIP;
- iv) Enforce compliance with the contractual environmental and social requirements;
- v) Support the Contractor in the preparation of monthly site meetings and that, such meetings have their agenda embody aspects of environmental and social compliance;
- vi) Review and approve work method statements by the contractor to ensure environmental and social safeguards are fully addressed in works to be undertaken;
- vii) Approval acceptable sites for project associated facilities prior to their respective ESIAs; and
- viii) Issue any penalties for non-compliances with contractual environmental commitments.

10.7.10.3 Project Contractor(s)

During the construction phase, the NWSC will engage contractors to undertake the civil works. Contractors will be responsible for complying with all relevant legislation and adhere to all mitigation measures specified in the ESMMP including the NEMA conditions of approval. NWSC will therefore have to ensure enforcement of mitigation measures which will be enshrined under contractual obligations. The contractor(s) will be obliged to commit resources to ensure implementation of obligations in the contract through hiring qualified Safeguards Officers to operationalize the environmental and social requirements in the ESMP and supporting

documentation. The Contractors shall hire the following key staff to undertake project implementation: Project Manager, Environmental Specialist, Sociologist and a Health and Safety Officer.

Therefore, the contractor(s) will;

- i) Develop a C-ESMP in line with this ESMMP and other plans (Section 10.4) prior to construction, providing detail to meet environmental and social management requirements, and to the satisfaction of the Supervision Consultant;
- ii) Effectively implement and manage the ESMP to the satisfaction of Supervision Consultant and NWSC;
- iii) Monitor, record, audit and conduct surveillance of the implementation and effectiveness of the C-ESMP and report their effectiveness to Supervision Consultant;
- iv) Report regularly to the Supervision Consultant's Environmental and Social Specialists regarding environmental and performance;
- v) Undertake adequate environmental and social assessments, including annual environmental compliance audits, for project associated facilities;
- vi) Recruit qualified and experience environmental, social and social personnel to implement the ESMMP;
- vii) Report environmental and social incidents to the Supervision Consultant, NWSC and relevant government authorities. Furthermore, document actions taken to rectify and improve the situation;
- viii) Check that all other requirements as described in the contract specification and other licenses, certificates and permits are complied with;
- ix) Review and update the C-ESMP, during construction annually or if any significant changes occur; and
- x) Ensure that all workers are regularly sensitised on environmental and social, occupational health and safety aspects of the project to enhance compliance.

Note:

- a) *NWSC through the supervising consultant must approve the contractor's safeguards team. It may be useful to include the minimum requirements in the contracts for the civil works. The Contractors are encouraged to sign MoUs with different service providers for safeguards related matters (waste management, HIV/AIDS, etc).*
- b) *Sub-contractors shall not develop their own ESMP but shall follow and abide by the main contractor's ESMP.*

10.7.10.4 Development Partner (WB)

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

- i) Provide appropriate guidance towards compliance with the Operational Safeguards;
- ii) Allow for quick feedback on the any safeguards documentation of the project;

- iii) Provide no-objection on environmental and social matters whenever required; and
- iv) Play an oversight role in implementing the Safeguards Requirements.

10.7.10.5 NEMA

NEMA retains its mandatory role of coordination, supervision and monitoring environmental issues. NEMA's role will involve coordinating the review of the ESIA's of the planned interventions with relevant line agencies and if acceptable approve. Other lead agencies that would participate in the review are the Ministry of Local Government and local governments. NEMA will review this ESIA as well as undertake compliance monitoring through its regional office in Northern Uganda or through the Adjumani District Environment Officer. Therefore; it will do the following:

- i) As part of preconstruction activities, NEMA will undertake environmental and social due diligence including review and consideration of this ESIA in consultation with other relevant stakeholders.
- ii) NEMA shall also review and consider ESIA's for project support facilities.
- iii) Issue permits and licences required to guide project operations
- iv) Monitor implementation of EIA conditions of approval and provide feedback for continuous improvement.

10.7.10.6 Riparian States and Regional Bodies

The ESIA recommends that NWSC creates a forum for regional participation during construction and operation works through the Nile Basin Initiative (NBI) by inviting representatives of the partner states to be part of project supervision teams and to share progress reports to partner states and regional bodies such as Lake Victoria Basin Commission. In Uganda, the International and Transboundary Water Affairs Department within MWE coordinates national efforts to manage shared water resources.

There are already existing projects such as hydropower plants along the R. Nile while others are under construction e.g., Karuma hydropower plant. Catchment protection activities such as tree planting and promoting sustainable land management are critical for the sustainability of the project. Building climate resilience of the Nile Basin requires regional efforts. A wider stakeholder engagement should be pursued, not only on the Ugandan side, but other riparian states (Rwanda, Burundi, Kenya, Tanzania and Southern Sudan) should also engage in activities to maintain the riverine ecosystem through NBI. Where grievances arise, such will be solved by following guidance in the Convention on the Law of the Non-Navigational Uses of International Watercourses and the East African Community Protocol on Environment and Natural Resource Management.

10.7.10.7 Ministry of Water and Environment (MWE)

The 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 (3) directorates: Directorate of Water Resources Management (DWRM), Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA). MWE shall ensure all recommendations contained in the mitigation plan requiring its participation are implemented.

- a) 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.
- b) 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.
- c) 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.

10.7.10.8 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, analyse, develop and formulate national policies on all taxes, fees, levies, rates for Local Governments. Adjumani DLG falls under this Ministry and will be supervised and supported by MoLG.

Specifically, the Environmental Monitoring and Compliance Department of NEMA is responsible for the review and approval of ESIAs, 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.

- a) The District Environmental Officers (DEO) in the Adjumani district are responsible for overseeing environmental protection on behalf of NEMA through advising the District Environment Committee (DEC) on all matters relating to the environment, monitor roles during execution of this ESMP in their respective project areas, among others.
- b) The Adjumani District on its part, the DEO and CDO are all key in the implementation of the project with respect to observance of environmental and social safeguards during project implementation.
- c) District Environmental Committees will 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.

Note: Usually, these officials lack adequate facilitation so the project will need to provide auxiliary financial assistance for them to have effective participation in this project.

10.7.10.9 Non-Governmental Organisations (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.

10.7.10.10 Department of Museums and Monuments (MTTI)

This will provide support in preserving the physical cultural resources (PCRs) within the project area and managing any chance finds encountered.

10.7.10.11 Occupational Health & Safety Department

The OHS Department in Ministry of Gender, Labour & Social Development (MGLSD) unit has authority to inspect any facility for compliance with national requirements on safety in workplaces. The department will also undertake registration of the construction site as well as participate in periodic supervision visits to assess and monitor management of occupational health and safety issues. The Department will also undertake checks on all equipment used by the contractor.

10.7.10.12 Local Council Leaders

The local council leaders in the project areas traversed by the T/Line will have a role on matters of helping the contractors settle in the project area and to support identification of raw materials sources. They will be key in aspects of labour identification and endorsements as well as grievance redress. The local leaders will support law enforcement agencies in curbing crime during project implementation

10.8 Grievance Redress Mechanism

10.8.1 Overview

Effectively addressing grievances from people impacted on projects is a core component of managing operational risk. Grievance redress mechanisms (GRMs) can be an effective tool for early identification, assessment, and resolution of complaints on projects. This helps to boost the relationship between the project proponent, contractor, and the stakeholders. NWSC and MWE working in collaboration with Local Governments, CSOs and communities shall establish GRM for to promote mutually constructive relationships and enhance the achievement of project objectives. This shall be done in line with the guidance provided in the ESMF and RPF. NWSC and MWE should on regular occasions review the GRM and verify that they are working properly.

This section describes ways in which communities and project workers can lodge a complaint or express a grievance against the project, its staff or contractors during project implementation and operation. It also describes the procedures, roles and responsibilities for addressing grievances and resolving disputes. Every aggrieved person shall be able to trigger this mechanism to quickly resolve their complaints.

Complaints/ Grievances

A complaint is an expression of dissatisfaction. It can be an issue, concern, problem, or claim (perceived or actual) that an individual or community group wants addressed by the project management or the grievance management committee and in a formal manner. At a project site, complaints can be related to safety and health conditions, environmental degradation, design mismatches, abandonment of the works, poor or no pay for workers, criminal matters such as sexual harassment, rape, theft among others.

10.8.2 Purpose and Objectives of the Grievance Redress Mechanism (GRM)

The purpose of the system is to ensure all grievances are received, recorded and resolved in a timely, fair and transparent manner. This is to ensure proper management of complaints and grievances from all stakeholders in order to minimise the potential risks to the implementation of the project. The system is also in place to create a systematic process of recording, processing and resolving in a transparent manner, complaints, grievances and concerns raised during the project implementation.

The GRM shall be communicated to all stakeholders from the early stages of the program identification and referenced throughout the lifetime of the program at every meeting and event in order to ensure that stakeholders understand the process but also provide feedback and comments on whether it is effective and fit for purpose.

10.8.2.1 Objectives of GRM

The objectives of the grievance process are:

- a) Establish a prompt, easy to understand, consistent and respectful mechanism to support the receiving, investigating and responding to complaints or grievances from community stakeholders;
- b) Ensure proper documentation of complaints or grievances and any corrective actions taken; and
- c) Confirm that complaints are satisfied with outcomes of corrective actions;
- d) Avoid the need to resort to legal proceedings.

10.8.2.2 Scope of the GRM

It shall apply to all concerns and grievances, perceived or real, related to all activities linked to the implementation of the project including but not limited to:

- Disclosure of information;
- Land acquisition and Resettlement;
- Criminality on the projects;
- Project selection/identification;
- The procurement procedures;
- The general contract management/project implementation;
- The infrastructure designs;

- Time and pace of works;
- Fraud and Corruption;
- Environmental concerns;
- Time and manner of payments; and
- Any other social related concerns affecting the people.

A proper and strong Grievance mechanism is very important in ensuring the stakeholders grievances and issues as they relate to the proposed project are addressed in a timely and appropriate manner, to boost the relationship between the project proponent, contractor, and the stakeholders. Therefore, the project proponent should therefore put in place a GRM for the project to ensure any issues raised by stakeholders related to the project safeguards are addressed.

It is important to emphasize that grievance redress mechanisms are for all aspects of a project, not just environmental and social safeguards. NWSC should prepare and disseminate grievance redress guidelines for the project, including a hierarchy of reporting levels for redress, roles, and responsibilities.

Public information about grievance redress should be posted in visible locations in project area of influence. Where needed, Grievance Redress/Management Committees (GRCs) should be established, with the necessary authority, training and resources. Entities involved in grievance redress should keep proper records and logs. The structures of the GRM should also include women's representatives to allow female stakeholders to more easily make complaints or lodge grievances. Project budgets should include resources for the establishment and operation of the Grievance Redress System. NWSC should on regular occasions review the GRM and verify that they are working properly.

During project implementation, two major grievance redress mechanisms, should be established namely;

- a) Community Grievance Redress Mechanism (GRM)
- b) Contractor Workers Grievance Mechanism.

Community Level GRM

At community level, a Grievance Redress Mechanism (GRM) will be established to help manage all community issues related to the Adjumani water and sanitation project. Generally, complaints and grievances will be resolved at the community level as much as possible under the management of the contractors and the Supervising Consultant (SC) representative.

The statutory rights of the Complainant to undertake legal proceedings remain unaffected by participation in this process. The structures of the GRM shall include women's representatives to allow female stakeholders to more easily make complaints or lodge grievances. The use of representatives is also available to any affected party and may be used in situations where the affected party cannot represent themselves (for example when the affected party is a child or disabled).

Considering the nature and extent of works on water and sewer line improvements, grievances may arise especially during construction phase of the project and these include;

- a) Land requirements especially where the water and sewer pipelines will traverse
- b) Clearance of right of way which may affect perimeter walls, hedges, and trees
- c) Complaints related to noise, dust, and traffic incidents
- d) Complaints on worker's behaviour or conduct specially towards women, girl and boy children
- e) Illicit behaviours like alcoholism, smoking, drug abuse etc of the contractor's workers
- f) Disruption of social set up and security
- g) Disputes on compensation values
- h) Increased pressure on social services and infrastructure, including water supply
- i) Theft of pipes
- j) Criminal cases
- k) Sexual Harassment and GBV

The communities will be informed about the GRM during the stakeholder consultation and disclosure activities. The mechanism will be communicated and made available to all affected communities and in particular to both genders and vulnerable groups.

10.8.3 Grievance Management Committees (GMCs)

A dedicated Grievance Management Committee will be established to manage grievances during project implementation. The committees will be set up in a manner that brings local leadership and safeguards teams (such as the Community Development Officers, Municipal Principal Community Officers, Environmental Officers) so that any resultant agreements are acceptable. The GMCs shall be formed at village/cell, sub-county, district level, Contractor's site and National (NWSC/MWE) levels as described below:

10.8.3.1 Community GMCs - To Handle Within 3 Days Upon Receipt of Grievance

The Grievance Management Committee per Village/Cell shall be formed. This is due to the recognition that these water and sewer lines are traversing through different cells having their own representatives and the establishment of a Village/Cell level committee will be adequate to support grievance management. Safeguards staff from NWSC and MWE shall work with community leaders in the project area to set up a Community-Level Grievance Management Committee (to be chaired either by LC1 Chairperson or as shall be agreed but with the LC1 being part of the committee) as the first point where grievances are addressed. The Community-Level Grievance Management Committee informs and consults with the Sub-County or District GRC to determine validity of claims and seek technical guidance especially on contentious issues. The committee shall include at least 6 members including Chairperson, Secretary, other Members (4) including at least 2 female members. This shall be the first stage of lodging and managing complaints at community level.

10.8.3.2 Contractor GMC - To Handle Within 3 Days Upon Receipt of Grievance

In addition to handling worker's grievances, the contractor's safe guards team follow up on community grievance committee. All Complaints will be communicated to and registered by the Contractor's nominated representative usually the Contractor's Sociologist in the site log book immediately upon receipt, including details of the Complainant, attempts to resolve the complaint, the resolution of the complaint and outcome.

10.8.3.3 Subcounty GMC - To Handle Within 5 Days Upon Receipt of Grievance

Unresolved and contentious issues shall be forwarded to the Sub-County for action. Depending on the nature and the severity of the complaint/s, the GRC in consultation with the Project Affected Persons (PAPs) or complainant, shall identify and decide on an approach for grievance resolution. Where appropriate, complainants shall be given the choice of selecting an affordable approach with which they are comfortable and confident and that is beneficial to them. Given its extended nature of staffing and complexity, the Subcounty grievance management committee shall include the following members;

- a) Sub-county Chief
- b) Parish Chief
- c) Community Development Officer
- d) Village Health Teams where the grievances originated
- e) Representative of the PAPs

10.8.3.4 District GMC - To Handle Within 3 Days Upon Receipt of Grievance

At the District Level, the Grievances Management Committee shall consist of;

- a) LC V Chairperson (Chairman)
- b) Resident District Commissioner (RDC)
- c) Chief Administrative Officer
- d) District Community Development Officer (Secretary)
- e) Environmental Officer
- f) Representative from the PAPs
- g) District Lands officer
- h) Any other Officer that the CDO or CAO deems fit to fast track the grievance redress process

NWSC should have a district focal person/representative at the district to address project related grievances.

10.8.3.5 National GRC - To Handle Within 3 Days Upon Receipt of Grievance

There shall be a National Grievance Redress Committee (NGRC) consisting of NWSC/ MWE Chair, Project Coordinator, Social Development Specialist, Environment Specialist, Environmental Coordinator, a member of a recognized Non-Government Organization, and a community leader. The Safeguards team from NWSC/MWE, (Social Development Specialist and Environmental Specialist) shall be the focal persons for grievance handling.

10.8.4 Community Grievances Handling Procedure

Figure 10-1 illustrates the steps or procedure that will be involved in the process of handling community grievances. The details of the process are given in sub-sections that follow.

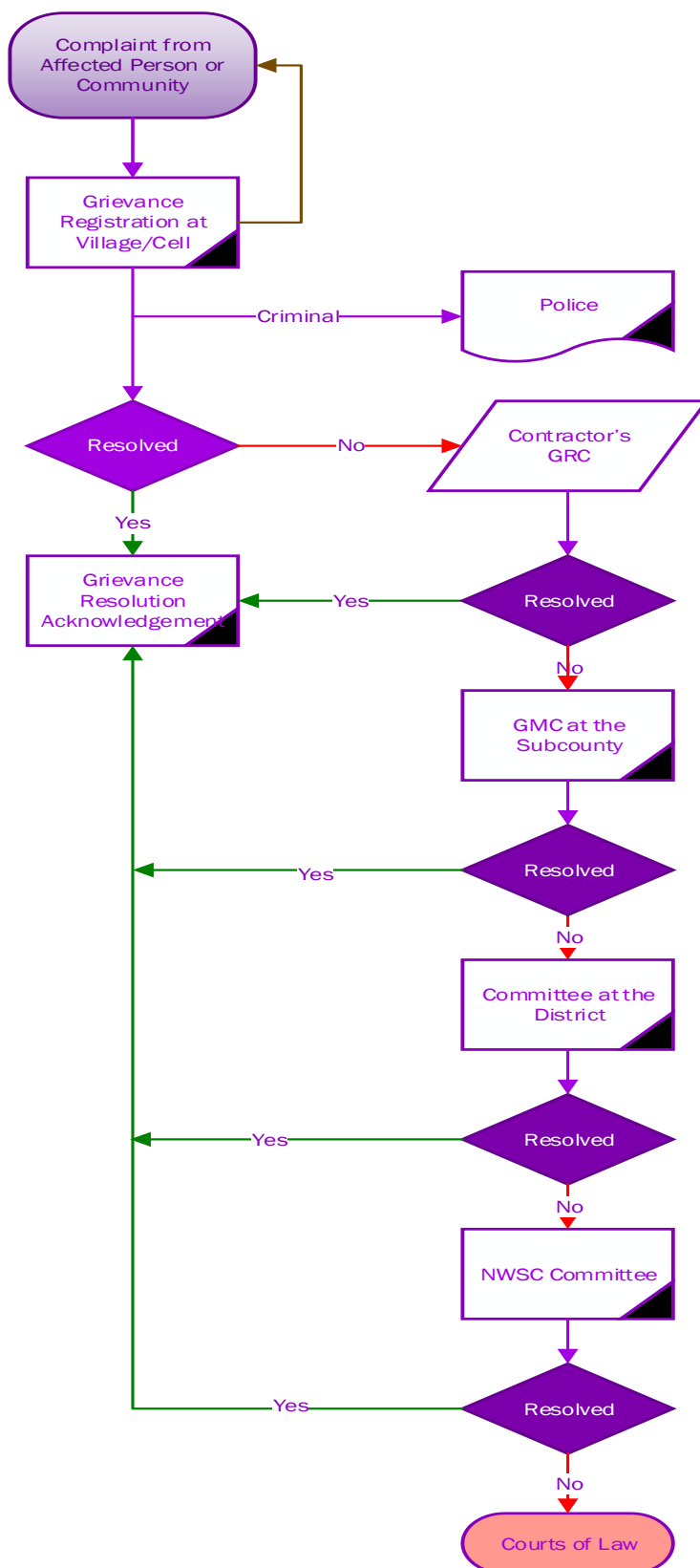


Figure 10-1: Grievance Procedure at community level

10.8.4.1 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 village/Cell level, which is the first level of community grievance management, the grievance officer shall register the complaint, screen it and handle it if possible or;

- a) Refer to the grievance management committee for further investigations, or
- b) 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 log book.

This committee shall sit at least every two (2) 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 log book. If the party is not satisfied, the matter shall be referred to the town council in Step 2.

10.8.4.2 Escalation of Grievances to Construction Site GMC

The site GMC 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 GMC meeting. The affected person(s) shall be involved in GMC 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 the subcounty within 7 days.

At the Site level, the Resident Engineer shall update NWSC on grievances management and emerging issues which might require immediate or explicit action or support from NWSC to expedite project implementation.

10.8.4.3 Escalation of Grievances to Subcounty GMC

The Sub- County shall have a grievance management desk. The Community Development Officer (CDO) shall be the grievance officer responsible for recording all grievances at this level. Member of the committee shall include; the Subcounty chiefs, parish chiefs, and representatives from the community. Where the Subcounty receives grievances directly from the community, the issues will be referred to Construction site for action. If necessary, the complainant and LC1 chairperson of their village shall be invited to attend the hearing.

If the complainant is satisfied with the decision at this level, he/she shall be informed of the outcome within 24hrs and the matter shall be closed off and signed in the grievance log book. If the complainant is not satisfied, the matter shall be referred to the District Grievance management committee.

10.8.4.4 Escalation of Grievances to District GMC

In the event that a complainant is not satisfied with the decision made by the Subcounties or the committee fails to resolve it, it shall be referred to the District Grievance management committee. This committee shall be chaired by the LCV Chairperson and members will include the CAO, RDC, District Councillors, and any other persons deemed relevant by the chairperson. At district level, the District Community Development Officer shall be responsible for receiving and recording the grievance in the log book. On receipt, he 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 log book. If the aggrieved is not satisfied, the matter shall be referred to the NWSC as step 4.

At the District level, the CAO shall update NWSC on grievances management and emerging issues which might require immediate or explicit action or support from NWSC to expedite project implementation.

10.8.4.5 Escalation of Grievances to NWSC GMC

At NWSC, referrals shall be registered in a complaint log book by the Social Development Specialist. Within 2 weeks, the NWSC 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 log book with consent of the complainant. NWSC 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, NWSC may advise the complainant to seek further justice from alternative offices like courts of law or any other Government agencies

10.8.5 Contractor/Worker GRC

Workplace concerns are usually different from issues raised by project-affected communities and other stakeholders, and therefore call for a separate workers' grievance redress mechanism to address them. For better organisation and management of workers' grievances and discipline, the contractor shall establish a Workers' GRC. Examples of worker's grievances include demand for employment opportunities; lack of PPE, lack of proper procedures or unreasonable overtime, labour wage rates; Sexual Harassment and GBV, delays of payment; disagreement over working conditions; and health and safety concerns in work environment among others.

10.8.5.1 Roles of Workers' GRM

With management support from the contractor, supervising consultant and NWSC, the workers' council shall play a significant role in proactive management of employer – employee relations, workers' welfare and grievances within the workplace. This council shall not interfere with either Management's authority or its obligation to manage their contracts but rather provides a formally recognized opportunity and avenue for their grievances to be lodged and managed and their rights to be heard and respected. Workers' Council shall;

- a) Provide a forum for consultation, frank exchange of information, discussion and joint problem solving between management and employee representatives on issues pertaining to staff welfare, rights, discipline; any proposed changes dealing with policies, procedures and working conditions.
- b) Receive and report worker's 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.
- c) 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.
- d) 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.
- e) Regularly solicit for employees' suggestions/opinions to management through appropriate and organized channels such as their representatives, suggestion box, or joint meetings from time to time.
- f) Act as a point of contact between the employees and management; establish and maintain good relations, foster effective two-way communication and mutual understanding between workers on one hand, and with management on another.
- g) Identify and represent concerns of special interest groups on the project such as women, expectant and lactating mothers, workers with disability etc.
- h) Organize and conduct monthly Workers' GMC 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 NWSC pointing to key action areas requiring attention.

10.8.5.2 Establishment of a Worker's GRC – To Handle Within 5 Days Upon Receipt of Grievance

A worker's committee shall be instituted headed by the sociologist and involving other safeguards members from the contractor and supervisor. The committee shall have such representatives from the workers elected by workers. For effective confidence building and confidentiality, the contractor's Sociologist shall be the secretary to document and manage the grievance log, minutes, and writing the committee reports.

At the time of recruitment, the project workers should be sensitized of the grievance mechanism and the measures put in place to protect them against any reprisal for its use. Measures will be put in place to make the grievance mechanism easily accessible to all such project workers.

The workers will then elect their own representatives who will represent all workers during the grievance meetings. The GRC at Site shall comprise of the following members.

- a) Resident Engineer (Chairperson and presides over all committee meetings).

- b) Consultant's Sociologist
- c) Contractor's Sociologist Secretary- (deals with correspondences and recording of Grievances in the Site Grievance Log Book kept at the contractors site office).
- d) Consultant's Environmentalist
- e) Contractor's Site Engineer
- f) Contractor's Health and Safety Officer
- g) Chairperson of Workers' Council - represents all workers concerns and interests.

The committee shall meet at least twice (2) every month, during working hours based on a meeting schedule prior agreed with project Management (contractor and supervising consultant). A special meeting, if required, may be held at the call of the chairperson at short notice in consultation with the project management. The contractor shall make immediate responses to matters related to the water construction, contractor's workers, agents, sub-contractors or suppliers.

10.8.5.3 Stages of Handling Workers' Grievances

10.8.5.3.1 Option 1: Informal Discussion

If workers have a grievance or complaint regarding their work, they shall, wherever possible, raise their concern with a supervisor or manager as it may be possible to find a solution informally. This shall make it more likely that disputes can be resolved quickly, closer to the source of the problem, making it less likely that the issue escalates into an intractable problem. Nonetheless, the issue and response shall still be logged and tracked from the perspectives of checking outcomes and monitoring.

10.8.5.3.2 Option 2: Formal Complaint

If the grievance is not resolved informally, the aggrieved shall proceed to resort to the formal grievance redress mechanisms as per the following steps;

10.8.5.3.2.1 Lodging the Complaint to Workers' GRM

If the matter is serious and/or the worker wishes to raise the matter formally, the worker shall set out the facts of the grievance verbally or in writing to the committee, with support and guidance from the section representative who then forwards the complaint to the secretary. The secretary then records the complaint in the log book and notifies the chairperson. Alternatively, the worker may raise complaint through suggestion boxes, phone calls, text messages or e-mail to the secretary (Consultant's Site Sociologist).

10.8.5.3.2.2 Assessment of Complaint and Investigation by Workers' Council Within 5 Days

On receipt of the complaint, the secretary (sociologist) shall make further investigations and in consultation with Chairperson shall schedule for a meeting (depending on the urgency of the complaint) to assess the complaint and determine the corrective action. The assessment shall also identify the key issues that have been raised, together with any root causes, and shall determine

the outcome that the worker is looking for from the process. Any additional information shall be gathered to allow a full assessment.

The appropriate form of investigation will depend on the type of complaint and the seriousness of the allegation. In general terms, the committee shall try to understand the key issues and interview the individuals involved in a complaint, e.g., those managing the workers, or those responsible for the activity or service that is raised in the grievance.

The workers' council shall conclude the issues or escalate the issues either to the Site Disciplinary Committee (if it is of a disciplinary nature) or to the Site GMC if it is a grievance which needs redress. Concluded issues which require attention of management shall be communicated formally by the Secretary to Contract Manager for action with a copy to the Resident Engineer.

10.8.5.3.2.3 Determination of Corrective Action Site GMC Within 7 Days

A GMC shall then hold hearings, and invite both the offender and the offended. The committee shall give fair hearing to anyone suspected as offender in order to make fair judgment guided by the Workers' Code of Conduct. On assessment of the complaint and judgement derived from hearings convened for complaints of disciplinary nature, the committee will advise / recommend to the contractor's management in writing on the appropriate course of action to be taken against the suspected offender. The submission shall be made by the Chairperson to Contract Manager with a copy to the Resident Engineer.

Where a complaint is not of disciplinary nature, or is from a community member, the Site GMC shall hold hearings, and invite the complainant to provide detailed information; consider the settlements required and make effort to resolve the matter. The Site GMC shall give utmost consideration to the issue raised so as to salvage the after-effects this may cause to the project, the affected person(s); public amenities or natural systems.

10.8.5.3.2.4 Feedback From the Affected Parties Within 3 Days

The contractor or worker shall give feedback to the committee on the implementation of the Committee recommendation and this shall be recorded in the log book. On assessment of the non-disciplinary complaints and redress derived, if this is acceptable to the complainant, the Site GMC shall liaise with the complainant to document the redress agreed and have it signed by the complainant; this shall be recorded in the Log Book. The redress shall be implemented according to the timelines that shall be agreed upon during the discussions with the complainant. The feedback on corrective actions shall however be given in a period of 03 days.

10.8.5.3.2.5 Appealing to NWSC Against the Verdict of the Site GMC

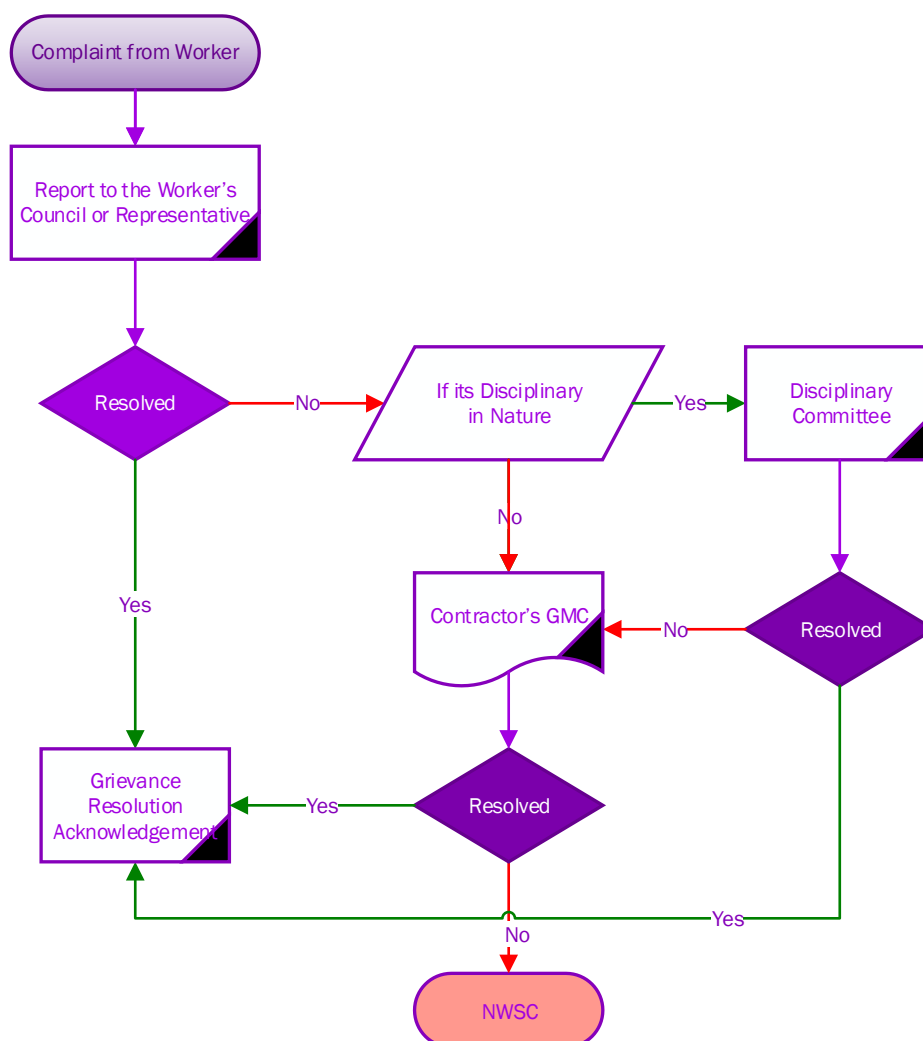
Any issues that require escalation beyond disciplinary committee or Site GMC shall be referred to NWSC. The issues shall be referred by the Resident Engineer and addressed to NWSC with attention to Social Development Specialist. Upon the receipt of case the project management team including shall review and handle the matter within 10 days. The team shall comprise at the minimum the following;

- a) Project Engineer (Chairperson)

b) Social Development Specialist (Secretary)

c) Environment Specialist

The steps of the Worker's grievance management process are illustrated below;



S

Figure 10-2: Worker's grievance process

In the event that NWSC finds a valid case, it would then re-visit the process of investigation in consultation with the District Labour Office (DLO) and/or any other relevant office/ agency.

10.8.6 Capacity Building for the Grievances Management Committees

A team can be constituted with representatives from the NWSC to train the committees on how to handle project related complaints. In the execution of their responsibilities, the respective committee will seek support and advice from any other relevant official(s) from time to time depending on the matter being handled. NWSC will also retain the responsibility to facilitate and provide tools for the GRMs

10.8.7 Appeals Procedure

Where the complainant is dissatisfied with the outcome of the negotiation or implementation of agreed upon actions, he/she shall be advised to lodge an appeal to be handled at a higher level within 14 days. This procedure shall be followed until all resolution levels.

10.8.8 Police Cases

In case of criminal or theft cases, grievances shall be immediately referred to Police (in respective cells) for statutory investigations and management in accordance with Uganda's legal system. Criminal grievances include GBV, VAC, sexual harassment, theft, etc.

10.8.9 Grievance Log Book

NWSC will develop a grievance log book (Annex 2) and share with the established grievance committees at the different levels. After filling in the grievance form, a copy should be given to the complainant while the rest of the copies remain with the grievance officer and should be stored safely and in an organized manner.

10.8.10 Reporting

NWSC sociologists and or contractor/consultant appointed representative in charge of grievances will make monthly grievances management reports with gender and area disaggregated data; highlighting information regarding the status, management, coordination and implementation of the GM.

Key indicators relevant for the weekly and monthly GRM reporting will be:

- a) No. of grievances received / month or week
- b) No. of outstanding grievances currently within each tier of the GRM
- c) No. of outstanding grievances and reasons for non-resolution
- d) No. of resolved and closed out grievances
- e) No. of closed out grievances on stipulated time period allowed
- f) No. of closed out grievances outside the stipulated time allowed
- g) No. of escalated grievances and reasons for escalation.

10.8.11 GBV/ SEA/ SH Pathway Referral Pathways

Figure 10-3 is the recommended MGLSD referral pathway for mitigating the risk of work place and community based GBV/SEA/SH. Sexual Exploitation is defined as any actual or attempted abuse of a position of vulnerability, differential power, or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another. A clear distinction has to be drawn between SEA and SH. SEA occurs against a beneficiary or member of the community while SH occurs between personnel/staff and involves any unwelcome sexual advance or unwanted verbal or physical conduct of a sexual nature⁵⁰. Projects that involve

⁵⁰ World Bank Good Practice note: Addressing Sexual Exploitation and Abuse and Sexual Harassment in Investment Project Financing involving major civil works.

civil works many times are potential avenues for people who wield power to abuse their positions hence the need to have a GBV/SEA/SH risk mitigation and referral pathway.

Reporting sexual harassment helps put an end to offensive behavioural and encourages other victims to speak up. The contractor should always guide and advice the community, workers and agents to report any suspected case of GBV/SEA/SH. Perpetrators of Gender based violence/sexual harassment may be subject to disciplinary action and criminal charges. Disciplinary and criminal procedures are independent of one another and may be undertaken simultaneously.

In a formal reporting, the following procedure will be undertaken using the report form;

- Getting the details of the Victim of GBV by GBV focal person
- Documenting the details of the Case
- Preparing witnesses to engage other Legal Actors like the Police
- Establishing the appropriate procedure including the need to for medical examination of the victim and the perpetrator
- Producing a comprehensive report to enable duty bearers assess and take appropriate actions
- Submitting the report to Duty Bearers like Uganda Police, State Attorneys and Courts
- Follow up of GBV Cases and victims to ensure appropriate services are accessed by the Victim

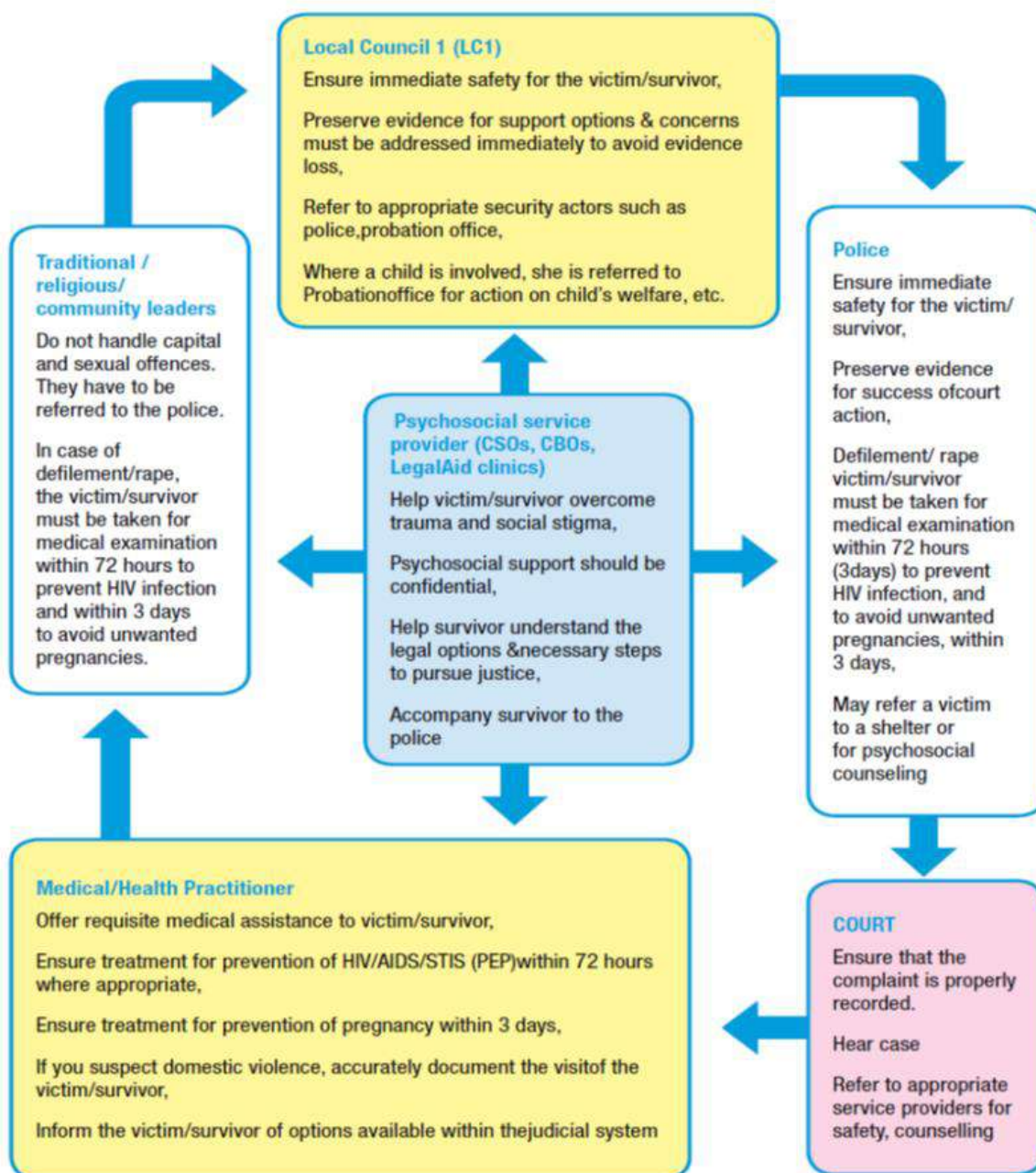


Figure 10-3: MGLSD referral pathway for mitigating the risk of work place and community based GBV/SEA/SH

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 Conclusions

The anticipated benefits of the construction, operation and maintenance of the proposed Adjumani Water Supply Project are immense. The project will provide a reliable supply of affordable portable water to the residents of Adjumani, which comes along with many benefits. For example, the project will result into an improvement of public health conditions, provide employment to local residents and bring the water closer to the residents, including refugees, gender empowerment and improved education outcomes with increased enrolments.

However, just like most developments, the immense benefits of this proposed project do not necessarily insulate this project from negative impacts. In order to evaluate the project so that its impacts on the environment and socio-economic set up are enhanced, avoided, minimized, restored, compensated or offset. An evaluation of the possible project alternatives was also conducted to come up with the most feasible alternative. Further, an evaluation of the positive and negative impacts was performed for all project components, and an Environmental and Social Management and Monitoring Plan (ESMP) was drawn.

The key negative impacts that will arise during the construction phase include susceptibility to soil erosion and pollution risks which may trigger water pollution, disruption to traffic flow and communication routes due to road crossings which may cause accidents, influx of immigrants and labour and land acquisition that will trigger displacement of livelihood activities. Compensation and community health and safety are the key fears raised by the communities. Land acquisition and resettlement impacts and risks are expected to be managed through utilisation and implementation of the prepared RAP. The transmission and distribution lines are expected to mainly utilize the road reserves which will significantly minimize resettlement risks. Road crossings of the transmission line especially within Atiak - Adjumani – Laropi Road are expected to pose traffic safety risks but implementation of a robust Traffic Management Plan and utilisation of the pipe ducts that have been provided by the UNRA Contractor on the road will address such impacts. The ESMP emphasizes the need to immediately restore excavated/ disturbed areas as soon as the pipes have been laid.

In general, all negative impacts can be mitigated following the ESMP proposed in this report. Suggestions were also proposed on the enhancement of the positive impacts. The project should be developed in conformity with all legal requirements. The Developer should ensure that the wastes and chemicals are handled and disposed of in accordance with the ESMP, and following the established regulations and policies. If the proposed project is developed following the suggestions given in the ESMP of this ESIA, we believe that there will be no negative impacts that can deter its implementation.

The project is an intervention of the NWSC with support from the World Bank that will require collective action from stakeholders such as the Adjumani Local government and regional actors in the WASH sector for its effective implementation, NGOs, MWE, among others. . The critical aspect is meaningful stakeholder mobilization and engagement as well as recruitment of an experienced team to manage the safeguards risks. NWSC will lead the supervision (directly and through a Supervising Consultant) of the construction Contractor and the operations to ensure negative impacts from the project are minimised. This should entail among others, undertaking of annual audits following provisions of the ESMP to ensure continuous improvement of the project's processes and products. NWSC should use its vast experience in implementing similar water supply projects to effectively manage these potential risks.

11.2 Recommendations

Based on the benefits expected to accrue from the proposed Adjumani Water Supply Project, which have been stated above, and the fact that the identified negative impacts can be mitigated following the proposed ESMP, we strongly recommend to NEMA to review and approve this ESIA to enable further development of the project.

Therefore;

- the design should consider extending the distribution lines back to the areas where water is abstracted e.g village of Arra West and Laropi around the intake. This will promote social equity and sustainability of the project in Adjumani district;
- Construction material for the project should be sourced from legally authorised sites, mainly the existing ones where possible;
- It is mandatory for the Contractor to develop and implement a Contractor ESMP for the project's construction phase, encompassing the auxiliary footprint;
- Tapping and extension of the hydroelectric power lines at the Intake, WTP and borehole sites, should strictly follow the access route alignment to ensure that the set-out land requirements suffice; and
- Ground water sources, during the operation phase, the recommended number of pumping hours and abstraction rates should be maintained in order not to compromise the existing ground water sources.
- A landing site should be open up at about 180 m downstream of the proposed intake for the fishermen and community at large to cater for the livelihood displacement anticipated

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APPENDIX

Annex 1: Stakeholder Engagement

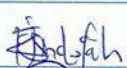
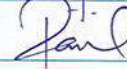




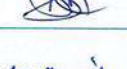
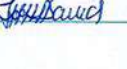


ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... NWSC OFFICES - ADJUMANI

Date..... 29th November 2021

No.	Name	Email/Contact	Signature
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3.	Kiwito Angela	kiwico.angela@gmail.com 0779194327	
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6.	Kigoolo Stephen	0772624274	
7.	Segawe Samuel	0704283550	
8.	Dr. David Hlere	0783365652	
9.			
10.			
11.			
12.			
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15.			

Stakeholder consultation record:

Name of Assignment: ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT FOR ADJUMANI WATER SUPPLY PROJECT

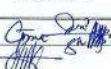
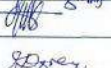
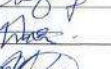






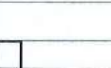
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	ESIA	<input checked="" type="checkbox"/>	Other (specify)	

Date: 30/11/2021

Location: PACARA SUB-COUNTY HEADQUARTERS.

Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.

Proponent: NWSC

Name of person/ official met:	Gender		Village name	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
Mawadri D. Gumbi	<input checked="" type="checkbox"/>		Pachara S/C	PP SACAO	0788730528	
Okudi Gobriel	<input checked="" type="checkbox"/>		C/MAN LC1	ianganyika	0785566745	
DRANGA GODEY	<input checked="" type="checkbox"/>		ARRA WEST	C/MAN LC1	0760459977	
MURUGA SILVER	<input checked="" type="checkbox"/>		CENTRAL	C/MAN LC1	0777229372	
ALUMMI MIKE	<input checked="" type="checkbox"/>		SEC. PRODUCTION	PRODUCTION	0787630000	
OPI Felix SABAZIO	<input checked="" type="checkbox"/>		NUSALE	COMMITTEE CHAIR	0783940411	
ASERUA ROSE		<input checked="" type="checkbox"/>	MADIINDI	COMMITTEE CHAIR	0780389386	
MAABAMA ALEX	<input checked="" type="checkbox"/>		UNDA CEN	SEC SOCIAL SERVS	0789645028	
EIMWI BORROW	<input checked="" type="checkbox"/>		ASUJO	D/SPEAKER	0786592168	
ANZOD BEATRICE	<input checked="" type="checkbox"/>		ARRA CENTRAL	Committee	0787338149	

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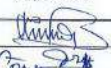
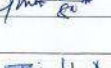


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Date: 30/11/2021

Location: PACARA

Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.

Proponent: NWSC

Name of person/ official met:	Gender		Village name	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
Kimbo Kenet	<input checked="" type="checkbox"/>		Pachara S/C	PP SACAO	0773674632	
Mawadri Gumbi	<input checked="" type="checkbox"/>		Pachara S/C	PP SACAO	0788730528	
MAABAMA ALEX	<input checked="" type="checkbox"/>		ADROPI S/C	PICHIEF	0786.666.435	
KASIM BRAN	<input checked="" type="checkbox"/>		ADROPI S/C	SAA	0781475 282	




Stakeholder consultation record:

Name of Assignment: ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT FOR ADJUMANI WATER SUPPLY PROJECT					
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	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input type="checkbox"/>	Other (specify)		
Date:					
Location:					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village name	Designation	Contact (Tel/email)	Sign/ initial
	M F				
AMOKO PATRICK	✓	KALAMAIRO	SEC. FINANCE	0760606270	AMOKO
AZIKU GRACE	✓	UNWA	Councillor	0771951446	AZIKU
KEMBOHETT	✓	PACHARISIE	HCN S/P	0775678632	KEMBOHETT
SIDORY GORDON	✓	WYEM	LC S/P	0772158294	SIDORY


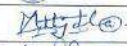

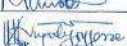
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	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 30 NOVEMBER 2021					
Location: DPM OFFICE ADJUMANI					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	District	Designation	Contact (Tel/email)	Sign/ initial
	M F				
Amolege Robert	✓	Adjumani	SKOMMANDANT	0772366170	AMOLEGE

Stakeholder consultation record:

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Date:	30 Nov 2021					
Location:	ADJUMANI DISTRICT OFFICES.					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		District	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
Edema Richard D	M		Adjumani	Ag. D/CAO	0182315200	
MAWADRI RAMADHAN	M		ADJUMANI	DCDO	0712 241355	
DLEMA SWAIB	M		ADJUMANI	SLO	0774421836	

Stakeholder consultation record:

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	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date:	30/11/2021					
Location:	LUTHERAN WORLD FEDERATION (LWF)					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		District	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
Endreia Hoss		F	Adjumani	project officer (rural)	0780769720	
Sinal Swaib Awei	M		Adjumani	CBGPS community based support	078067055	
Momani Robert	M		Adjumani	Adjumani Core Program Supervisor	0774007625	
Vupale J. Sesce	M		Adjumani	OIC WASH	0784919578	

Chief Protection Supervisor



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: MEDICAL TEAMS INTERNATIONAL (MTI)

Date: 01/DEC/2021

No.	Name	Email/Contact / Designation	Signature
1.	Dr. Oluma Jacob	Medical Coordinator / 0783358465	Compt
2.			
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JAPS












ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: FOCUS GROUP DISCUSSION (WOMEN), AMU PARISH

Date: 01/12/2020

No.	Name	Email/Contact	Signature
1.	MORIKU HARIET	ARLA CENIRAZ	
2.	KANJA NABURU	11	12.21
3.	ABIO CLARA	11	A.C
4.	UNZIA FLORA	11	
5.	FLORA BOSCO	11	
6.	12IKU LETISIA	11	
7.	ENDREO ALICE	11	
8.	ANDIA RIZETA	11	
9.	LULUA DESCA	11	
10.	ATARADIZA DIZAA	11	
11.	ABIO SCOVIA	ARAA ADES	
12.	TARAKPE SANGI	11	
13.	MANDERA SARAH	11	
14.	LAGUA AGNES	ARDA WIST	LA
15.			

FGDS



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: FG D WITH FISH MONGERS FROM OMU PARISH

Date: 01/12/2021

No.	Name	Email/Contact	Signature
1.	Adjumani George	ARRA CENTRAL	[Signature]
2.	Amoko Ronald J.	11	[Signature]
3.	Odena J. Stephen	TANGANYIKA	[Signature]
4.	Hamana William	ARRA WEST.	P.W.
5.	Muku Alex Madi	ARRA WEST	[Signature]
6.	Mwambi Geoffrey	ARRA WEST	[Signature]
7.	Kudra Martin	A C	[Signature]
8.	Kundur Richard	ARRA C	[Signature]
9.	Draku Manasi	ARRA CENTRAL	[Signature]
10.	Eva go bog John	ARRA CENTRAL	[Signature]
11.	Okubi Gabriel	TANGANYIKA	[Signature]
12.	Druma William	ARRA WEST	[Signature]
13.	Selle Anthony	ARRA WEST	[Signature]
14.	Odebasiku Martin	ARRA CENTRAL	[Signature]
15.	Ganyiza Richard	78999472	[Signature]

IGA












ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: ^{FHD} ~~ARRA~~ MALE FROM OMI PARISH

Date: 01.12.2021

No.	Name	Email/Contact	Signature
1.	Mukumba Paulick	ARRA Central	
2.	FETIGA JOHN INDORE	" " 0777796430	
3.	ECHIMA MICHAEL	" "	
4.	Amoko Bosco	Arra Central	
5.	GUND HANNAH	Arra West	
6.	DRICHI STEPHEN	ARRA Central	
7.	AMAZURU JOSEPH	ARRA CENTRAL	
8.	AMBAO DAVID	" "	
9.	TAJIRI CHARLES	0780733775	
10.	Amoko Sunday	Arra west	
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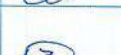






ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: ARRA WEST & TANGANYIKA
ARRA CENTRAL ADJUMANI PARISH

Date: 01/DEC/2021

No.	Name	Village Email /Contact	Signature
1.	AMACHA MOSES	TANGANYIKA 107441848	
2.	VUNYA JAMES	ARRA WEST 11	
3.	OKUBI GABRIEL	TANGANYIKA 0785566745	
4.	BRANJA GODFREY	ARRA WEST 0786045772	
5.	GUMA EMMANUEL	ARRA WEST 0779913743	
6.	AROMA WILLIAM	ARRA WEST 0775615597	
7.	ANIGA - AN THONY	ARRA CENTRAL 07750584	
8.	CAT. BOSCO ASABA	ARRA WEST 0789908787	
9.	MORIKU HARRET	ARRA CENTRAL 0789908787	
10.	UNZIK FLORENCE	ARRA CENTRAL -	
11.	IZIKU LETISIA	11 11 -	
12.	KAMBARUKU LEONAS	ARRA CENTRAL	
13.	LAKUA AGNES	ARRA WEST 0788288583	
14.	TARAKPE JANE	ARRA CENTRAL 0773609737	
15.	ALUMAT WILLIAM	ARRA WEST 0786147096	

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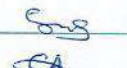












ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: ARRA WEST & TANGANYIKA
ARRA CENTRAL & OMU PARISH

Date: 01 DEC 2021

No.	Name	Village Email/Contact	Signature
1.	SEKE ANTHONY	ARRA WEST 0789018552	
2.	MAKU ALEX MADE	ARRA WEST 0787823148	
3.	MAWADRI GEDFRET	ARRA WEST 0784183987	
4.	KARLO FRANK	ARRA C	
5.	MADRA SARAH	0770779990	
6.	ABIO SCOLIA	—	
7.	AMBANO DOMINIC	ARRA CENTRAL 0711430791	
8.	AMAKO SUNDAY	ARRA WEST 0777350799	
9.	GAYIZARA RICHARD	ARRA CENTRAL 089992172	
10.	AMAZUREU JOSEPH	ARRA CENTRAL	
11.	AMOKO RONALD	ARRA CENTRAL	
12.	DIZAA MALIA	ARRA CENTRAL	
13.	EBREO ALICE	ARRA CENTRAL	
14.	DRUCK STEPHEN	ARRA CENTRAL	
15.	VUDRA MARTIN	ARRA C	






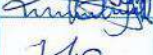
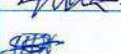






ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: ARRA CENTRAL ARRA WEST & TANGANYIKA
OWI PARISH

Date: 01/12/2021

No.	Name	Email/Contact	Signature
1.	DAENDIJ. STEPHEN		
2.	DEBASIKU MARTIN	ARRA CENTRAL 0750541828	
3.	MANSON RONALD	11 —	
4.	LUNA JESCA	11	
5.	Mulumba Patrick	11	
6.	FETIGA JOHN INNOCENT	0780771449	
7.	MURUGA SILVER	0777229372	
8.	AMBAO DAVID	078540482	
9.	Emery b25 John	0782049701	
10.	FLORA BOSCO	—	J.B
11.	ARMANDER GONZALEZ	0778207097	
12.	ANDIA RUZETA	—	
13.	KANTA NASURU	—	K.N
14.	VUDRU RICHARD	—	V.R
15.	TAJIRI CHARLES	0780733775	T.C



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: ARRA CENTRAL / OM. PARISH, ARRA WEST DISTRICT, TANZANIA

Date: 01.12.2021

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I

No.	Name	Email/Contact	Signature
1.	ABABIKU BEATRICE	0783525940	AB
2.	ANZOTO ROSE		AR
3.	Chandia Dorothy	0777796480	Cen
4.	Amoko Bosco	0787420173	AB
5.	Eshima Michael		Eshima
6.	Drigo Vicky	072966963	Drigo
7.	Mawa Richard	0789437999	Mawa
8.	IDRAKU MAXASI	—	I-M
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ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: JI-HWA PARISH, MUKONO NYEU, MIJALE, ASISI

Date: 01/02/2021

No.	Name	VILLAGE/Contact	Signature
1.	TIONDO Simon Samios	NYEU / 0777829168	[Signature]
2.	ANDRUBA CEASAR	NYEU 0789388528	[Signature]
3.	OTI PATICK	NYEU -	[Signature]
4.	KANARUKU GOSBY	NYEU 0787028911	[Signature]
5.	MORIO KARULA	NYEU -	[Signature]
6.	BARUA AGNES	NYEU -	[Signature]
7.	ASIEWZO ELLIVIRA	NYEU -	[Signature]
8.	LASHI JULIUS	NYEU	[Signature]
9.	DRICHI ROBERT	MUKONO	[Signature]
10.	DRAGUKU PATRICK	MIJALE 0774896787	[Signature]
11.	RAMUNDU ELIAKEL	ASISI 0783651709	[Signature]
12.	ASIEWZO JUSPAENE	ASISI 07	[Signature]
13.	OLIMAR EDWARD METUGUKU	ASISI 0777262022	[Signature]
14.	LIMIO ROSEMARY	MIJALE 0782928327	[Signature]
15.	BARUA ROSEMARY	MIJALE 0774350898	[Signature]


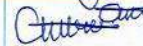



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: SIKWA PARISH MUKONGU, NYERU, MIGALE, ASISI

Date: 01/12/2021

No.	Name	Email/Contact	Signature
1.	ISAAC COOTREY	^{NYERU} 0772158294	
2.	AGALATO STEPHEN	^{NYERU} 0760646299	
3.	WYANI SAVADORE	ASISI, 0775139977	
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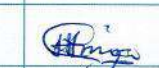

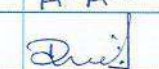





ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location.....MARINDI PARISH.....

Date.....01/12/2021.....

No.	Name	VILLAGE HEAD/Contact	Signature
1.	Loum SUGATIK	0786668452	
2.	MOLIKU LILIAN	0777275900	
3.	DRAMI ALEX	0783542814	
4.	AMBAYO FEDERICO	-	A.F.
5.	DRAGUEN YASSIN	-	D.Y.
6.	LEXU FRANCES	-	L.F.
7.	MOLIKU LEPISSA	0788724099	
8.	ANGUCHIA HAJARA	0715322063	A.A.
9.	DRAMIO FLORENCE	0783250747	
10.	ENDREO JULIET	-	
11.	ANZA GILADISHA	0760275871	A.G.
12.	DALDO GRACE	-	D.G.
13.	ANZA PESCA	-	A.S.
14.	ASERUA ROSE	MARINDI 0720384336	
15.	MATMAN ROBERT	MARINDI 0760037670	


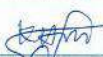


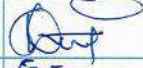

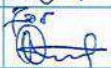
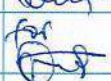


ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location... MARINDI PARISH

Date... 01/12/2021

No.	Name	Village Parish Contact	Signature
1.	AMAZULUKU GODFREY	MARINDI 083227958	
2.	LUGA DAVID	MARINDI —	L.D.
3.	KABBO HELEN MARY	MARINDI CENTRAL	
4.	AKUMA SIDIBASHU	MARINDI CENTRAL	
5.	CHANDICA ALIX VUO	RABIA EAST	
6.	MALIAMUGU JACKSON	RABIA EAST 087620 518	
7.	HELEN LULUA	MARINDI CENTRAL	
8.	ADAMKO KORINE	MARINDI CENTRAL	
9.	EIMANI GLORIA	MARINDI CENTRAL	
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ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: Unms Central Village

Date: 01/12/21

No.	Name	Email/Contact	Signature
1.	AZIKU GRACE	UNNA	AZIKU
2.	ALIGA KASSIM	UNNA	ALIGA
3.	ADUMBE FRED DADY	UNNA C	Fred
4.	MONDIA ALEX	KAROKO	MONDIA
5.	CHANDA GEOFFREY	UNNA	CHANDA
6.	IDULU PATRICK	KAROKO/idulepatrick@gmail.com	IDULU
7.	ONDOBA ALEX	UBERU	ONDOBA
8.	WELI TAYSON		WELI
9.	ODUTI VINCENT	0781140704	ODUTI
10.	IDDI AMIN BADA	0760694264	IDDI
11.	MAIKU Raphael	0784633705	MAIKU
12.	LAGU RICHARD	= = =	LAGU
13.	AKUKU MARGIN	0787956510	AKUKU
14.	AMBAKU Dominic	07776238909	AMBAKU
15.	ANYANGO GEOFFREY	0771642616	ANYANGO



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... LEWDA CENTRAL

Date..... 01/12/21

No.	Name	Email/Contact	Signature
1.	TIONBI EDWARD	Village	JES
2.	MALIAMUNGU ISAAC	0785296258	JES
3.	CHIRIKU GEDFREY	0786046045	JES
4.	MANIBA MUCHEAL	manibamike@gmail.com 077242095	JES
5.	AMAZA DOMINIC	0773949739	JES
6.	AMOKO RICHARD	0782286693	JES
7.	ONDUA DENNIS	0788068794	JES
8.	MORIKU JULINA		JES
9.	DRANIA RACHAEL	0770601371	JES
10.	MIZATIA VIVIAN	0788952626	JES
11.	ASITOLLO MARTINA		JES
12.	LAGUA HARRIET	0761021672	JES
13.	KINYAABEATRICE		JES
14.	INYAA ROSE	0781044748	JES
15.	MESIKU JOSPLINE		JES



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... WASA CENTRAL

Date..... 01/11/21

No.	Name	Email/Contact Village	Signature
1.	ERIKA BUNIA	ISAROKO	
2.	Larua Santa	UNWA 0760672877	
3.	Lucy Ndutu	—	L.N.
F 4.	Kelvin Groue	0785509888	
F 5.	Koneo Sabina	—	ant
F 6.	Afinau Zaida	077124986	
F 7.	Sua Jacqueline	—	
F 8.	SARAH ADNERI SWALI	—	
9.	MADRARA ANJOLA	078511068	
10.	ADRAWA BAGA, TUPONIE	0774072355	
11.	Aziza KASSIM	077645227	
12.	Mawani Davis	0788730528	
F 13.	ASERUA. AUCI	0785956546	
F 14.	LILIAN MAUDRE	074698141	
F 15.	MURAA Joyce		M.D













ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location.....UNNA CENTRAL.....

Date.....01/12/2021.....

No.	Name	Email/Contact Village	Signature
1.	TAMALE JOSEPH	UNNA C 077105692	
2.	MASUDIO IRENE	"	
3.	MULU PATRICIA	UNNA C 0770655145	
4.	BAYKA HARIEI	UNNA C 0787171061	
5.	DAWA SCOVIA	UNNA C 0775330488	
6.	MAIYA GORETHY	UNNA C 0784673184	
7.	INYAA ROSE AZUO	UNNA C 0773615759	
8.	SARAH OBETE	UNNA C 0774578671	
9.	OJAMANI RABECCA	UNNA C 077497093	
10.	HARRIET MAZAKPE	UNNA C 0786619542	
11.	FLORENCE MANJERA	UNNA C 0789704886	
12.	ASUNJA MUDI	ADUNA 0786650678	
13.	AGNES ISSIA		
14.	GRACE UNZIA	UNNA C 0783480515	
15.	EIMANI SANJA	UNNA C 0788675892	






ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location.....

Date.....

No.	Name	Email/Contact Village	Signature
1.	KALSUM MUNGURITA	UNNIA - C	
2.	BUNYA ANGELA	UNNIA - C	
3.	ASIANZO VILKY	UNNIA - C	
4.	ABAZIRU BSAIRU	UNNIA - C	
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ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... UNNA CENTRAL

Date..... 01/12/21

No.	Name	Email/Contact	Signature
1.	AMAMU BWT BUSCO	Village UNNA CENTRAL	BWT
2.	VESIGA GIZRGE	U	Gizrge
3.	ANYAZO IMMANUEL	U	Immanuel
4.	ADUNI FRED	U	Fred
5.	KABAKA RASUL	U	Rasul
6.	MANABIRI CHARLES	U	Charles
7.	MABRAMA AGEX TONY	U	Agex
8.	ERUAGA DOMINIC	UNNA CENTRAL	Dominic
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ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... PAKELI TOWN COUNCIL

Date..... 01/12/2021

No.	Name	Email/Contact	Signature
1.	Sabi Yezid Jackson	YezidJackson@gmail.com Town Clerk	
2.	BALIA RICHARD	balia.richard73@gmail.com	
3.	MAUA JACKLINE C.	Uman L C III MauaJackline@gmail.com	
4.			
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FGD















ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC) – FGD

Location: PACHARA S. COUNTY, UNWA PARISH

Date: 2/12/2021

No.	Name	Email/Contact	Signature
1.	ADRIANO PALMA	UNWA CENTRAL	
2.	MAZIRA LILI	UNWA CENTRAL	
3.	ABIO GLAD'S	UNWA CENTRAL	
4.	ANDALO GLAD'S	UNWA CENTRAL	
5.	BARTHO JENINI	UNWA CENTRAL	
6.	ADIO FIDUA	UNWA CENTRAL	
7.	MAZAPKWE MAGUREI	UNWA CENTRAL	
8.	SATA IMMACULET	UNWA CENTRAL	
9.	TEMALYA BRENDA	UNWA CENTRAL	
10.	ABIO ALICE	UNWA CENTRAL	Az Francis
11.	LEGO SCOUA	UNWA CENTRAL	
12.	ROSE TIAGORA	UNWA CENTRAL	
13.	MOKOMUKU KEWO	UNWA CENTRAL	
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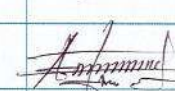
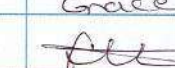

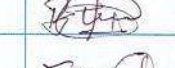
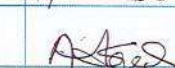


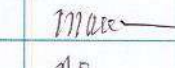
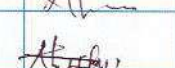
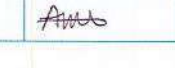





ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... Layopi Parish

Date..... 02/12/21

No.	Name	Email/Contact Village	Signature
1.	AMUKO STEPHEN GULISO	RENDE	
2.	VUJE GRACE	mokolo East	Grace
3.	Endreo Florence	mokolo west	
4.	melinyi Joyce	mokolo East	M.I
5.	ZEMA FRANCIS	MOKOLO WEST	
6.	BAGID GHERISTINE	mokolo East	
7.	BAID VIERINIC	mokolo East	
8.	ASTIRA KALISOM	mokolo East	
9.	KONYIO AGENIS	mokolo East	
10.	Bachyo LILIAN	Mokolo west	
11.	ABERA GRACE	mokolo East	
12.	MURUBEL CIRAGE	mokolo West	
13.	AGID GRACE	mokolo East	
14.	Ahumi SUNDAR	mokolo West	
15.	ASIENZO ANNET	mokolo west	

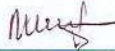


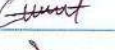


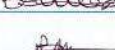
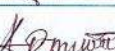




ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: Layopi Parish











Date: 02/12/21

No.	Name	Email/Contact Village	Signature
1.	ASUAR ALUIE	MOKOLO WEST	
2.	OBUNGA DOMINIC	MOKOLO WEST	
3.	VICTOR ROBERT	// //	
4.	DHAMANI PATRICK	// //	
5.	AJIRIKA GODFREY	MOKOLO WEST	
6.	LILUA SOPHY AGNES	MOKOLO WEST	
7.	MARIDIO OLIVER	MOKOLO EAST	
8.	ASIKI JOSEPH	LEII CHIMAN-LABORI	
9.	APIKO WILLIAM	RENIE	
10.	TIBE ALEX	PICHEF	
11.			
12.			
13.			
14.			
15.			









Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 02/12/21						
Location: ALERE PARUK						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
AYUW PHILIP MADYOK	<input checked="" type="checkbox"/>	M	ALERE	MABULLEI	0789056282	
AMBRUSA HEUS TUNG	<input type="checkbox"/>	M	Robidire		0777240790	
AMOKO PATRICK	<input type="checkbox"/>	M	Kalamairo	SEC. PUNJANER	0760606270	
PHILIP MABULLEI	<input type="checkbox"/>	M	ALERE	CBF psychosocial support	077540147	
XAKU NANCY	<input type="checkbox"/>	F	Alere	MEMBER	075879182	
ASTENZO SUSAN	<input type="checkbox"/>	F	Alere			
KANDURU WILIAN	<input type="checkbox"/>	F	Alere		0780090552	
DERAH AJOK	<input type="checkbox"/>	F	Alere		0772526390	
MUJA ESTHER	<input type="checkbox"/>	F	Alere		0787416923	
APIU MAKUEI KUI	<input type="checkbox"/>	F	Alere	MABULLEI	077713984	


Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit		<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP		<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 02 DECEMBER 2021						
Location: ALERE COMMUNITY CENTER.						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
John Atem Deng	M		ALERE	Blockleader	0776384419	
Abraham Mahiro	M		ALERE	C.B.F	0776203116	
KUM ROBERT	M		ALERE	Community center guard	0774473958	
Isaiah Prizet	m		Kalamerio	LC 1/P	0757626298	
AMACHA LEONARD	m		ALUJO	PLC	0775573577	
VUCIRI PETER IGAVU	m		ORUGERE	Gen. Secretary of LC1	0770349543	
AMANDA GUGA	m		ALUJO	Pump operator	077452607	
MURKAT MURKAT	m		ALERE	Elder	0774478842	
CHRIS EDEMA	M		ALERE	Member	0771139401	
Wani Samuel	m		ALERE	Member	0786550088	

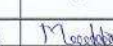
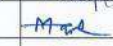

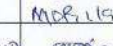


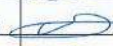
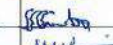
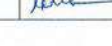

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit		<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP		<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 02/12/21						
Location: ALERE PARISH						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
DADA HARRIET		F	ALERE			
MUDONG CELINA		F	ALERE			
ROUDOUS NGOR	M		ALERE	0	0779401676	
REBECCA NYAKUL		F	ALERE	Peace promoters	0777550759	
MANGULI ANNET		F	ALERE		0789027416	
MARY AMOUR ATER		F	ALERE			
WIVOR GAIKOTH	M		ALERE	Blockleader	077503795	

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 02/12/2021					
Location: D2api Market					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
UZZI GEORGE	M	D2api Market	Market leader	0973994597	

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 03/12/2021					
Location: PAKULE TOWN COUNCIL OFFICES					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
MAWA SACKINGA R.	✓	P.T.O	Ag. CND	0774678432	
MAKWE FRED	✓	PTC	Asst. Eng. officer-water	0777629145	
EKUONZI JAMES	✓	MELIADERI CELL	ASKARI PTC	0777783902 0776684903	
MORIKU JOYCE	✓	ATOBOD "A"		0782810343	
APIO MARTHA	✓	ATOBOD "A"		0780521240	
MOSIRUKU MARGARET	✓	WAZIRI CELL	VICE L.C. III	0711342552	
HON. DRICI KACI N	✓	NAMAMWA	COUNCILLOR	0788847749	
HON. JASIA CELINA	✓	YAKOTI	SEC S S	0774441329	
SIMBA AUGUSTINE IGA	✓	ATOBOD "A"	GIS P.T.C.	0772994342	
ERIKU NOLIMU	✓	ATOBOD KALA	LCII/PERSON	0780936870	

J S

fcd

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date:	03/12/2021					
Location:	PAKELLE TOWN COUNCIL OFFICES					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial	
	M	F				
Kansiime Judith		F	Ataboo A	Member	0780247670	Kansiime
MAURINA DROBYO		F	Ataboo west	Member	0772667607	maurina
LORDNEAR MASUNDU		F	Ataboo west	member	0773447291	LORDNEAR
ADUU Alice		F	Ataboo west	member	0771043721	AA
ODOLIA ASUTU		F	Ataboo A	Member		ODOLIA
Margate L		F	Ataboo west	member		Margate
Mary Madera			Ataboo A	member		Mary
ANNET CHEROTIC		F	Ataboo A	Member	0789938660	ANNET
BANDU GLORIA		F	Ataboo A	member		BANDU
DOREEN MURUGA		F	Ataboo west	member		DOREEN

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date:	03/12/2021					
Location:	PAKELLE TOWN COUNCIL OFFICES (ATABOO CENTRAL ATABOO WEST, YATIKO)					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial	
	M	F				
MABRAMA GEORGE	M		ATABOO WEST	GEN SEC LCI	0772827202	MABRAMA
JURUGO SIGAMEN	M		ATABOO A cell		0773379333	JURUGO
IMON IVAN KOMA	M		ATABOO A cell	member	0780151449	IMON
MAGBWI VICTOR L. M.	M		ATABOO A cell	MAN LCI ATABOO	0777365722	MAGBWI
AHMEB BEBBI	M		ATABOO B	PERSON LCI	0777163924	AHMEB
IDRIFUA SUNDAY	M		ATABOO W	UPF	0777099576	IDRIFUA
OKUDI RICHARD	M		ATABOO WEST	MAN LCI	0785568994	OKUDI
OLYPI LEONARD	M		ATABOO WEST	members	0772460900	OLYPI
ICETA COSMAS	M		" A	vicep LCI	0776663742	ICETA
ABAU EATUMA	F		" "	MEMBER	0781630017	ABAU

Stakeholder consultation record:


Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit		<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP		<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 03/12/2021						
Location: PAKELLE TOWN COUNCIL OFFICES						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
Amoko Geoffrey Amu	M		Ataboo A	member (Elder)	0777910174	<i>[Signature]</i>
MUYANI LAZIERO AMU	M		Ataboo B	member (Elder)	-	<i>[Signature]</i>
MUTEKE GIDEAL	M		Ataboo - B	member	0725201946	<i>[Signature]</i>
ADAMU ADISI GRIFANE	M		Ataboo West	Member	0773746499	<i>[Signature]</i>
LAWEJING OYA		F	Ataboo West	Member	-	<i>[Signature]</i>
ANGUZU CHRISTOPHER	M		Ataboo A	Member		<i>[Signature]</i>
VUKU PATRICK	M		Ataboo West	Member		<i>[Signature]</i>
Kanyiga GRACE	F		Ataboo A	member	075071991	<i>[Signature]</i>
MESIKU FLORA	M		Ataboo A	member	-	<i>[Signature]</i>
ANZOO IRENE	F		Ataboo A	member	0784514963	<i>[Signature]</i>

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit		<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP		<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 03/12/2021						
Location: PAKELLE TOWN COUNCIL OFFICES						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
Inyaga Martin		F	Ataboo West	Member		<i>[Signature]</i>
ICEITA MOSES	M		Jukoni cell	Member	0788598862	<i>[Signature]</i>
DRANZON JEDI		F	Ataboo A	member	NH	<i>[Signature]</i>
OIOD CHARLES	M		Ataboo West	member	NH	<i>[Signature]</i>
AMADID SHARON	F	F	Ataboo West	member	NH	<i>[Signature]</i>
MARTIA DOMINICA	F		Ataboo West	Member		<i>[Signature]</i>

FGDS WOMEN

Stakeholder consultation record:











Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 03/12/2021					
Location: CENTRAL WARD (FOCUS GROUP DISCUSSION)					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ Initial
	M F				
HON. TASIM CELENA	<input checked="" type="checkbox"/>	JANKOTI	Councillor	0777441329	
SIMLA ROSEA	<input checked="" type="checkbox"/>	AGALEJO	C.P.W.C.P.T.C	0789929301	RA
ASSIO SARAHINA	<input checked="" type="checkbox"/>	WANZIRI	Business	—	A.S
ACHEN JUDITH	<input checked="" type="checkbox"/>	ATABDD	Business woman	0785291415	ACH
CHANDIA ROSE	<input checked="" type="checkbox"/>	WANZIRI	m.	0789849740	CH
Toropke Josephine	<input checked="" type="checkbox"/>	Agalejo cell	Le/Vice	0785513404	TH
Mandera Margaret	<input checked="" type="checkbox"/>	Wanziri	m.	0777117408	MA
AS. ENZO DOMINIK	<input checked="" type="checkbox"/>	agalejo	m.	0771286730	EN
ATAA JOHANNA MARTIN	<input checked="" type="checkbox"/>	Agalejo	m	0788410360	AA
MANDERA JULIET	<input checked="" type="checkbox"/>	WANZIRI	m	0776888367	MA

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 03/12/2021					
Location: CENTRAL WARD (Wanziri Agalejo, Relikwesi Muboni)					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ Initial
	M F				
ATAA JOHANNA MARTIN	<input checked="" type="checkbox"/>	Agalejo	m	0788410360	AA
HON. ANDAMA DOMINIC	<input checked="" type="checkbox"/>	"	m	0778733100	HA
DR. MATTHIAS	<input checked="" type="checkbox"/>	"	m	0772514335	MA
OPIO LUMBA STONE	<input checked="" type="checkbox"/>	WANZIRI	m	0760133780	OP
ULEA JOYCE	<input checked="" type="checkbox"/>	"	fm	0785966649	UL
HARRIET WIO	<input checked="" type="checkbox"/>	"	FM	0789439500	HW
JOYCE M	<input checked="" type="checkbox"/>	"	FM	0779231813	JM
NYANZURU WILSON	<input checked="" type="checkbox"/>	AGALEJO	MANAGER	0777965235	NY
MOLIMA FRANCIS	<input checked="" type="checkbox"/>	"	"	0778247915	MO
AS. ENZO DOMINICA	<input checked="" type="checkbox"/>	"	"	0771226730	EN





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Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 03/12/2021						
Location: CENTRAL WARD (Wanziri, Agalejo, Kelikwesi - Mgbonjo)						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
OBITA JAMES SIDA	M		WANZIRI CELL	LC II CHAIRPERSON	0772994915	
Tumpke Josephine	F		Agalejo cell	LC/UCO	0485513804	
Majo Serepina	F		WANZIRI CELL	M.		
BARUA RAKELE	F		WANZIRI CELL	M	0776217581	
CHANDIA ROSE	F		WANZIRI CELL	M	0789849740	
DRAMUNU DOMINIC	M		Agalejo	M	0784659658	
ACHEN JUDITH	F		ATABDO	=	0785291415	
MARLITA SCOVIA	F		ATABDO	=	0772836944	
ASERUA FAKINE	F		KELIKWESI	=	0778927551	
DAYO HARRIET	F			=	0777322322	

2 8

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 03/12/2021						
Location: CENTRAL WARD (Wanziri, Agalejo, Kelikwesi - Mgbonjo)						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
MANIDERA MARCIE	F		WANZIRI	MEMBER	0779117408	
MAHADDI JUSTINE	M		ATABDO WEST WARD	PASTOR	0785680407	
KOTEVU GABRIEL	M		KELIKWESI MGBOJO	LCI GEN SEC	0780833950	
ZEMA ZACHARY	M		AGALEJO CELL	MEMBER		

3 1

Stakeholder consultation record:











Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 05/12/201					
Location: NYIVURA WARD - WARD CENTRAL					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
KARATI EMILIANO	M	ODIGO CELL	SEC LCI	0786352164	Karati
AGBA AGUNTA	F	ODIGO CELL	LCI CHAIRMAN	0726886789	AGBA
MAKPE JOHN	M	TIDLO CELL	MEMBER	-	MAKPE
OKIDGO VUKA GNS	M	MEMBERS CELL	ELDER	0775803530	OKIDGO
ANIVU THOMAS	M	TIDLO CELL	LCI DE	0783026652	ANIVU
HON. MAMUKORIN	F	ODIGO	CONCILIATOR	0781619605	HON. MAMUKORIN
Magape Chivim	F	ODIGO	Sec for Women	0775595302	Magape
ASINZO JUSPINE	F	TIDLO	MEMBER	0785565294	ASINZO
EKUGA NELSON	M	ODIGO	SECURITY DEFENSE	0776332024	EKUGA
ALILE LEONARD	M	TIDLO	MEMBER	0787137216	ALILE

Stakeholder consultation record:











Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 03/12/21					
Location: NYIVURA WARD					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
MASUDIO CERINA	F	TIDLO	MEMBER	-	MASUDIO
OTIDRA DANIEL	M	TIDLO	MEMBER	-	OTIDRA
LAMUNU SIRA	F	TIDLO	MEMBER	-	LAMUNU

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Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date:	03/12/2021					
Location:	PERECI PRIMARY SCHOOL (Mangala, Marinyo, Pociro) LOPIRE					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
HON. EDENIA ISHAKI	<input checked="" type="checkbox"/>		MANGALA CELL	AREA COUNSELLOR	0780190492	
ANYIDI STANLEY	<input checked="" type="checkbox"/>		LOPIRE CELL	PARISH YOUTH C/P	0786126704	
AMONA GOFREY	<input checked="" type="checkbox"/>		Marinyo	P	0782957788	
AUDEYMA DAVIS	<input checked="" type="checkbox"/>		Marinyo	Parish Youth C/P	0789328566	
IBUKWU IMMANUEL	<input checked="" type="checkbox"/>		Marinyo	Parish Youth C/P	078906694	
ODOCI JUNIOR	<input checked="" type="checkbox"/>		Marinyo	Parish Youth C/P	-	
IRAMA STEPHEN	<input checked="" type="checkbox"/>		Marinyo	Parish Youth C/P	0774102926	
LADA DAVID	<input checked="" type="checkbox"/>		Marinyo	"	0789328366	
BRUCHI KEMARUWA	<input checked="" type="checkbox"/>		Marinyo	" "	0788223316	
SICOVIA MARTIN		<input checked="" type="checkbox"/>	"	" "	0772836940	

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date:	03/12/2021					
Location:	PERECI PRIMARY SCHOOL (Mangala, Marinyo, Pociro) LOPIRE					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
AKUMA CHARLES	<input checked="" type="checkbox"/>		Marinyo	"	0789083696	
ANYANZO PETER	<input checked="" type="checkbox"/>		Marinyo	Member	0772432422	
MADRARA PETER	<input checked="" type="checkbox"/>		"	"	-	
BULELE JOHN	<input checked="" type="checkbox"/>		"	LC C/P	0770741510	
VUONZI WILLIAM	<input checked="" type="checkbox"/>		"	member	0787161220	
WAYI LILIA		<input checked="" type="checkbox"/>	"	"	-	
ABISO SUSAN		<input checked="" type="checkbox"/>	"	"	-	
MADRARA ZACH	<input checked="" type="checkbox"/>		"	"	0781630247	
MAWADAI SUNDAP	<input checked="" type="checkbox"/>		"	LC Asst. Sec	0775124029	
MADRARA AUGUSTINE	<input checked="" type="checkbox"/>		"	"	0770392854	

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit		<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP		<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 03/12/2021						
Location: PEREPI PRIMARY SCHOOL (Manyalwa; Marinyo, Lopiye)						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
03/12/2021						
ANDEUA SAMUEL			MARINYO	member	0787364627	ASB
EBEURMA William	<input checked="" type="checkbox"/>		"	"	0776950994	W
ISAMA FRED	<input checked="" type="checkbox"/>		"	member	0712348219	ISAMA
ISJO JOSEPH	<input checked="" type="checkbox"/>		"	member	077949480	ISJO
BABECIA ATIMAKU	<input checked="" type="checkbox"/>		"	"	07799373	BA
Mundua Kedomu	<input checked="" type="checkbox"/>		"	member	-	M
Abio Grace	<input checked="" type="checkbox"/>		"	"	-	AG
MASUDIO LILIAN	<input checked="" type="checkbox"/>		"	"	-	M
CANDIA AGNESS Komu	<input checked="" type="checkbox"/>		"	"	-	CA





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Stakeholder consultation record:











Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit		<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP		<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 03/12/2021						
Location: PEREPI PRIMARY SCHOOL (Manyalwa; Marinyo, Lopiye)						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
INDOCENT FRANCIS	<input checked="" type="checkbox"/>		MA-AN-ALWA	-	0779618169	INDOCENT
HON. DECI ISAC NANTON	<input checked="" type="checkbox"/>		NGANYALWA	COUNSELLOR	0788847749	DECI

2

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date:	03/12/2021					
Location:	Adjumani Town Council Offices					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial	
	M	F				
YUKO ESIHER ASUS		F	ADJ. TOWN COUNCIL	Deputy mayor A.C	0785073512	
KABULEEZI DAVID	M		ADJ. TOWN COUNCIL	Health Inspector	0782319643	
Ambayo Godfrey	M		Adjumani Town Council	Ass. Eng. officer	0774568650	
OTSOBE SHAMBAW	M		ADJ. TOWN COUNCIL	LC-1 C. man	0782101520	

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date:	4/12/2021					
Location:	PAGIRINYA					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial	
	M	F				
UNZIMAT DOMINIC	<input checked="" type="checkbox"/>		OBV	AREA COUNSELLOR	0785524568	
KANDARIKU BOSCO	<input checked="" type="checkbox"/>		PAGIRINYA	TECHNICAL PERSON	0777797225	
ARIA JOYCE		<input checked="" type="checkbox"/>	PAGIRINYA	IER		
MOBUTU WILLIAM	<input checked="" type="checkbox"/>		PAGIRINYA	LC1	0782812933	
DRAMA STEPHEN	<input checked="" type="checkbox"/>		PAGIRINYA	MEMBER	0776067385	
BEATRICE DRAMA	<input checked="" type="checkbox"/>		PAGIRINYA	MEMBER	0776411241	
OWOR MARTINE	<input checked="" type="checkbox"/>		PAGIRINYA	MEMBER/ENVIRONMENTAL	0784510599	
DRAMA ANTHONY	<input checked="" type="checkbox"/>		PAGIRINYA	MEMBER	0779886493	
ARIJAMBA PAMUK	M		PAGIRINYA	FOOT MEMBER	0775560853	
WATY NATAL	M		PAGIRINYA	MEMBER	0783770412	

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 4/12/2024					
Location: PAGIRINYA					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
ANNE CIRELA	F	PAGIRINYA	Member	-	[Signature]
OLOYA WILLIAM	M	PAGIRINYA	member	-	[Signature]
EUDREX JARE	L	PAGIRINYA	Member	11	[Signature]
BUNYA IRENI	L	Pagirinya	member	0784807025	[Signature]
PIMADI BEATRICE	L	Pagirinya	member	11	[Signature]
CBURUJO GODFREY	L	Pagirinya	member	0786339449	[Signature]

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Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 4th Dec. 2021					
Location: PAGIRINYA					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
MAGURIEL MAMBA	L	Pagirinya	member	-	[Signature]
NITHY CHANDIA	L	Pagirinya	member	077369364	[Signature]
CHANDIX GERACE	L	Pagirinya	member	-	[Signature]
MAMDERX GELOPIA	L	Pagirinya	member	-	[Signature]
MURAA AGINCE	L	Pagirinya	Member	-	[Signature]
IDHA SUNDAY	L	Pagirinya	member	0777023797	[Signature]
ALIYANZO PATRICK	L	Pagirinya	member	-	[Signature]
AZIKU JULIE	L	Pagirinya	Member	-	[Signature]
AIMAKU JULIE	L	Pagirinya	member	-	[Signature]
OPLO WILLIAM	L	Pagirinya	Member	0771497688	[Signature]

3 7

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date:	14 Dec. 2021				
Location:	PAGIRINYA				
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
Lagu Emilio Maku	✓	PAGIRINYA	Member	0772038825	[Signature]
IPEE INYASIO	✓	Pagirinya	Member	-	[Signature]
Amoko SEMER	✓	Pagirinya	member	-	[Signature]
Lagu Patrick	✓	Pagirinya	member	0776270132	[Signature]
ERIKU GATIAO	✓	Pagirinya	member	-	[Signature]
YUNI CHELASSIO	✓	Pagirinya	member	-	[Signature]
APIKU RICHARD	✓	Pagirinya	member	0773-612195	[Signature]
BROKA MASIMO	✓	Pagirinya	member	-	[Signature]
ANGU RICHARD PETER	✓	"	"	0783038007	[Signature]
AMANZURUKU PATRICK	✓	"	"	0775616127	[Signature]

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date:	04/12/2021				
Location:	DZAIPU CENTRAL				
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
DRAGA ALI THOMAS	✓	DZAIPU CENTRAL	DEPUTY SPEAKER	0778936003	[Signature]
KO KAMULO	✓	DZAIPU CENTRAL	LC-1 CHAIRMAN	0780698816	[Signature]
TAKO FULU	✓	Aboki Village	LC2 C Person	0778871654	[Signature]
NEKIMUYA ISRAEL'S	✓	ABOKI VILLAGE		0783036620	[Signature]
MADRAMA SEJUNG	✓	SILILI	SEC DEFENCE	0772017590	[Signature]
KADRA SABASIMU	✓	D/CENTRAL	C/P WATER COMMITTEE	0780145654	[Signature]
IYA PATRICK	✓	SILILI	Pulmber	0784596134	[Signature]
TAKO JACKSON AUGUSTINE	✓	D/CENTRAL	Member D/Central	0788212555	[Signature]
ENDRO HARRISA	F	D/CENTRAL		0777689865	[Signature]
EMMANUEL WILIAM	F	ABOKI		0772393765	[Signature]

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 04/12/2021						
Location: DZAIPI CENTRAL						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial	
	M F					
EDER JANE		✓	Sikibi	member	0778942334	ED
ADRUPO MARIEEN		✓	D/Central	member	0785640929	AD
DRAGU MARICELON	✓		ABOKI	member	-	DR
ABUNI CHARLES	✓		SILILI	member	0777451883	AB
MBI GERSE	✓		PAWIKIYO	member	0777621430	MB
MALI CHARLES	✓		D/Central	member	0774803224	MA
MORI PATRICK	✓		ABOKI	member	0774343486	MO
MAMBI PETER	✓		D/CENTRAL	MEMBER	0780158113	MA
UMBA LUKA	✓		SILILI	"	0783634122	LU
IRANYA MOSES	✓		ABOKI	MEMBER	0772172466	IR

8 + 2 = 10

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 04/12/2021					
Location: DZAIPI CENTRAL					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
1. ACHEN DORRE	F	D/C	M	0772232121	ACH
2. BUNIA MARGRE	F	LAYE	M	0779196639	BUN
LIMBO JULIET LUNA	F	ORU	"	0774503860	LI
3. MADA WILLIAM	M	BARAN	M	0777626654	MA
4. ABIO IRENE	F	ABOKI	M	-	AB
5. ABIO TOME STELA	F	DZAIPI/S	F	07-87230194	AB
BETIS MANDEBA	F	DZAIPI	F	0788268642	BET
MOFUKU YUTIMASI	F	DZAIPI/CENTRAL	F	0773369160	MO
BARIO CHRISTINE IRAMA	F	DZAIPI CENTRAL	F	0774797453	BA
FIMROI BETTY	F	SILILI	F	0760721225	FI

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Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 04/12/2021					
Location: DZAIPI CENTRAL					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
ADRUPIO CHRISTINE	F	DICOTIARA	COUNCILLOR		ACE
ULLEO CHRISTOPHER	M	F	—	0774677613	Chang
AIORI STEPHEN	M	ABOKI	0771857530	0771857530	Amunjo
UNZIM DORFFES AMOFO	F	PANDIYI	078684742	0786847426	DES
IVU SEVERINO SUDI	M	ABOKI	MEMBER	0785261127	Shirwa
DRAPARAKU JOSEPH	M	ABOKI	0777950532	0777950532	Amunjo
TIODI EMANUEM	M	ABOKI	M	—0784010536	
BASHALE JAMES	M	ABOKI	MEMBER	077270066	Amunjo
GRUBA BEN	M	ABOKI	M	078821275	G.B.
ASIENZO GRACE	F	ABOKI	M	0784382024	Amunjo

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Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input type="checkbox"/>	Other (specify)		
Date: 04/12/2021					
Location: DZAIPI CENTRAL					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
ASIENZO GRACE	F	PANDIYI	COUNCILLOR	0777699974	Amunjo
ICETA JUSTINE	M	DZAIPI	ABOKI	078799380	Amunjo

1

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 14th Dec. 2021						
Location: MARINDI, DDAPI S.C						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
MANGKI WILLIAM	<input checked="" type="checkbox"/>		MARINDI	MEMBER	0788950983	MHLL
ISA MICHAEL CHUD	<input checked="" type="checkbox"/>		MARINDI	MEMBER	0786586648	ISA
ICAMA GODFREY	<input checked="" type="checkbox"/>		MARINDI	MEMBER	0770443681	ICAMA
ALULE GAITANO	<input checked="" type="checkbox"/>		MARINDI	MEMBER	-	ALULE
ALUMAI TABAN C. M			MARINDI	member	-	Alumai
MR OMA TABU DOUMU			MARINDI	member / Supervisor	0775102028	OMA
MR ERWAGA CHUBI			MARINDI	MEMBER	0773857573	ERWAGA
MADRAMA MICHAEL			MARINDI	MEMBER	0779944363	MADRAMA
Madraka Luke Giris			MARINDI	ELDER	0782232830	MADRKA
Aman Stephen Agoro			MARINDI	ELDER	-	Aman

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 04/12/2021						
Location: MARINDI, DDAPI S.C						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
BERNARD KUBIRI	<input checked="" type="checkbox"/>		MARINDI	MEMBER	0788690106	BERNARD
LORNA MADELENA		<input checked="" type="checkbox"/>	MARINDI	M		LORNA
LEWIA JUDITH		<input checked="" type="checkbox"/>	"	"	0784739062	LEWIA
MARAKPE PALMIRA		<input checked="" type="checkbox"/>	"	"	0783645118	MARAKPE
MARINDI DOREEN		<input checked="" type="checkbox"/>	"	"	0783645118	MARINDI
ASUKPE MARY		<input checked="" type="checkbox"/>	"	"	0779099910	ASUKPE
JOHANN GODFREY VUN		<input checked="" type="checkbox"/>	"	"	0785381287	JOHANN
ANCYAJA RICHARD	<input checked="" type="checkbox"/>		"	"	0774557079	ANCYAJA
IZATE ROBERT	<input checked="" type="checkbox"/>		"	"	0771083489	IZATE
ZEKORU BARTON	<input checked="" type="checkbox"/>		"	"		ZEKORU

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 4th Dec. 2021					
Location: MARINDI, NZAIP					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
GAMA JIMMY	<input checked="" type="checkbox"/>	MARINDI	Member	0778858850	Jimmy
AMAMARU JIMMY MESHU	<input checked="" type="checkbox"/>	MARINDI	LCI C/person	0727441123	Amf

2

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date: 5th Dec. 2021					
Location: KAROKO VILLAGE, ADJUMANI TC BIRAYA PERISH					
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
APIKU JULIUS BRABIGA	<input checked="" type="checkbox"/>	KAROKO	LCI GEN. SEC.	0777916651	Apiku
MUSTAFA MUHAMMAD	<input checked="" type="checkbox"/>	KAROKO	MEMBER	0789958676	Musema
UNZIMA RICHARD	<input checked="" type="checkbox"/>	KAROKO	MEMBER	0778080869	Unzima
SOAHANGA JAMES	<input checked="" type="checkbox"/>	KAROKO	MEMBER	0770534292	James
DIOGA JOSEPHINE	<input checked="" type="checkbox"/>	KAROKO	MEMBER	0774351402	Dioga
ADONG NANCY	<input checked="" type="checkbox"/>	KAROKO	MEMBER		Nancy
MOSIRUKU ALICE	<input checked="" type="checkbox"/>	KAROKO	member	07806189311	Alice
MAWA PATRICK	<input checked="" type="checkbox"/>	KAROKO	11 11	0784443637	Patrick
UZADIO MARY MOSI	<input checked="" type="checkbox"/>	KAROKO	11 11	0775338746	Mary
RISJO GRACE	<input checked="" type="checkbox"/>	KAROKO	11 11	0785276318	Grace

5

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 5 th DEC 2021						
Location: KAROKO K. VILLAGE, BIYAYA PARISH, ADJUMANI T.C						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
ERIKU PATRICK K.	<input checked="" type="checkbox"/>		Central II - Ate	Assistant Town Clerk	0772958611	CEMP 5-12-21
EDEN JUDITH		<input checked="" type="checkbox"/>	KAROKO	LC 1 CP	0783071433	
UTUA MARITINA		<input checked="" type="checkbox"/>	KAROKO	MEMBER		Maritina
HAWA NAIMA		<input checked="" type="checkbox"/>	KAROKO	member	0778933893	
LILY ACHAM AHAMAS		<input checked="" type="checkbox"/>	KAROKO	MEMBER	0783371036	
LUCY MAUA		<input checked="" type="checkbox"/>	KAROKO	MEMBER	0770519149	Lucy
UNI ZIMAMAS	<input checked="" type="checkbox"/>		KAROKO	MEMBER	0770519149	Uni
DRIBERO CONY		<input checked="" type="checkbox"/>	KAROKO	member	0777976979	

2 5

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 5 th DEC 2021						
Location: ABIRICHAKU VILLAGE, BIYAYA PARISH						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
HAWA YUNUS		F	ABIRICHAKU	LC mobilizer	0775314669	
KORINA TATO		F	"	MEMBER	-	
RATIB KEMIS	M		"	"	0788010049	
Mujir Abd Akeem	M		"	LC II Eldest Person	-	
ABIMAD ATUB	M		"	MEMBER	-	
MUSA GADI	M		"	"	-	
MUSTAFA ABDALA	M		"	SEC. pro & environment	0779772722	MUSTA-2
ALI MOHAMMAD	M		"	NRM C/Man	0774495670	
NASUR GADI	M		"	MEMBER	0777631106	
ISSA GORE	M		"	LC Treasurer	0789060600	

9 2

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 5 th Dec. 2021						
Location: ABIRICHAKU VILLAGE BIYAYA PARISH						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
ERIKU PETER K.	<input checked="" type="checkbox"/>		Central II-ATC	Assistant Town Clerk	07958611	ERIKU P. K.
KEMUS ISMAIL	<input checked="" type="checkbox"/>		ABIRICHAKU	MEMBER	0760471735	Kemus
ZURCDA ABDULHAMID		<input checked="" type="checkbox"/>	ABIRICHAKU	MEMBER	0794737512	ZURCDA
ALISHA HUSSEIN		<input checked="" type="checkbox"/>	"	"	0785715819	ALISHA
JAMIA DOBA		<input checked="" type="checkbox"/>	"	"	0773424986	JAMIA
MATJUMA MYUB		<input checked="" type="checkbox"/>	"	"	0773826652	MATJUMA
KERIMA MUKHAMA		<input checked="" type="checkbox"/>	"	"	0784503058	KERIMA
FAIZA HUSSEIN		<input checked="" type="checkbox"/>	"	"	0787806791	FAIZA
MUNDARA JOB EUREKIO	<input checked="" type="checkbox"/>		"	MEMBER	0785576538	MUNDARA
LUKIA SERRI		<input checked="" type="checkbox"/>	"	"	0778707754	LUKIA

3

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>		
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>		
	ESIA	<input checked="" type="checkbox"/>	Other (specify)			
Date: 5 th Dec. 2021						
Location: ABIRICHAKU VILLAGE BIYAYA PARISH						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
BONA DAIMA		<input checked="" type="checkbox"/>	ABIRICHAKU	MEMBER	0788574052	BONA
ZAMZAM YASIA		<input checked="" type="checkbox"/>	"	"	0775670777	ZAMZAM
ZUMBA NURE		<input checked="" type="checkbox"/>	"	"	-	ZUMBA
YUNUS RAMADHAN	<input checked="" type="checkbox"/>		"	"	0788450109	YUNUS
SADIA FARJAH		<input checked="" type="checkbox"/>	"	"	-	SADIA

1

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date:	5th Dec 2021				
Location:	ABIRICHAKU VILLAGE BIYAYA PARISH				
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
OTORE SHAMBA	M	ABIRICHAKU	L.C. EXECUTIVE	0782101526	[Signature]
ABIRIGA SILIMAN	M	"	CLERK	0772842505	[Signature]
SAID MOHAMMAD	M	"	MEMBER	0784529070	[Signature]
MUDATHIR KEMU	M	"	SEC PHD	0771337900	[Signature]
ABDULAI MOHAMMAD	M	"	MEMBER	0786026927	[Signature]
KEMIS ABDALLA	M	"	LC EXECUTIVE	0777761070	[Signature]
KADIMALA MUSA	F	"	MEMBER	0761102333	[Signature]
ATOMA HAEWA	F	"	MEMBER	0779868622	[Signature]
FATUMA DAWA	F	"	MEMBER	081050549	[Signature]
NARMA NDIKE	F	"	MEMBER	0784298442	[Signature]











6/4

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT					
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>	Other (specify)		
Date:	5th DEC 2021				
Location:	KAROKO VILLAGE BIYAYA PARISH ADJUMANI T.C				
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.					
Proponent: NWSC					
Name of person/ official met:	Gender	Village	Designation	Contact (Tel/email)	Sign/ initial
	M F				
ADRANI MARIC	✓	KAROKO	07608649VHT	0760864910	[Signature]
MASUDIO ALICE	✓	KAROKO	MEMBER		[Signature]
ASIA EMANUEL BINDE	✓	KAROKO	MEMBER	0779570886	[Signature]
ADRI THOMAS D.	✓	KAROKO	MEMBER	0770987293	[Signature]
BENSON VURU	✓	KAROKO	MEMBER		[Signature]
ALIEZ MOMBIA	✓	KAROKO	MEMBER	0775570717	[Signature]
ASIKO RAUDA	✓	KAROKO	MEMBER	"	[Signature]
IZIKU SARAH	✓	KAROKO	MEMBER	0784301426	[Signature]
ASIMUZA VURU	✓	KAROKO		0784780090	[Signature]
MURGO CIZARIA	✓	KAROKO	VHT	0773625302	[Signature]

7/3

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF	<input type="checkbox"/>		Environmental Audit	<input type="checkbox"/>	
	RPF	<input type="checkbox"/>		RAP	<input type="checkbox"/>	
	ESIA	<input checked="" type="checkbox"/>		Other (specify)		
Date: 5th Dec 2021						
Location: KAROKO VILLAGE ADJUMANI T.C. BINAYA PARISH						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
Vicky Maki		<input checked="" type="checkbox"/>	KAROKO	MEMBER		
CIZARIA Gumira Dami	<input checked="" type="checkbox"/>		KAROKO	MEMBER		
CIZIRA Anyanzo		<input checked="" type="checkbox"/>	KAROKO	TRABUSURA	0787146011	
MESKU ALICE		<input checked="" type="checkbox"/>	KAROKO	MEMBER	0761620603	
BETTY DRACHO		<input checked="" type="checkbox"/>	KAROKO	MEMBER		
KELIKI JANE		<input checked="" type="checkbox"/>	KAROKO	MEMBER	0781107084	
AMITZA DASTARA		<input checked="" type="checkbox"/>	" "	MEMBER	074494949	
ARIZIO JACKLINE		<input checked="" type="checkbox"/>	KAROKO	MEMBER		
JOSPHEN MORI		<input checked="" type="checkbox"/>	KAROKO	MEMBER		
MASUDIO RUZINA		<input checked="" type="checkbox"/>	KAROKO	MEMBER		



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... Lagope, Cessia, Lagope Ginony, Adjumani T.C.

Date..... 5th/12/2022

No.	Name	Email/Contact	Signature	Village
1.	NDIRI GABIREH	0779740816	Ndirig	Lagope
2.	Drazi Abel	—	DA	Lagope
3.	LINA BAYOA	0784105365		Lagope
4.	MADRAMA JOSEPH	0777191877		Lagope
5.	APIO JOSEPHEN	07889448839		Lagope
6.	MADRAMA FAUSTINA	0784159464		Lagope
7.	MARIATA DIPLO	—		Cessia
8.	Agnes Agaleso	0787147244		Lagope
9.	AOYO HELEN IBBA	0787839143		Lagope
10.	MALWADI JOSEPH	072210874		Lagope/Cessia
11.	ODUKE ADELIXO	0787171337		Lagope/Cessia
12.	HON TARA KPWIE HARRIE	0783120810		" "
13.	AKUMA MAMAWI ROBERT	0782252767		Lagope-Cessia
14.				
15.				








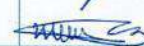









ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... Lasape, Casia, Lappe Ginery, Adjumani Te.

Date..... 6th / 12 / 2022

No.	Name	Email/Contact	Signature	Village
1.	ANGUDUBO BRAN BAGA	0772359818		LASAPI GINERY
2.	IBRIFUA JOEL	07777700178		Llcesia
3.	MAWADRI JOEL	0776712417		Llcesia
4.	VUKOMI BOMINTA	0779163475		UR
5.	CHANDIA LUCY	0774590273		Llcesia
6.	ANGU EMMANUEL	0777590276		Llcesia
7.	ALUMAI JOSEPH	0786065129		Llcesia
8.	IRANJA BOBEO	0771618446		LASAPI GINERY
9.	MAWENO ZALIKA	0784761713		LASAPI GINERY
10.	DOMINICA KLUZIKU			Llcesia
11.	MADRANA JOSEPH (ORO)	0777191573		Llcesia
12.	GUDUA LAWURA	—		Llcesia
13.	LUCIA ANGELA	—		Llcesia
14.	MESIKU TEDDY	0783984008		Llcesia
15.	ANROA Birdge P.V	0775240471		Llcesia

Stakeholder consultation record:

Name of Assignment: ESIA FOR ADJUMANI WATER AND SANITATION PROJECT						
Purpose of consultation (tick appropriate box):	ESMF		<input type="checkbox"/>	Environmental Audit	<input type="checkbox"/>	
	RPF		<input type="checkbox"/>	RAP	<input type="checkbox"/>	
	ESIA		<input checked="" type="checkbox"/>	Other (specify)		
Date: 6 th Dec 2021						
Location: Adjumani Town Council						
Project name: Consultancy Services for Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) for Adjumani Water Supply and Sanitation Project.						
Proponent: NWSC						
Name of person/ official met:	Gender		Village	Designation	Contact (Tel/email)	Sign/ initial
	M	F				
MUGHERI MUSE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	A.T.C	D/RDC	0786634129	


















ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... BIYAYA VILLAGE

Date..... 7th Dec. 2021

No.	Name	Email/Contact	Signature
		<u>Biyaya Village</u>	
1.	GULE GIFT	Biyaya Village	
2.	Juma Musamil	Biyaya Village	
3.	Musili Joy Bukaya	Biyaya Village	
4.	DRICH PEIEROKHO	BIYAYA	
5.	ADDEMA SUNDAY BAKI	BIYAYA	
6.	Iyani Rose	Biyaya	
7.	Alamu Rose	Biyaya	
8.	Eleba Anzela male	Biyaya	
9.	Madraa Mary	Biyaya	
10.	Keliki Grace	"	
11.	Neder Rahima	"	
12.	Chandra Sarah	"	
13.	Kiden Jeska	"	
14.	Tete Jane	"	
15.	Chandra Magret		

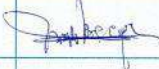



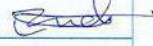



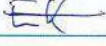






ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: BIYAYA VILLAGE

Date: 7th Dec. 2021

No.	Name	Email/Contact VILLAGE	Signature
1.	Akomi Nicholas	Biyaya Village	
F 2.	Mandera Patricea	"	M.P
F 3.	Morika Agnes	"	
F 4.	Murua Christine	"	
F 5.	Zubeidah faina	"	
F 6.	Encheo Clara	"	
F 7.	Alea Magret	"	
8.	Drati Simon	"	
9.	Rose Hassan		
10.	Elivira Komaa		
I 11.	Acidu Mary		
I 12.	Odelendi Marcelo		DM
F 13.	May Vinchu	"	
I 14.	Stella brown	"	
F 15.	Dranzoa Janet	"	

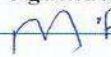

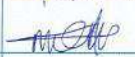

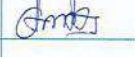
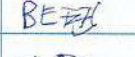


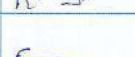








ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: BIRAYA VILLAGE

Date: 6th / 12 / 2022

No.	Name	Email/Contact	Signature
1.	Mocimki Aneta	Biyaga	
2.	Madang Charity	Biyaga	
3.	Mesiku Christine	Biyaga	
4.	KIDEN LOICE	Biyaga	
5.	Sangy Hope	"	
6.	Tarakwa Betty	"	
7.	Mokoni Mary	"	
8.	PITA EMELIDA	"	
9.	Kabang JINE	"	
10.	FOT FULO FULO ESTERES ESTERES	"	
11.	Sadia Agnes	"	
12.	Keneri Helong	"	
13.	Florence Icuale	"	
14.	Poni Rose	"	
15.	Josphine Gule	"	

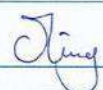





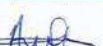


ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: BIYAYA VILLAGE

Date: 6th / 12 / 2020

No.	Name	Email/Contact	Signature
1.	Aurelia Oling	Biyaya Village	
2.	Chandia Betty	Biyaya Village	
3.	MASUPIO LIWAN	BIYAYA "	
4.	Angkoru Scovia	Biyaya Village	
5.	Kagodi Evaline	Biyaya Village	
6.	Iako Martinie	Biyaya Village	
7.	Riria Jacey Edema	Biyaya Village	
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
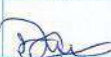




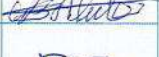



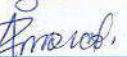



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: Mocope, Kabooli, Onigo, Loa, Marila, Ciforo Central

Date: 6th/12/2022

No.	Name	Email/Contact Village	Signature
1.	BUNIA SARAFINA	MOCOPE	
2.	MUGUCHI HARRIS	MOCOPE	
3.	DEANNA MOSES	MOCOPE	
4.	AMBAYO FELIX	KABAOLI	
5.	Agnes Victor	Onigo	
6.	ABRAHY FRAS	OBUNGO	
7.	INYANI BOSCO BUN	LOA	
8.	ABIRIHA SUNDAY	LOA	
9.	IRXIMWI MICHAEL	MOCOPE	
10.	ALLIE JOSEPH	LOA	
11.	Lula Simon DWARI	KABAOLI	
12.	OKELLO JAMES	MARILA	
13.	EDEA FLORENCE	LOA	
14.	NYANDA GODFREY	MARILA	
15.	AMOKO GODFREY	Ciforo Central	



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: Mocope, Cyfuro Central, Loa, Kaboli, Malira

Date: 6th 12/2022

No.	Name	Email/Contact Village	Signature
1.	UNZIA PASKA	MOCOPE	
F 2.	AYEJI JUSPHANE	MOCOPE	
3.	VUKOLU JUSTINA	Cyforo Central	
4.	MAMGBWI GEDREY	KABOLI VILLAGE	
5.	DIMA PETER	KABOLI	
6.	MADRAGA PHILIP	"	M.P
7.	NABARA ABRAM KANTAMBI	KABOLI	
8.	AMAZA NELSON	LOA	
F 9.	EIMANI ALICE	KABOLI	
F 10.	CHANDIA REGINA	KABOLI	
11.	MORIGA WILSON	LOA	
F 12.	ASIGORO MARGARET	marula	
F 13.	ATARO LILIAN	"	A.L
F 14.	MURACA BETTY	"	
F 15.	LEKEA AGNES	Obungo	L.A.









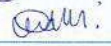





ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: Ubugo, mocope, onigo, Loa

Date: 6th/12/2022

No.	Name	Parail/Contact Village	Signature
1.	IZAKARE PATRICK	ONIGO	
2.	Kentembuse Mary Guma	Ubugo	
3.	LINDRIG CARULINE	UBUGO	
4.	AMACHARA RICHARD	DABORO	
5.	DULU GEMINIO K	CULTURAL LEADER ODRUMPI, LOA, CIFORO	
6.	DRAZELEGA Luke	LC3 CIFORO	
7.	BAKU IYARIZO	UBUGO	
8.	ALARI JULIUS	UBUGO	
9.	UHEA BEATRICE	mocoPE	
10.	ABIO VALERIA	LOA	
11.	Bana Joyce	Ubugo	
12.	Vukoni Charles	MocoPE	
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14.			
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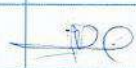














ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: Central II Village

Date: 8th Dec. 2021

No.	Name	Email/Contact Village	Signature
1.	ASIO Alice	CENTRAL II	
2.	Mary Okaro	"	
3.	Anastazia EMO	"	
4.	Abau Zenab	"	
5.	WILLIAM Vidi	"	
6.	NDREMIGBWE BEO	"	
7.	NUSURA ARUWA	"	
8.	AZUDI GODFREY	"	
9.	AKULU GEORGE IC	"	
10.	BRAGA LAWRENCE	CENTRAL I	
11.	ISMAIL ADRIAN	CENTRAL II	
12.	EITO Sabina	"	E.S.B.
13.	Virginia Gudua	"	
14.	JURUA JANE	"	
15.	ALI YASIN	CENTRAL II	











ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location... CENTRAL II VILLAGE

Date... 8th DEC. 2021

No.	Name	Email/Contact	Signature
1.	DAMA EMMANUEL	CENTRAL II	
2.	OLUWANLA EMMANUEL	CENTRAL I 0776992418	
3.	TABU KATONGOLE	CENTRAL II	
4.	IMAKURU Wilson-M	U	
5.	A Toma SUMA	U	
6.	ADIRU FAIMA	U	
7.	Mr Asdalaye Abdul KORA	U 0785578566	
8.	MOINI RONALD IZAMA	U 0772965026	
9.			





ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location... PAGURINYA BASE CAMP

Date... 8th DEC. 2021

No.	Name	Email/Contact	Signature
1.	ICHUKA BARBARA	PAGUR VILLAGE bichuka03@gmail.com 0785182762	
2.	OBULEO MARIO	0784506497	
3.			



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... NYUMANZI BASE Camp, AJIWAPE PARISH, DZAPI S.C.

Date..... 8th Dec. 2021

No.	Name	Email/Contact/ Designation	Signature
1.	NAMAGYEYO JUSTINE	0773-720021/0773-720038	[Signature]
2.			
3.			



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... OLVA ITI BASE Camp

Date..... 9/12/21

No.	Name	Email/Contact VILLAGE	Signature
1.	RODOLPH MICHAEL	OPM OLVA	[Signature]
2.	BUNJI ALEX	OPM LCI GOMIYILAA 0784738347	[Signature]
3.	Angok Daniel Bior	Olva 1 Ruc1 0783823223	[Signature]
4.	Ang Jeros Bul	OLVA 0784509714	[Signature]
5.	MADIRA BETTY	OPM BODI 0780534464	[Signature]
6.	MUWEREZA JULIUS	OPM OLVA 0776749494	[Signature]
7.	IRAMA FLOA TUSIME	OPM KOLALI 0778-111923 0778-700117	[Signature]
8.			




ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location.....MOKOLO EAST, LAJOPE PARISH, ADROPI SC

Date.....9th/12/2021.....

No.	Name	Email/Contact	Signature
1.	EDIKU DENNIS	C/MAIN LC1 0788504208	
2.			
3.			

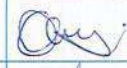






ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location.....ONIGO VILLAGE.....

Date.....10th/12/2021.....

No.	Name	Email/Contact	Signature
1.	AMAZA COFFREY	—	
2.	ANYAMA KENNEDY		
3.	KANDARUKU JUSTINE	0776349337	
4.	AFEDI RICHARD	0775932046	
5.	IZAKARE PATRICK	LC1 ONIGO VILLAGE 0773407719	
6.			
7.			
8.			











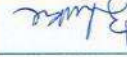






ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: ONIGO VILLAGE

Date: 10th / 12 / 2021

No.	Name	Email/Contact	Signature
1.	NBULUGA NELSON	0777471344	
2.	MAYIMUNA SSANYU	0775031891	
3.	ANDRUMAI CRASER	0760726700	
4.	DHARI CHARLES	0775861011	
5.	OBULEJO MICHAEL	0778746068	
6.	OLIA MOSES	0783732740	
7.	ANGU SIMON	09777081055	
8.	EDUAGA STEPHEN A.	0976363163	
9.	JAM JUSTINE	0783635988	
10.	AMACHA PATRICK	0789928072	
11.	ANYARZO LUKO	0778280792	
12.	OKUNZI EMMANUEL	0787618532	
13.	EXLIGU WINSON	0784815025	
14.	MAWADZI GODFREY	0761632109	
15.	OBULEJO JOSEPH	—	




ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: MELIJO VILLAGE (OLUA II)

Date: 8/12/2021

No.	Name	Email/Contact	Signature
1.	BANI RICHARD	0752665414	
2.	(LCI - MELIJO)		
3.			

Health & Safety

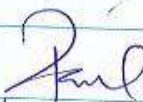



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: Adjumani - NWSC

Date: 29/10/2021

No.	Name	Email/Contact	Signature
1.	Paul Ghona	Paul.ghona@nwsc.gov	
2.	Martin Abaga	asige2012@gmail.com	
3.		07030183919	
4.			

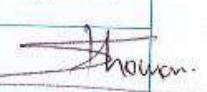
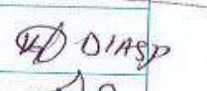



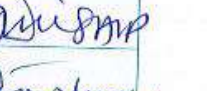

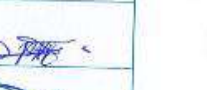





ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: Adjumani District

Date: 30/11/2021

No.	Name	Email/Contact	Signature
1.	ASP MURICHE FRANS	0780413730 storm.256@aol.com	
2.	D/ASP. KASEMBEZA MIA/PII	0784603311 kasebwaizi@gmail.com	
3.	D/SPR. Anielis	0772909341	
4.	Eduma Richard D	0782315200	
5.	AFAYO NICK	0787340844	
6.	QISA MURCHER	0775323252	
7.	APR BMONGOLUK-R	0775801835	
8.	No.31816 C/O Ops Michael Jackson	0772900946	
9.	MORIKO STELLA	0778498492	
10.	OCHRO ROBERT MAMUWI	0777444609	
11.	MAMUWI HENRY	Mamawiherry3@gmail.com 0777306581	
12.			
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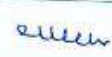


ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location.....RED CROSS ADJUMANI.....

Date.....2nd December 2021.....

No.	Name	Email/Contact	Signature
1.	Athech Barbara Rose	barbararose@igmail.com	
2.			
3.			
4.			




ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location.....PACIFIC H/C ITI.....

Date.....PACIFIC H/C ITI 21/22/2021.....

No.	Name	Email/Contact	Signature
1.	G.G. OLOTHI EMM SSBMWE	eggoloth@medicalteams.org	
2.			
3.			



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... ARRA P/L SAN

Date..... 3/12/2021

No.	Name	Email/Contact	Signature
1.	<u>ODONGUYIGA MICHAEL</u>	<u>odonguemichael@gmail.com</u>	<u>odongue-o</u>
2.			
3.			



ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location..... ARRA / PACHARA

Date..... ARRA H/K II (3/DECEMBER)

No.	Name	Email/Contact	Signature
1.	<u>AYAA CHIZAKA</u>	<u>0775539547</u>	<u>[Signature]</u>
2.			
3.			

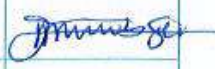


ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location... DZAP Police STATION

Date... 21/12/2021

No.	Name	Email/Contact	Signature
1.	<u>NO 28736 BARUSALI</u>	<u>0782779814</u>	
2.			
3.			




ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location... PACHARA HCU

Date... 3rd December 2021

No.	Name	Email/Contact	Signature
1.	<u>ABIO MILDIA BOSTI</u>	<u>0773640253</u>	
2.			
3.			

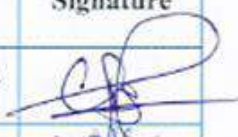

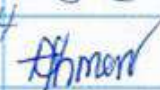




ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: ADJUMANI TOWN COUNCIL -

Date: 08/12/2021

No.	Name	Email/Contact	Signature
1.	MANGIATI LOWZBIE	mangiatilaw@gmail.com 0774362990	
2.	VUKONI FRANCIS DASI	fdickson@gmail.com 0772016224	
3.	SADIK SHABAN	sacheshab@yahoo.com	
4.	VUKO ESTHER ADUSI	0785073512	
5.	LASH SAMAEL	0772361490	
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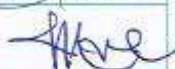


ATTENDANCE LIST

Project Name: ESIA FOR ADJUMANI WSSP – IWMDP (NWSC)

Location: ADJUMANI DISTRICT LOCAL GOVERNMENT

Date: 9th December 2021

No.	Name	Email/Contact	Signature
1.	AFAYO Nick	07873408444 afayonick@gmail.com	
2.	Izakare K. Richard	izakerichy@gmail.com 0772584363	
3.			
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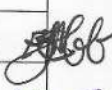
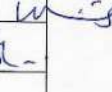


Kira Municipality, Wakiso
P.O. Box 101649, Kampala, Uganda
+256200901224/ +256772458903
info@jbn.co.ug | www.jbn.co.ug

ATTENDANCE LIST

Project Name: Adjumani Water Supply & Sanitation Project

Location: UNRA HQ - KAMPALA

Date: 24/03/2022

No	Name	F/M	Designation	Contact/ Email	Signature
1.	Eng. Patrick Mulema	M	Head Design	0772621123 patrick.mulema@unra.go.ug	
2.	ENG. DR. KENNETH MUNIWA	M	TL Hydrology	077148441 keneth-muniwa@unra.go.ug	
3.	Sarah J. Kasande	F	Consultant	Sarah.Kasande@gmail.com	
4.	Pamela TaShobya	F	Sociologist	pkolekwa3@gmail.com	P.T
5.	PASCAL BITUM	M	Environmental Consultant	pascalbitum@gmail.com	
6.					
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ATTENDANCE LIST

Project Name: **ESIA/RAP FOR ADJUMANI WSSP – IWMDP (NWSC)**

Location: OPM OFFICES - KAMPALA

Date: 22/03/2022

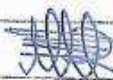









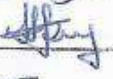

No.	Name	Gender M/F	Designation	Contact	Email	Signature
1.	Bafara Chuma	M	PSO	0772361418		<i>Bafara</i>
2.	Pamela Tashoga	F	Social Devt Consultant	0701580974	pkevelukwa@gmail.com	<i>Pamela</i>
3.	Sigawa Samuel	M	Sociologist	0704393850	sigawag@gmail.com	<i>Sigawa</i>
4.	Atozwa Carl	M	VALUER	0701478336	atozwa@gmail.com	<i>Atozwa</i>
5.	IVAN MOSES OKUNYI	M	OSH Specialist	0777880660	ivanmoseokuny@gmail.com	<i>Ivan</i>
6.	PASCAL BITTUM	M	Environmental consultant	0779163079	Pascalgudwila@gmail.com	<i>Pascal</i>
7.						
8.						
9.						
10.						
11.						
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ATTENDANCE LIST

Project Name: ADJUMANI WATER & SANITATION PROJECT

Location: MWE, LUZIRA - DWRM & DEA

Date: 8th June 2022



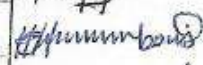





No.	Name	Gender M/F	Designation	Contact	Email	Signature
1.	Rwarinda E. Martin	M	Ag. AC (C+E)	0776 171096	rwarindaedward martin@gmail.com	
2.	Eng. Steven Ogwele	M	PWO	0772365278	steven.ogwele@gmail.com	
3.	David Kateramba	M	Senior Water officer	0788037157	dkateramba@yahoo.com	
4.	Isakindi Isaac	M	W/O - EIA (MWE)	075538110	isakindi@gmail.com	
5.	AMBAZIBWE PETERSON	M	SOCIOLOGIST - MWE	0782046015	ambazibwepeter@gmail.com	
6.	OJOK MATTHEW	M	WOC SW/CP	0786896990	matthewojokmwe@gmail.com	
7.	Olong Joseph	M	Hq. SWO (EIA)	0773496736	olongjoseph@gmail.com	
8.	Sarah Kasande	F	JBN Consultant	0777165589	Sarah.Kasande@gmail.com	
9.	Nabide Isah Buki	M	"	077248011	nabideisah@gmail.com	
10.	Andrew Nwawuima	M	JBN	0787600681	andrewnwawuima@gmail.com	
11.	VINCENT SEBUGGURUWU	M	JBN	077243049	sebugguruv@gmail.com	
12.	Kevin Apito	F	W/O - EIA (MWE)	0773295328	kevin.apito@gmail.com	
13.						

ATTENDANCE LIST

Project Name: ADJUMANI WATER & SANITATION PROJECT

Location: MWE, LUZIRA - DWDM & DEA

Date: 8th June 2022

No.	Name	Gender M/F	Designation	Contact	Email	Signature
1.	Sylvia Nanyungu N.	F	Ag. PWOKE	07245534	Sylvia.nanyungu@gmail.com	
2.	Obote Bong Emmanuel	M	WO - MWE	0755-946265	emmanuelobote2013@gmail.com	
3.	Denis Ocromac	M	WO	0785431154	denisocromac@yahoo.com	
4.	Abaho Joseph	M	WO - MWE	0774118195	Joseph.abaho2017@gmail.com	
5.	Okurut Daniel S.	M	Ag. SWO (sup/cr)	077573234	okurutdaniel@gmail.com	
6.	Stephen Tumwesige	M	LRO - BP (MWE)	0775926472	sttumwesige@gmail.com	
7.	Pascal BITHUM	M	JBN - CONSULTANT	0779163079	pascalbithum@gmail.com	
8.	MARGARET NABIRYO	F	JBN	0702011070	nabiryo.m@gmail.com	
9.						
10.						
11.						
12.						
13.						

Annex 2: Grievance Form

Received by: _____

Date Received: _____

Reported by: _____

Database ID: _____

S/N	Date Received	Name /of complainant	Village/Parish	Contacts	Compliant category ⁵¹	Solution sought	Action taken	Closure date	Referral Date
1									
2									
3									

Description of Concern: _____

Complainant satisfied with process? Yes ☐ No ☐

☐

Why not?.....

Complainant satisfied with outcome? Yes ☐ No ☐

☐

Why not?

Print Name (Complainant): _____

Signed (Complainant): _____

Date: _____

Signed (Recipient): _____


Date: _____

Copied to: _____

⁵¹ L= Land, H= Health and Safety, E= Employment, C= Cultural, LL= Loss of Livelihood, EV= Environment, GBV=Gender Based Violence, VAC= Violence Against Children, SH= Sexual Harassment/ Defilement, T= Theft

Annex 3: Laboratory Water Quality Analysis Certificates

a) Certificate for the Intake (R. Nile) - Upstream



NATIONAL WATER & SEWERAGE CORPORATION
CENTRAL LABORATORY- Plot M11, Old Portbell Rd, Bugolobi
P.O BOX 7053 KAMPALA, Email: external.services@nWSC.co.ug
CERTIFICATE OF ANALYSIS

Client: JBN Consults & Planners Ltd
Address: Dr Asea Road, Kigowa Ntinda
Sample Description: Intake Upstream
Sample Received Date: 20.01.2022
Sampled By: Client's Staff
Sample Number : 50/219/2022/C/B

Document No: NWSC/WQ/QF/21.2A
Invoice No: 131/INV/2022/054_QUO

Parameters	Units	Test Results	National Standards for UnTreated Water	Test Method
Alkalinity: Total	mg/L	120	500	APHA - 2320B
Bact: Escherichia coli	CFU/100mL	4	0	Colilert – 18
Bact: Faecal coliforms	CFU/100mL	114	0	Colilert – 18
Bi-Carbonate	mg/L	146.4	500	APHA - 2320B
Calcium: as Ca ²⁺	mg/L	8	150	APHA-3111A
Chloride	mg/L	23	250	Hach 8206
Colour (apparent)	PtCo	5	50	HACH 8025
Electrical Conductivity (EC)	uS/cm	233	2500	APHA-2510
Hardness: Total	mg/L	64	600	APHA-2340C
Iron: Total	mg/L	0.087	0.3	APHA-3111A
pH (Physical-Chemical)	—	7.56	5.5 - 9.5	APHA- 4500-H+ B
Sulphate	mg/L	0.681	400	Hach 8051
Total Dissolved Solids (TDS)	mg/L	149.12	1500	APHA-2540C
Total Suspended Solids (TSS)	mg/L	4	0.0	APHA-2540D
Turbidity	NTU	1.19	25	Hach 8195

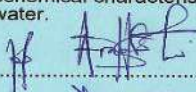
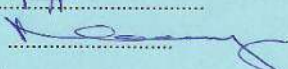
Remarks:


Biology :The sample tested showed uncomplying bacteriological characteristics as provided for by the National Standards for Untreated Potable water.


Chemistry :The water sample tested showed complying physiochemical characteristics with exception of TSS as provided for by the National Standards for Untreated Potable water.

AUTHORISED BY: Manager Central Laboratory Services.....

APPROVED BY: Senior Manager - Water Quality Management









*** The NWSC certificate of analysis by no means continues to permit to any person or company undertaking to conduct business, This report reflects results of the sample as received at the laboratory premises.

b) Certificate For the Intake (R. Nile) – Downstream



NATIONAL WATER & SEWERAGE CORPORATION
CENTRAL LABORATORY- Plot M11, Old Portbell Rd, Bugolobi
P.O BOX 7053 KAMPALA, Email: external.services@nWSC.co.ug
CERTIFICATE OF ANALYSIS

Client: JBN Consults & Planners Ltd
Address: Dr Asea Road, Kigowa Ntinda
Sample Description: Intake Downstream
Sample Received Date: 20.01.2022
Sampled By: Client's Staff
Sample Number : 50/220/2022/C/B

Document No: NWSC/WQ/QF/21.2A
Invoice No: 131/INV/2022/054_QUO

Parameters	Units	Test Results	National Standards for UnTreated Water	Test Method
Alkalinity: Total	mg/L	120	500	APHA - 2320B
Bact: Escherichia coli	CFU/100mL	3	0	Colilert – 18
Bact: Faecal coliforms	CFU/100mL	5	0	Colilert – 18
Bi-Carbonate	mg/L	146.4	500	APHA - 2320B
Calcium: as Ca ²⁺	mg/L	9.6	150	APHA-3111A
Chloride	mg/L	21	250	Hach 8206
Colour (apparent)	PtCo	11	50	HACH 8025
Electrical Conductivity (EC)	uS/cm	234	2500	APHA-2510
Hardness: Total	mg/L	44	600	APHA-2340C
Iron: Total	mg/L	0.183	0.3	APHA-3111A
pH (Physical-Chemical)	--	7.54	5.5 - 9.5	APHA- 4500-H+ B
Sulphate	mg/L	0.648	400	Hach 8051
Total Dissolved Solids (TDS)	mg/L	149.76	1500	APHA-2540C
Total Suspended Solids (TSS)	mg/L	5	0.0	APHA-2540D
Turbidity	NTU	0.88	25	Hach 8195


Remarks:


Biology :The sample tested showed uncomplying bacteriological characteristics as provided for by the National Standards for Untreated Potable water.

Chemistry :The water sample tested showed complying physiochemical characteristics with exception of TSS as provided for by the National Standards for Untreated Potable water.

AUTHORISED BY: Manager Central Laboratory Services.....


APPROVED BY: Senior Manager - Water Quality Management





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c) Certificate for the Stream Draining the WTP Catchment - Upstream



NATIONAL WATER & SEWERAGE CORPORATION
CENTRAL LABORATORY- Plot M11, Old Portbell Rd, Bugolobi
P.O BOX 7053 KAMPALA, Email: external.services@nWSC.co.ug
CERTIFICATE OF ANALYSIS

Client: JBN Consults & Planners Ltd
Address: Dr Asea Road, Kigowa Ntinda
Sample Description: WTP (Upstream)
Sample Received Date: 20.01.2022
Sampled By: Client's Staff
Sample Number : 50/221/2022/C/B

Document No: NWSC/WQ/QF/21.2A
Invoice No: 131/INV/2022/054_QUO

Parameters	Units	Test Results	National Standards for UnTreated Water	Test Method
Alkalinity: Total	mg/L	88	500	APHA - 2320B
Bact: Escherichia coli	CFU/100mL	10	0	Colilert – 18
Bact: Faecal coliforms	CFU/100mL	15	0	Colilert – 18
Bi-Carbonate	mg/L	107.36	500	APHA - 2320B
Calcium: as Ca ²⁺	mg/L	11.2	150	APHA-3111A
Chloride	mg/L	13	250	Hach 8206
Colour (apparent)	PtCo	214	50	HACH 8025
Electrical Conductivity (EC)	uS/cm	146.7	2500	APHA-2510
Hardness: Total	mg/L	64	600	APHA-2340C
Iron: Total	mg/L	0.174	0.3	APHA-3111A
pH (Physical-Chemical)	---	7.52	5.5 - 9.5	APHA- 4500-H+ B
Sulphate	mg/L	8.432	400	Hach 8051
Total Dissolved Solids (TDS)	mg/L	93.89	1500	APHA-2540C
Total Suspended Solids (TSS)	mg/L	12	0.0	APHA-2540D
Turbidity	NTU	23.65	25	Hach 8195


Remarks:


Biology :The sample tested showed uncomplying bacteriological characteristics as provided for by the National Standards for Untreated Potable water.

Chemistry :The water sample tested showed complying physiochemical characteristics with exception of Colour (True) and TSS as provided for by the National Standards for Untreated Potable water.

AUTHORISED BY: Manager Central Laboratory Services.....


APPROVED BY: Senior Manager - Water Quality Management





*** The NWSC certificate of analysis by no means continues to permit to any person or company undertaking to conduct business. This report reflects results of the sample as received at the laboratory premises.

d) Certificate for the Stream Draining the WTP Catchment – Upstream



NATIONAL WATER & SEWERAGE CORPORATION
CENTRAL LABORATORY- Plot M11, Old Portbell Rd, Bugolobi
P.O BOX 7053 KAMPALA, Email: external.services@nWSC.co.ug
CERTIFICATE OF ANALYSIS

Client: JBN Consults & Planners Ltd
Address: Dr Asea Road, Kigowa Ntinda
Sample Description: WTP (Downstream)
Sample Received Date: 20.01.2022
Sampled By: Client's Staff
Sample Number : 50/222/2022/C/B

Document No: NWSC/WQ/QF/21.2A
Invoice No: 131/INV/2022/054_QUO

Parameters	Units	Test Results	National Standards for UnTreated Water	Test Method
Alkalinity: Total	mg/L	100	500	APHA - 2320B
Bact: Escherichia coli	CFU/100mL	2	0	Colilert – 18
Bact: Faecal coliforms	CFU/100mL	3	0	Colilert – 18
Bi-Carbonate	mg/L	122	500	APHA - 2320B
Calcium: as Ca2+	mg/L	9.6	150	APHA-3111A
Chloride	mg/L	13	250	Hach 8206
Colour (apparent)	PtCo	117	50	HACH 8025
Electrical Conductivity (EC)	uS/cm	163.3	2500	APHA-2510
Hardness: Total	mg/L	32	600	APHA-2340C
Iron: Total	mg/L	0.217	0.3	APHA-3111A
pH (Physical-Chemical)	--	7.68	5.5 - 9.5	APHA- 4500-H+ B
Sulphate	mg/L	9.447	400	Hach 8051
Total Dissolved Solids (TDS)	mg/L	104.51	1500	APHA-2540C
Total Suspended Solids (TSS)	mg/L	4	0.0	APHA-2540D
Turbidity	NTU	9.49	25	Hach 8195


Remarks:


Biology :The sample tested showed uncomplying bacteriological characteristics as provided for by the National Standards for Untreated Potable water.

Chemistry :The water sample tested showed complying physiochemical characteristics with exception of Colour (True) and TSS as provided for by the National Standards for Untreated Potable water.

AUTHORISED BY: Manager Central Laboratory Services.....

APPROVED BY: Senior Manager - Water Quality Management





*** The NWSC certificate of analysis by no means continues to permit to any person or company undertaking to conduct business, if this report reflects results of the sample as received at the laboratory premises.

Annex 4: NEMA Approved Terms of Reference for the ESIA



NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA/4.5

19th May 2021

The Managing Director,
National Water and Sewerage Corporation,
Plot 3 Nakasero,
P.O. Box 7053,
KAMPALA.

Tel: +256 313 315 000/100

RE: REVIEW OF SCOPING REPORT AND TERMS OF REFERENCE FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED WATER SUPPLY AND SANITATION SYSTEM IN ADJUMANI AND PAKELE TOWN COUNCILS, ADJUMANI DISTRICT

Reference is made to the Scoping Report and Terms of Reference for carrying out Environmental and Social Impact Assessment for the above-mentioned Water Supply and Sanitation System that was submitted to this Authority on 22nd February 2021, for review and approval. This Authority has finalized the review and grants formal **APPROVAL** of the said TOR.

However, National Water and Sewerage Corporation will be required to submit two (2) separate ESIA reports for the two components **the Water Supply System and the Sanitation System**, respectively.

Please note that the approval of the TOR DOES NOT GRANT permission to start implementing any of the proposed project activities. This is not a Certificate of Approval.

In addition, you are advised to incorporate the considerations below during the conduct of the environmental impact study and the preparation of the ESIA report.

- (i) Provide a comprehensive description of the proposed Water Supply and Sanitation projects, the specific components and associated infrastructure, and the activities that will be undertaken during both the construction and operational phases of the project(s) and the size of the work force.



Page 1 of 3



- (ii) Undertake detailed hydrological investigations of the proposed water source for the water supply project and include in the ESIA report implications of the project on the surface and ground water resources in the project area. In particular, the methods for disposal of treated faecal sludge and measures that will be taken to ensure public health standards are maintained.
- (iii) Provide a detailed description of the waste streams that will be generated from the activities of the Water Supply and Sanitation projects, and the measures and equipment that will be put in place to handle such waste.
- (iv) Provide clear environment and social assessment of the proposed Faecal Sludge Treatment Facility including the detailed description of the processes that will be undertaken at the facility.
- (v) Include in the report other relevant baseline information that is project site-specific, on the soils, water, air quality and noise; as well as, clear-colored photographs depicting the current status of the project area(s) and the neighboring environs.
- (vi) Provide clear, colored and well-labelled location maps/images (preferably *each covering A-3 size paper*) of the project sites, and accurate sets of GPS coordinates clearly indicating the site boundaries. Ensure that all GPS coordinates are provided in UTM format.
- (vii) Provide a clear and legible copy of the site layout plan(s) (*preferably on A-3 sized paper*).
- (viii) Carry out consultations with all the relevant key stakeholders including Adjumani District Local Government authorities, the Occupational Safety and Health Department (OSHD), the Directorate of Water Resources Management (DWRM) and the local communities in the neighborhood. The views of the stakeholders consulted should be well documented and appended to the ESIA report.
- (ix) Include in the ESIA report, comprehensive analysis of alternatives/options to the selected project location, design and technology, among other aspects.
- (x) Carry out a comprehensive evaluation of the negative environmental impacts associated with the proposed project activities and the relevant mitigation measures to minimize the identified negative impacts and environmental management/monitoring plans that relate to the identified environmental impacts of the proposed project.
- (xi) Make reference to all the relevant provisions of applicable policies, laws, regulations, guidelines and standards, in particular, the National Environment Act, No.5 of 2019 and attendant regulations.


19/5/21

- (xii) Append to the ESIA report authentic copies of land ownership and acquisition documents.
- (xiii) Indicate the actual project (investment) cost including costs for works, machinery, equipment, land as applicable.
- (xiv) Note that only registered EIA Practitioners including the team leader should be contracted to carry out the ESIA for the proposed project.

This is, therefore, to recommend that you proceed with carrying out the ESIA for the proposed Water Supply and Sanitation System. We look forward to your cooperation receipt of comprehensive copies of the ESIA report, for our further action.

 19/5/2024
Patience Nsereko
FOR: EXECUTIVE DIRECTOR

Annex 5: Cultural and Heritage Report and Archaeological Resource Chance Finds Procedure for the Proposed Adjumani Water Supply Project

Introduction

This project will involve excavations. There is a likelihood of discovering chance finds during excavation, which may be of archaeological and/or paleontological importance. This will trigger the World Bank Safeguard Policy on Physical Cultural Resources, OP 4.11, and the Uganda Historical Monument Act, 1967. The implementation of Chance Finds Procedure (CFP) should be a responsibility of the contractor. This Chance Finds Procedure (CFP) is proposed for the Adjumani WSSP, implementation of which will be a responsibility of the contractor.

Purpose of the CFP

The purpose of CFP through its Contractor, NWSC pursues to ensure that impacts on cultural heritage resources are minimized as far as possible. Thus, the overall objective of this CFP is to describe an approach and procedures to be undertaken by the contractor with regard to protection of chance finds encountered during project implementation.

This CFP will serve the following purposes:

- a) Translate commitments in the ESIA into implementation procedures that will protect physical cultural resources (PCRs) during construction of the project;
- b) Serves as a key tool the contractor can utilize to manage and monitor preservation of resources of cultural heritage significance; and
- c) Provide transparency to stakeholders that commitments made in the ESIA in regard to preservation of finds of heritage value are actually being fulfilled.

Therefore, this CFP provides:

- a) Responsibilities for implementation of the procedure;
- b) Impact management measures to be implemented;
- c) Verification, and
- d) Records and reporting requirements.

Recommended Chance Finds Committee and Responsibilities

Committee or Personnel

A working committee on chance finds should be formed before the commencement of construction. It should be composed of the following:

- a) **Socio-Environmental Officer (SEO) and Site Engineer (SE):** The contractor will have an SEO on the site during project construction. The contractor's SEO will closely work with the SE and developer's socio-environmental staff to ensure compliance with national and financier's requirements as well as implementation of this CFP.
- b) **Archaeologist:** During ground opening and excavations, the developer (NWSC) will facilitate an Archaeologist from the Department of Museums and Monuments in MTTI to be on site and ensure that any chance finds encountered are managed according to requirements of The Historical Monuments Act, 1967.
- c) **All Contractors' construction staff involved in earthworks**

Specific Roles and Responsibilities

Role of the contractor's Socio-Environmental Officer and Site Engineer (SE)

- a) Communicate contents and requirements of this plan to contractor;
- b) Sensitise workers to ensure that all are aware of their responsibilities in regard to protection chance finds;
- c) Inform the Archaeologist of any chance finds encountered on site;
- d) Coordinate inspection and monitoring by the MTTI Archaeologist. The SEO and SE should keep in close contact with the archaeologist throughout the construction period;
- e) Implement measures recommended by the archaeologist for management of "chance finds" encountered;
- f) Conduct cultural heritage tool box talks to construction personnel as advised by the Archaeologist; and
- g) Maintain records (daily logs) related to archaeological finds during construction.

Archaeologist from Department of Museums and Monuments (MTTI)

An archaeologist contracted (on a non-permanent basis) from the department responsible for museums and monuments in MTTI will have the following roles:

- a) Archaeological monitoring of all earthworks;
- b) Advice/ guidance to the contractor with respect to halting construction activities if earthworks encounter chance finds;
- c) Conducting preliminary assessment of all previously unidentified archaeological features encountered and submission of these to the National Museum;
- d) Provision of advice on the significance and management of unidentified archaeological features encountered;
- e) Processing/ excavation of any unidentified subsurface archaeological features encountered in accordance with standard procedures recommended by the Department of Museums and Monuments;
- f) Maintain watching briefs during opening up site or deep excavations at any location during construction, with clear procedures for protection and documentation of any "chance finds" encountered;
- g) Maintain monitoring records of all unidentified archaeological features encountered;
- h) Develop a set of points to be discussed in "Tool Box" sessions to create awareness among construction crews on "chance finds"/ archaeological features. Note that as part of their sensitization, workers will be required to cease work if they encounter archaeological features and report to Contractor's SEO or SE, who will notify the Archaeologist; and
- i) Write a report for the developer upon completion of construction. This report will be submitted to the Supervising consultant, Contractor, Developer and Department of Museums and Monuments. The report will summarise findings of archaeological monitoring, describing any features encountered and their preservation significance.

The archaeologist will also undertake "Watching briefs" as the primary element of management and protection of cultural heritage during project construction. Watching briefs will consist of

passive visual investigation during ground breaking at excavation sites. The roles of the watch briefs include:

- i) Record subsurface archaeological features discovered during earth-moving activities;*
- ii) Provide advice to the contractor on significance of subsurface archaeological features discovered; and*
- iii) Provide advice to the contractor on areas where ground disturbing activities may continue or where necessary need to be “worked around” or stopped.*

The following will be implemented during the “watching brief”:

- i) Prior to commencing any construction activities, the contractor will give a brief to the archaeologist about site(s) they plan to excavate;*
- ii) The archaeologist will conduct a walkover to identify site’s archaeological sensitivity through characteristics such as soil type, topography, etc.; and*
- iii) The archaeologist will witness/ observe site clearance, soil stripping and excavations for presence of subsurface archaeological features.*

Scope of CFP

This CFP sets out requirements for management of cultural heritage resources during project Implementation. The focus of the procedure is primarily mitigation during earthworks at the project site. It is expected that earthworks will be undertaken at following sites, at which chance finds may be encountered.

- a) Intake/Raw Water Pumping Station;
- b) Water Treatment Plant;
- c) Transmission and Distribution Water Pipelines;
- d) Material Sourcing Areas e.g., Borrow sites (if any).

Therefore, cultural heritage resources considered in this CFP include the following;

- a) Archaeological deposits and remains;
- b) Historical monuments, sites and buildings;
- c) Places of worship;
- d) Cemeteries and graveyards; and,
- e) Places associated with folklore, mythology (and traditions) and the location of historical and cultural festivals, events and rituals.

Targets and Obligations

According to the Uganda’s Historical Monuments Act (1967), this CFP is to be executed by the Contractor on behalf of NWSC in compliance with the above act. In this Act, sub-section 12(1) requires that any portable object discovered in the course of an excavation is surrendered to the Minister who shall deposit it in the Museum. Management of archaeological chance finds is a responsibility of the Department of Museums and Monuments in the Ministry of Tourism, Trade

& Industry (MTTI). The contractor/NWSC together with other key stake holders will in case of any chance findings have commitments to fulfil. Therefore, this CFP is developed based on targets and obligations below:

S/N	Target	Obligation
1	Unidentified archaeological features	The Contractor/NWSC will implement this CFP to fulfill requirements of the Uganda's Historical Monuments Act, 1967.
2	Early earthworks involving excavations as explained in section of "Scope of CFP"	A specialist archaeologist from the Department of Museums and Monuments in the MTTI will be on site on call to come to site to investigate, inspect and retrieve any chance finds encountered. Retrieved chance finds will be submitted to the National Museum.

Other Reference Documents

For the success of Adjumani WSSP, the targets of the CFP should be implemented concurrence with the;

- Contractor's Environment & Social management Plan (C-ESMP);
- ESIA report for this Adjumani WSSP (specifically the ESMP); and
- Resettlement Action Plan (RAP) for Adjumani WSSP that covers the framework and procedures to be followed during land acquisition for construction of the project.

Overall Decree When Chance Finds Are Encountered and Procedures

Overall Decree

Upon identification of suspected archaeological remains, the location must not be disturbed until it is inspected by the archaeologist from MTTI.

General Procedures

In the event that genuine archaeological remains are encountered, the procedures to be adopted are described in the sections below.

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:

- The person or group (identifier) who identified or exposed the burial ground must cease all activity in the immediate vicinity of the site;
- The identifier must immediately inform his/her supervisor of the discovery;

- c) 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:

- a) 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.
- b) 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.
- c) 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.

Rescue Excavation

This 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 shall be reasonable rapid to avoid any undue delays, e.g., 1 to 3 days and definitely less than 1 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:

- a) On-site selection and sieving in the case of robust material in sand; and
- b) 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.

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.

In consultation with NWSC and the environmental consultant, the following alternative shall be considered when deciding on how to proceed in the event of a Major Find.

Alternative 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 shall 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.

Alternative 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.

Specific Chance Find Procedures

During excavations, chance finds may be encountered. Therefore, the Contractor/NWSC should have a chance finds management plan that defines the measures necessary for the overall management of any cultural heritage encountered during construction. In order to avoid potential damage to cultural property discovered during construction, the following will apply:

Human Remains (Burial Ground and Grave-BGG)

If encountered during earthworks, human remains must be handled with dignity and respect. If identified before disturbing the ground, such a location should be staked or flagged off to prevent additional disturbance. However, for uncemented graveyards, it may not always be possible to identify, distinguish and protect a burial ground from construction activities and therefore the following procedures subsequent to those outlined under “Initial Identification and or Exposure” above if suspected human remains are found:

- a) Work will immediately cease in affected location and contact the Contractor’s SEO who will notify the MTTI Archaeologist, Project Manager (NWSC) the Uganda Police on behalf of NWSC;
- b) If the affected location is likely to be disturbed by other workers on site, an employee will be assigned to stand watch until the archaeologist arrives;
- c) Any exposed bones will be covered with plastic sheeting but not backfilled, until the archaeologist arrives to inspect the chance finds;
- d) If excavated fill has been loaded into a truck, it will be emptied at a suitable location for inspection by the archaeologist; and
- e) The contractor will resume work once the archaeologist’s inspection is completed and an instruction to recommence works issued.

Artefact Scatters

The following procedures will be adopted when unanticipated artifact scatters are encountered:

- a) The contractor will immediately stop work at the location where finds are encountered and contact the SEO who will notify MTTI Archaeologist;
- b) The affected location will be staked or flagged off to prevent further disturbances;

- c) If excavated fill has been loaded into a truck, it will be emptied at a nearby secure location for inspection by the archaeological consultant; and
- d) The contractor will resume work only after the archaeologist has completed a site inspection and given the go-ahead for works to resume.

Isolated Artefact Finds

Due to their shape and colour, which often contrasts with the surrounding soil, artifacts are easy to identify by non-archaeologists during earthworks or other activities on site. Should an isolated artifact be observed, the following procedures will be adopted:

- a) If the artifact is in imminent danger of being destroyed or damaged, it will be collected and its location marked with a flag;
- b) Whenever possible, the artifact will be left on the ground where it was found;
- c) The SEO will be notified that the location requires an archaeological inspection;
- d) The SEO will notify the archaeologist of the chance find;
- e) The SEO will ensure that other workers near the location are aware of the need to avoid disturbing the area until inspected by the archaeologist; and
- f) The archaeological consultant will inspect the affected location, after which the SEO will be advised that construction works can proceed.

Historical Remains

All types of historic archaeological materials are subsumed within this category, including isolated historical artifacts. When historic remains or suspected historic archaeological remains are encountered the following procedures will be adopted:

- a) SEO will order cessation of work will and notify the archaeologist;
- b) The affected location will be staked or flagged off to prevent further disturbances;
- c) The archaeologist will determine if the materials encountered are of real historic significance; and
- d) The contractor will resume work only after the archaeologist issues instruction for the works to resume.

Isolated Historic or Suspected Historic Artifacts

If isolated historic or suspected historic archaeological artifacts are observed, the following procedures will be followed:

- a) If the artifact is in imminent danger of being damaged, it will be collected by the SOE and put in a bag (e.g., a Ziploc bag), along with any fragments thereof;
- b) If detached fragments are found, a label must be included with the date of the find and its position;
- c) Its depth and location must be marked with a stake or flag;
- d) Otherwise, whenever possible, the artifact may be left on the ground at the location where it was found; and

- e) The SEO will notify the archaeologist, who will determine if an inspection is required. If no follow-up inspection is necessary, the archaeologist will advise the SEO that construction can continue.

Fossil Shell Beds, Wood and Peats

The following responses shall be undertaken by personnel in the event of intersection with fossil shell beds:

- a) The Site Engineer and SEO in charge must be informed;
- b) The responsible field person 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.
- c) A generous quantity of the excavated material containing the fossils shall be stockpiled near the site, for later examination and sampling;
- d) The SEO informs NWSC who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The SEO is to describe the occurrence and provide images via email.

Training and Monitoring

Training

Before commencement of construction, general awareness training will be provided by an archaeologist from MTTI to all construction crews and their project Support Team (staff involved in earthworks) and the contractor's SEO.

The training will incorporate information on cultural heritage, its significance, protection status of previously unidentified subsurface archaeological features in the area and construction activities that may destroy them. This will entail basic skills of recognising suspected chance finds, how to protect the site and the procedure of notifying the SEO and Archaeologist.

This awareness will be maintained through tool-box talks that should be regularly conducted with all construction crews.

Monitoring

Monitoring will be done by the contractor's SEO together with SE with the principal objective being to provide assurance that:

- a) Project construction is compliant with this procedure; and
- b) Evidence is collected to demonstrate that commitments related to cultural heritage protection are being effectively met.

Key performance indicators (KPIs) below will be utilised in the monitoring

Key Performance Indicators

The contractor's SEO and SE will undertake monitoring of chance finds management based on KPIs in table below.

Monitoring criteria of the chance finds management

S/N	Measure (KPI)	Rationale		
1	Conduct cultural heritage awareness training	Ensures workers are aware of cultural heritage in the area and the possibility of sub-surface resources to be encountered.	90%	Quarterly (Every 4 months)
2	Number of "chance finds" damaged by construction activities	Monitors effectiveness managing chance finds	0	Monthly

Action Tracking

All non-compliance with this procedure shall be followed up and corrective action taken. The contractor's SEO and SE are expected to maintain actions tracking system as part of archaeological monitoring. Cultural heritage management action tracking including close out of actions (solutions and preventive actions taken) will be reported quarterly by the contractor to the project developer.

Reporting and Record Keeping

Records in sections below will be kept and maintained by indicated personnel.

Archaeologist (MTTI)

The Archaeologist will report the following to the Contractor's SEO and SE:

- Daily log of activities on a weekly basis;
- Results of any assessments of "chance finds" as soon as the assessment is completed; and
- A detailed report of field activities, findings and conclusions following a period of major earthworks.

Contractor's SEO

The Contractor's SEO will report the following to Frontier's Socio-Environment Manager.

- Awareness records on cultural heritage resource among workers on a weekly basis;
- Bi-weekly report summarizing cultural heritage management activities;
- Action tracking system on a weekly basis; and
- Performance against key indicators (KPI).

Major Institutions to Contact

During the implementation of the water supply project and in the event that, a PCR is encountered, the following can be contacted dealing with chance finds:

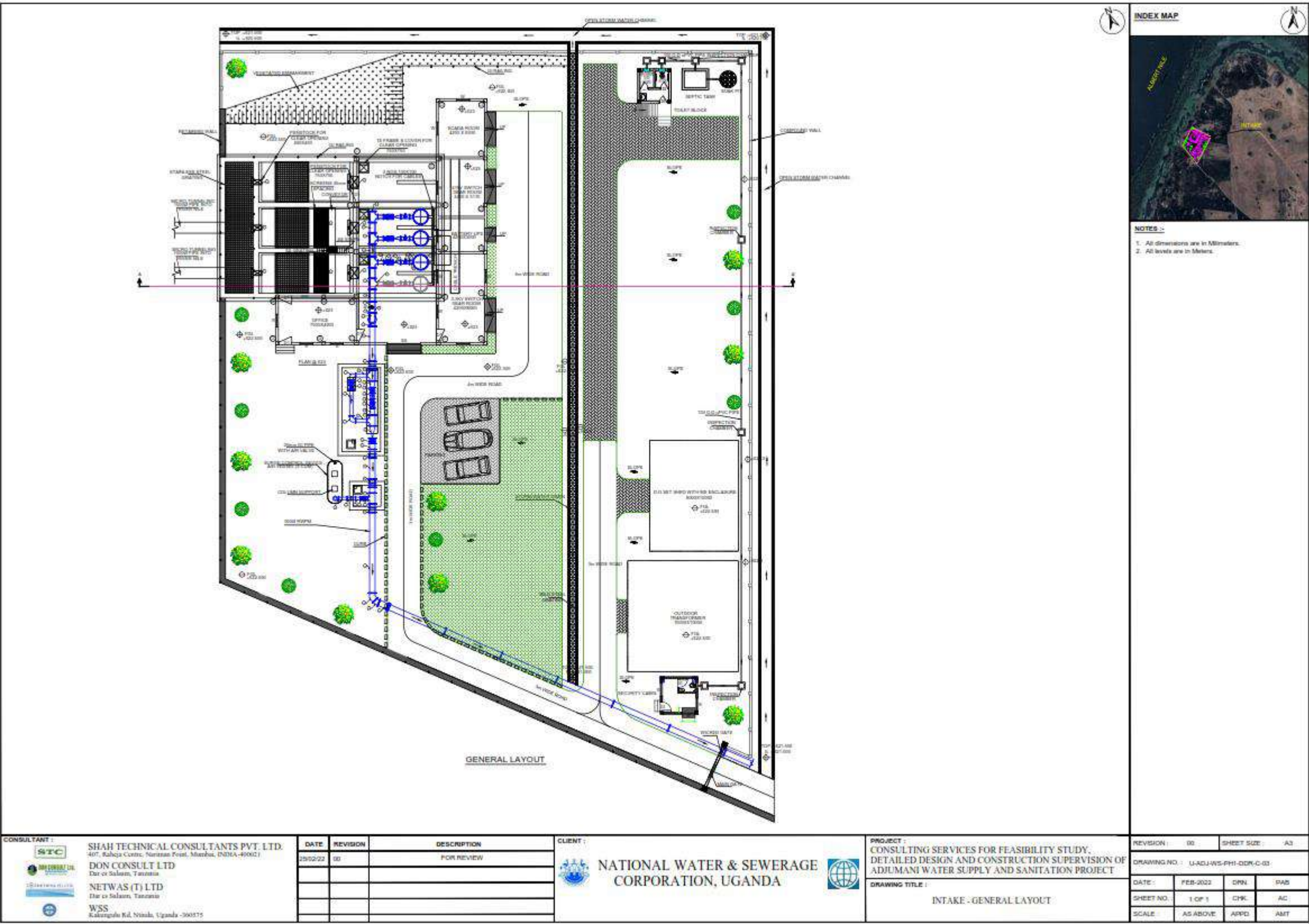
- a) National Water and Sewerage Corporation
Plot No. 43/49, 6th Street Industrial Area
P.O Box 7053, Kampala, Uganda.
Tel: 256 - 313 – 315800

- b) Ministry of Tourism, Wildlife and Antiquities
Rwenzori Towers 2nd Floor,
Plot 6 Nakasero Road.
Kampala, Uganda.
P. O. Box 4241 Kampala
Phone: +256 414 561 700
Email: info@tourism.go.ug

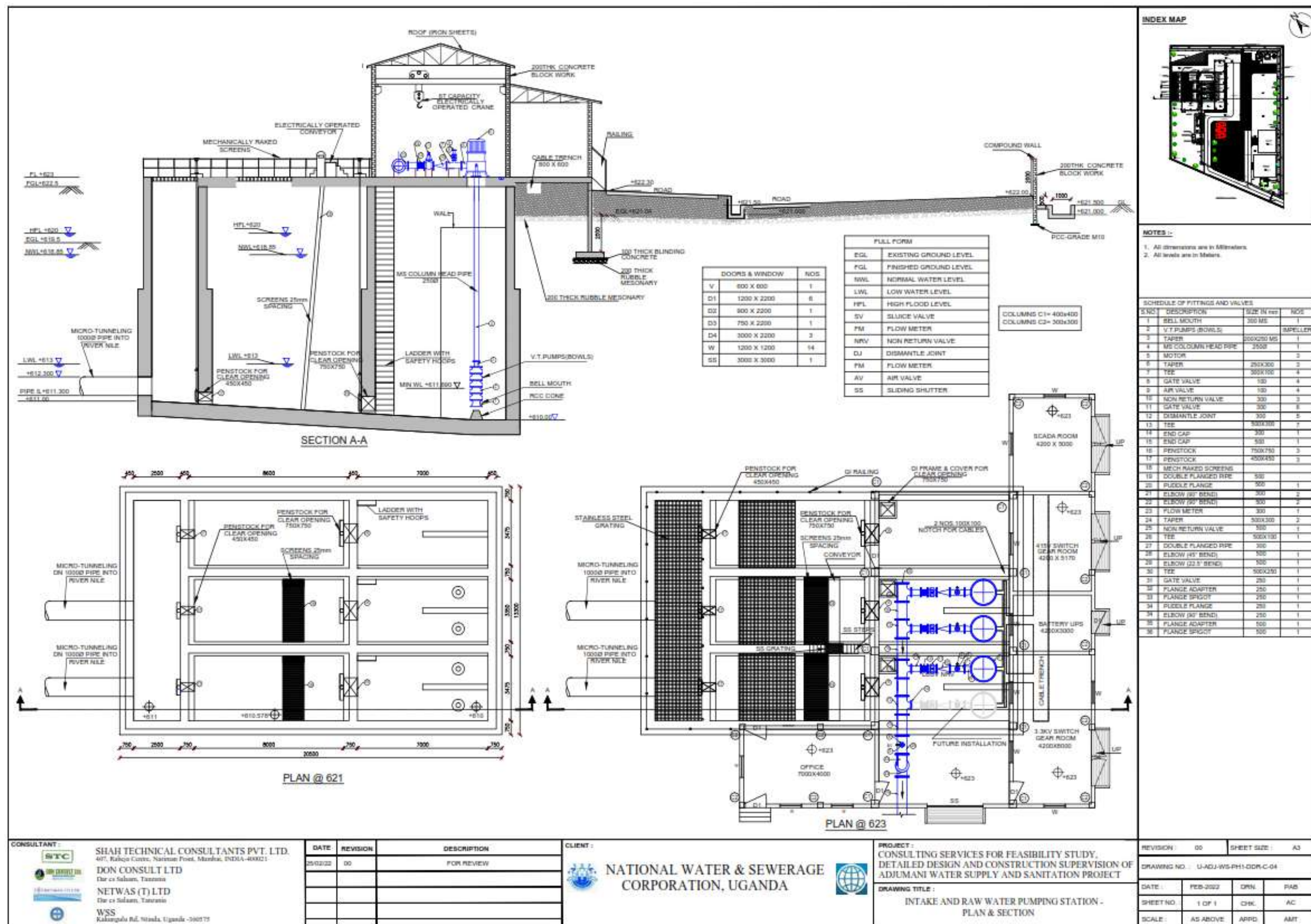
- c) Commissioner Uganda Museum
Department of Museums and Monuments, Uganda Museum
Plot 5-7 Kira Road, Kamwokya
P. O Box 365, KAMPALA-UGANDA
+256) 414 232707
Website: www.mtti.go.ug

Annex 6: Project Layout Drawings

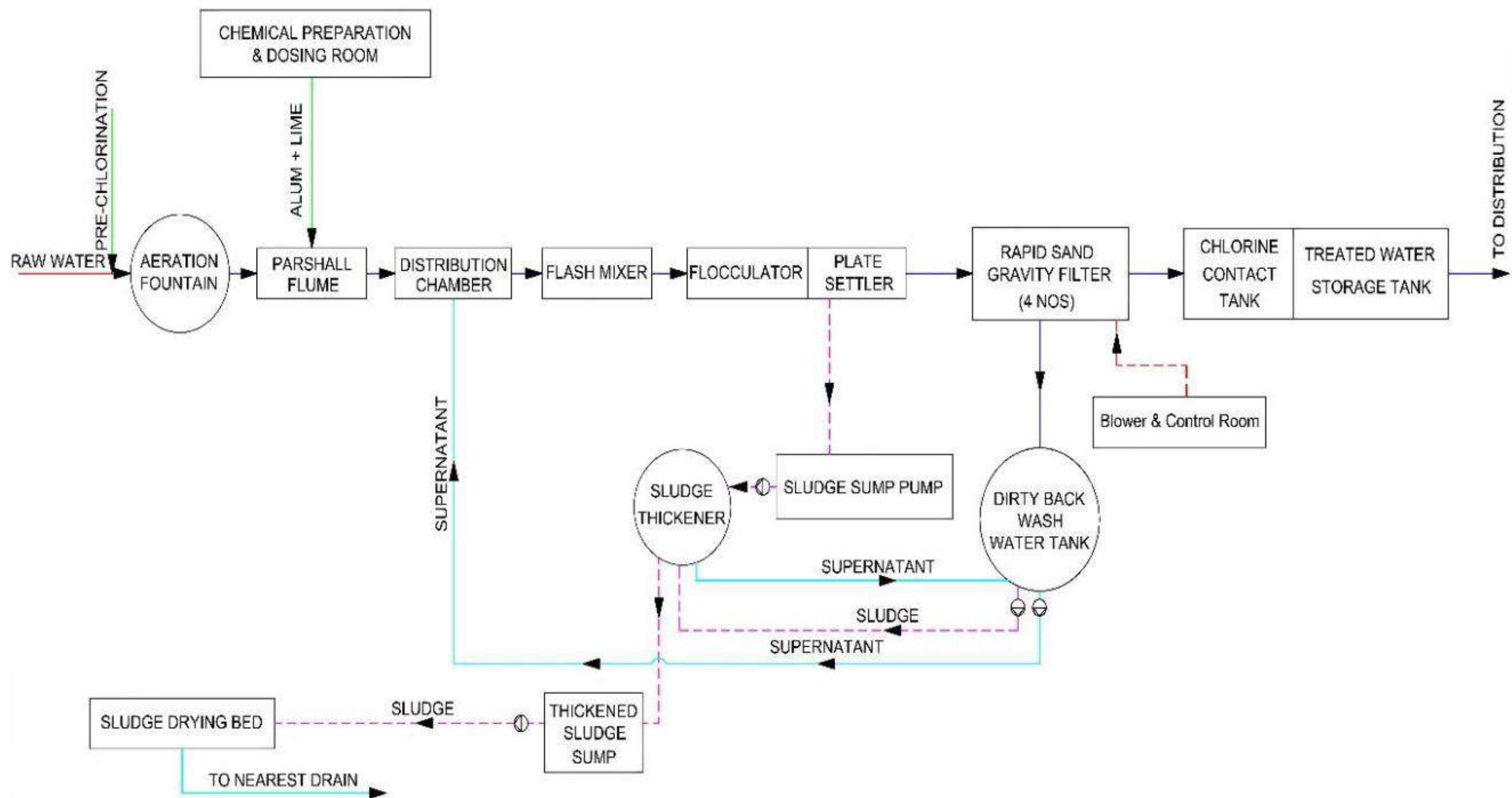
a) Lay out of the Proposed Intake



b) Plan and Section of the Water Intake and Pumping Station



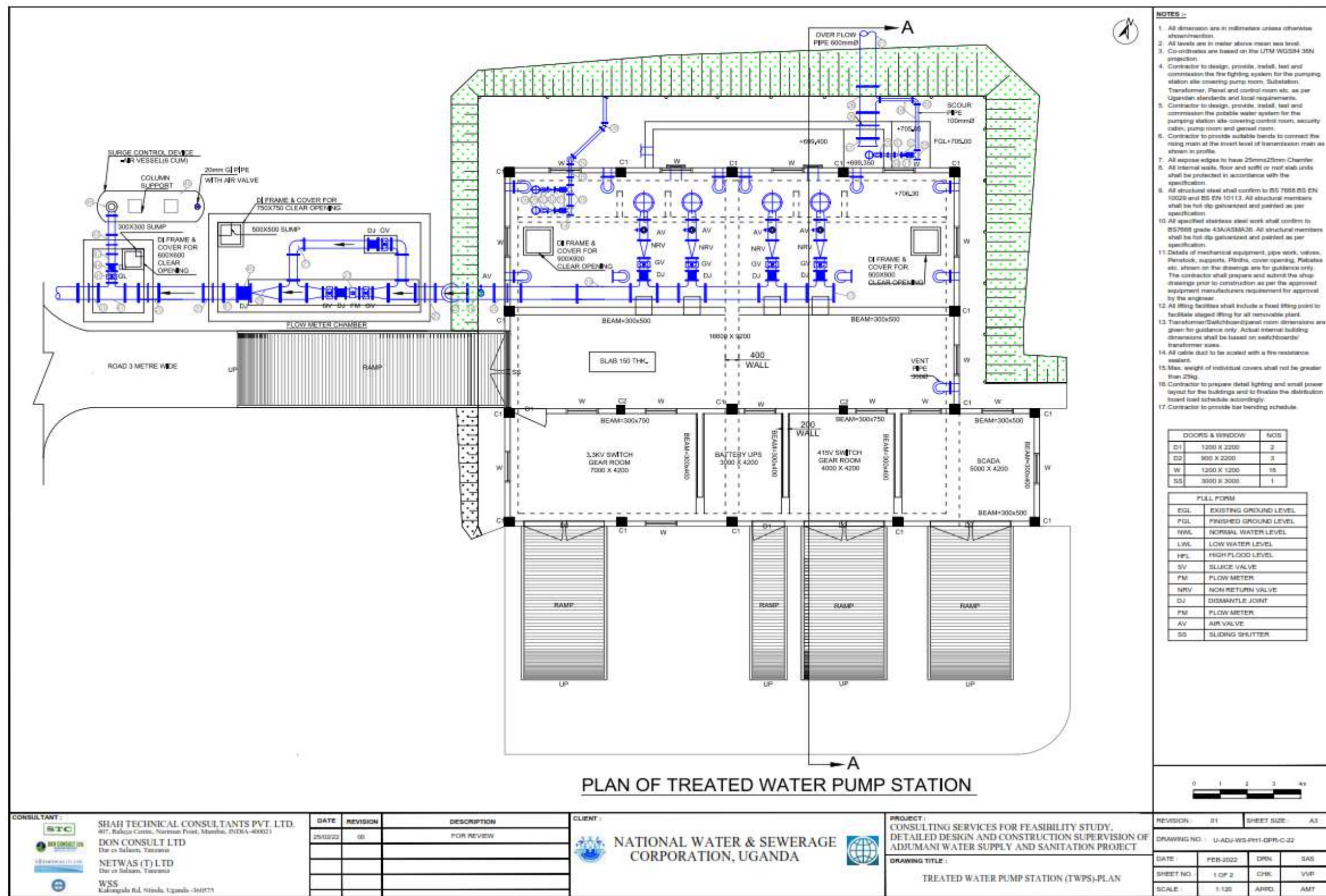
c) Schematic Layout of the Proposed WTP



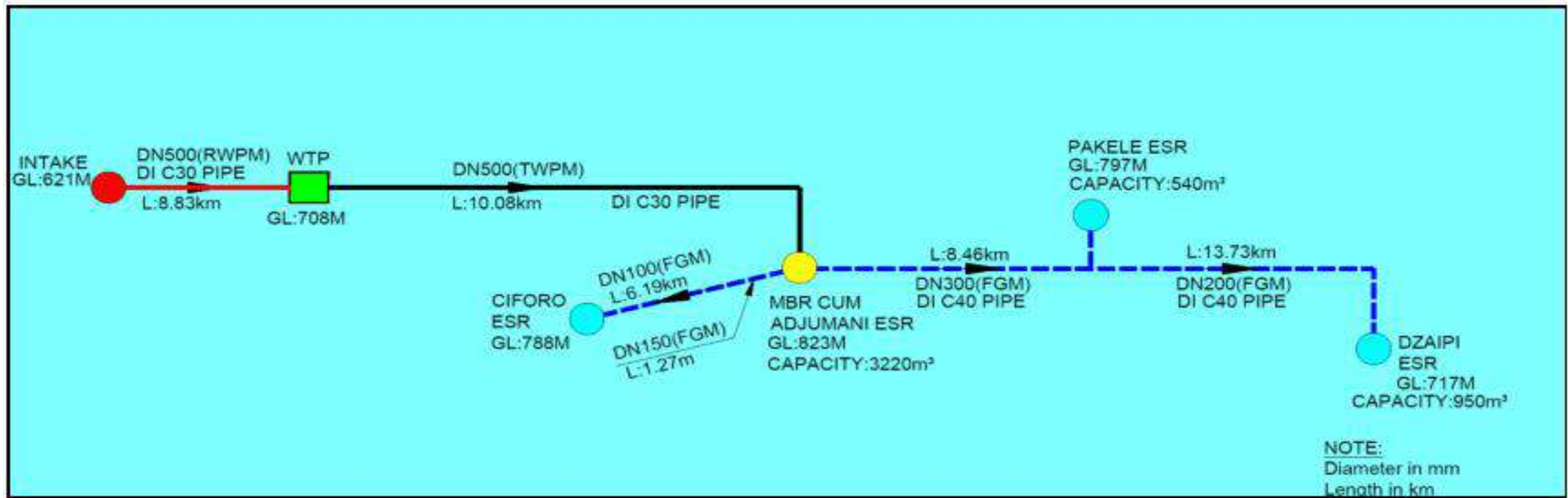
NOTE:-

1. A Unisexed = Male's, unless Otherwise noted.
2. A Textors and Lenase = Male's.

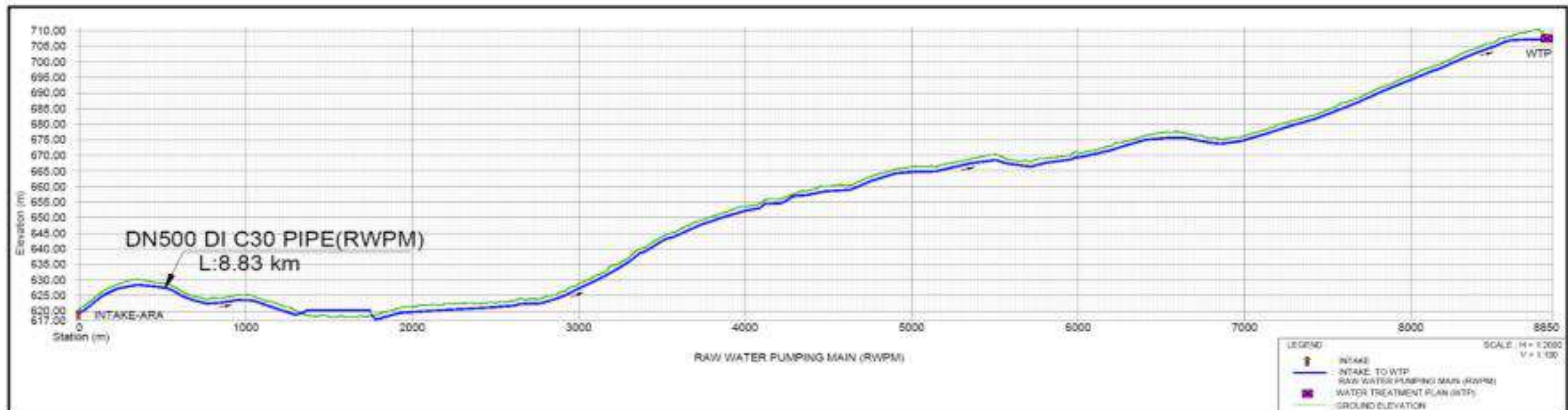
e) Treated Water Pumping Station



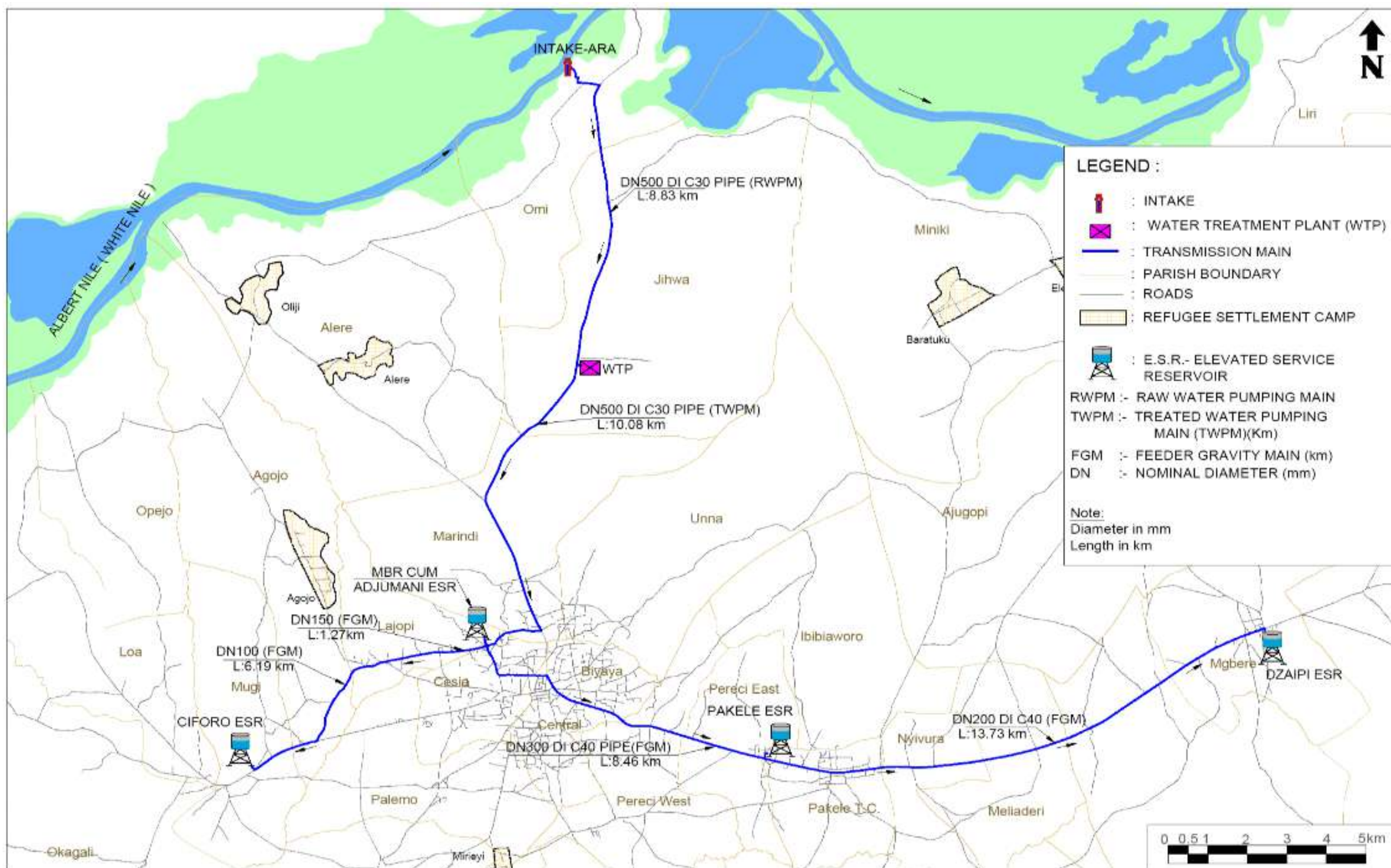
f) Schematic of Transmission Mains (Intake to ESRs)



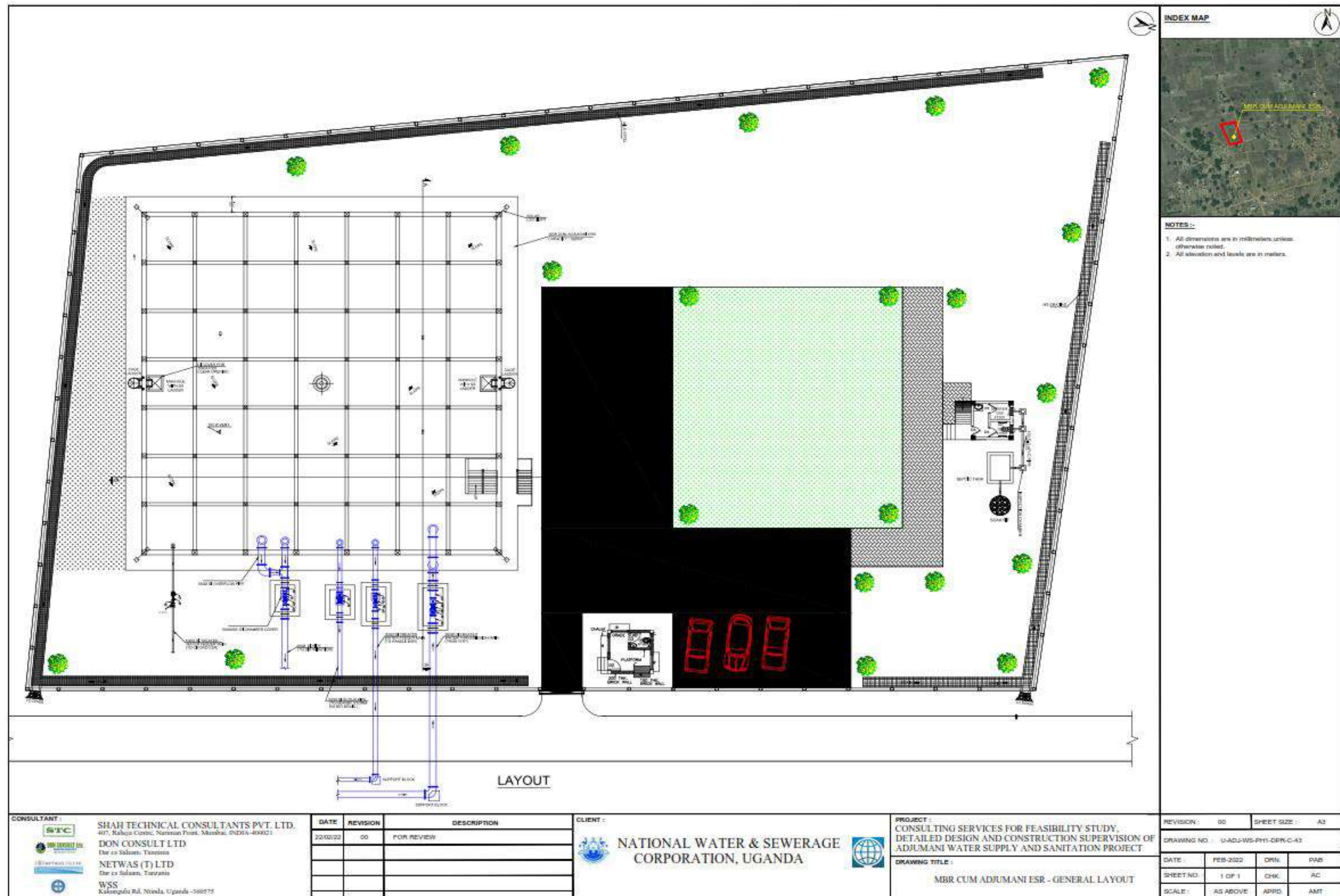
g) Raw Water Pumping Main - Profile



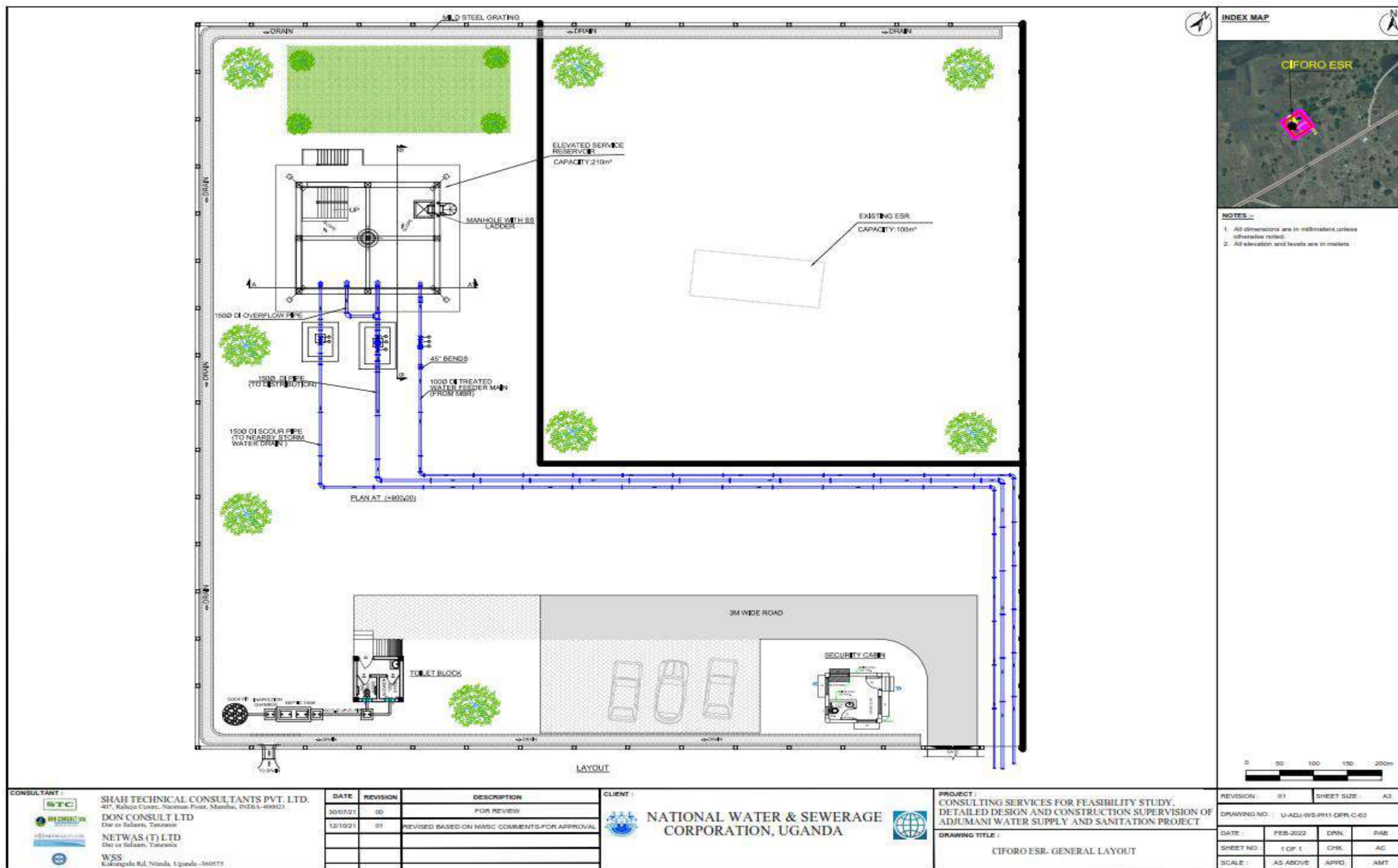
h) Plan Showing Transmission Mains (Intake to ESRs)



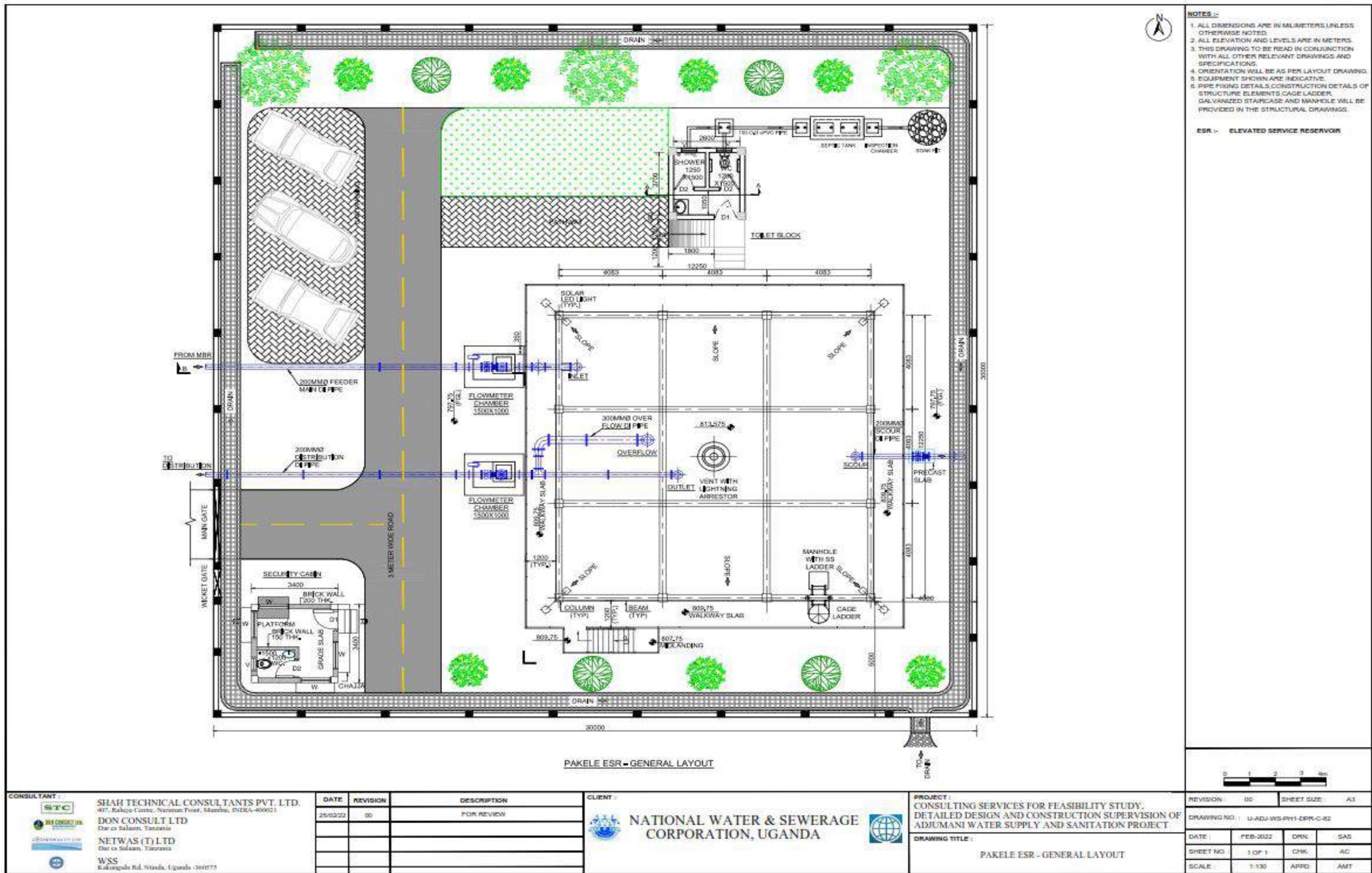
i) Layout of the MBR Cum - Adjumani



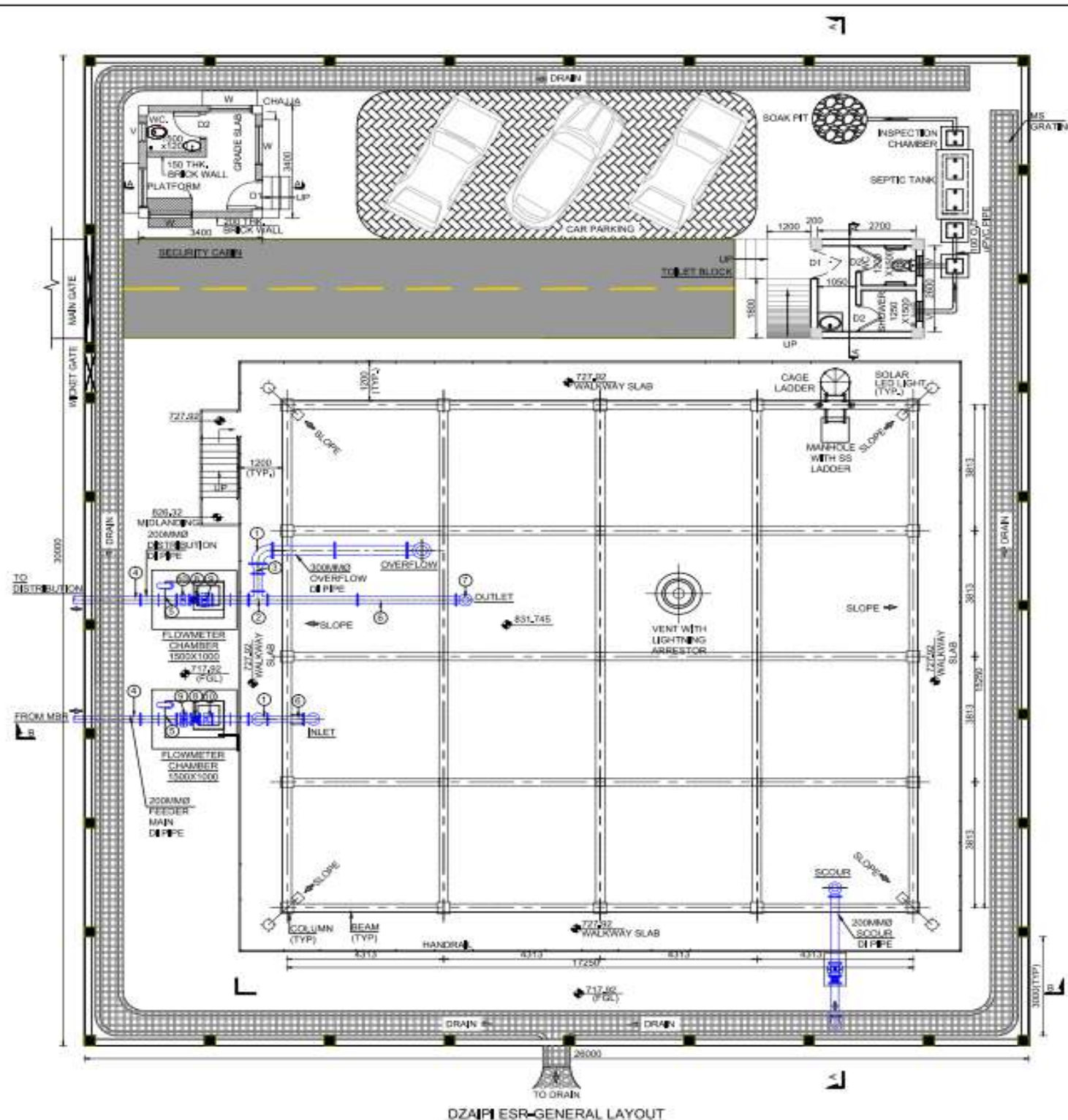
j) Layout of Ciforo ESR



k) Layout of Pakele ESR



I) Layout of Dzaipi ESR



- NOTES:-**
1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
 2. ALL ELEVATION AND LEVELS ARE IN METERS.
 3. HIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
 4. ORIENTATION WILL BE AS PER LAYOUT DRAWING.
 5. EQUIPMENT SHOWN ARE INDICATIVE.
 6. PIPE FIXING DETAILS, CONSTRUCTION DETAILS OF STRUCTURE ELEMENTS, CAGE LADDER, GALVANIZED STAIRCASE AND MANHOLE WILL BE PROVIDED IN THE STRUCTURAL DRAWINGS.

ESR :- Elevated service reservoir



CONSULTANT:
SHAH TECHNICAL CONSULTANTS PVT. LTD.
 407, Rakija Centre, Nansana Point, Murchison, DNDRA-400021
DON CONSULT LTD
 Dar es Salaam, Tanzania
NETWAS (T) LTD
 Dar es Salaam, Tanzania
WSS
 Kakungulu Rd. Ntinda, Uganda - 360575

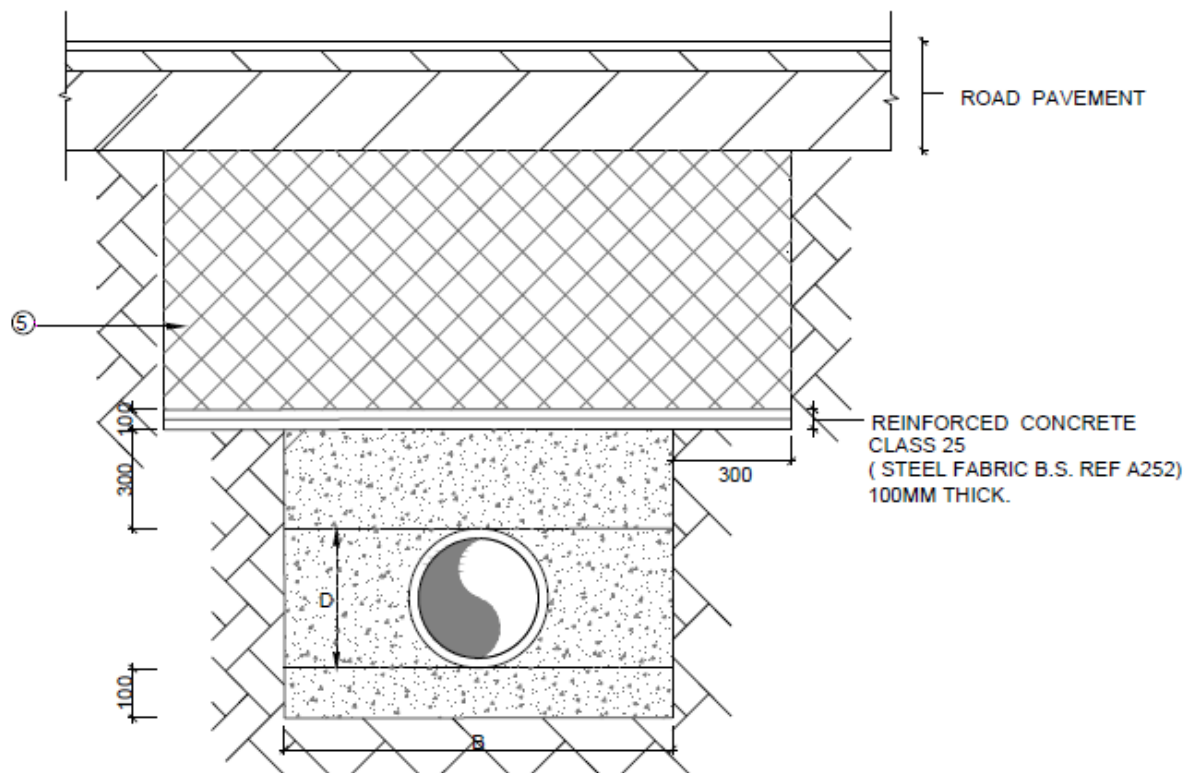
DATE	REVISION	DESCRIPTION
25/02/22	00	FOR REVIEW

CLIENT:
NATIONAL WATER & SEWERAGE CORPORATION, UGANDA

PROJECT:
 CONSULTING SERVICES FOR FEASIBILITY STUDY, DETAILED DESIGN AND CONSTRUCTION SUPERVISION OF ADJUMANI WATER SUPPLY AND SANITATION PROJECT
DRAWING TITLE:
 DZAIFI ESR-GENERAL LAYOUT

REVISION:	00	SHEET SIZE:	A3
DRAWING NO.:	U-ADJ-WSS-PH1-DPR-C-110		
DATE:	FEB-2022	DRN:	SAS
SHEET NO.:	1 OF 1	CHK:	AC
SCALE:	1:100	APPR:	AMT

m) Pipe protection at road crossing

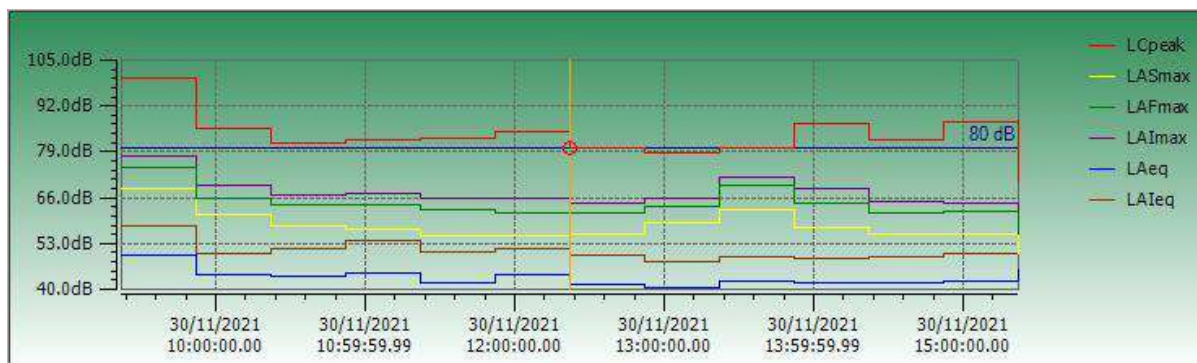


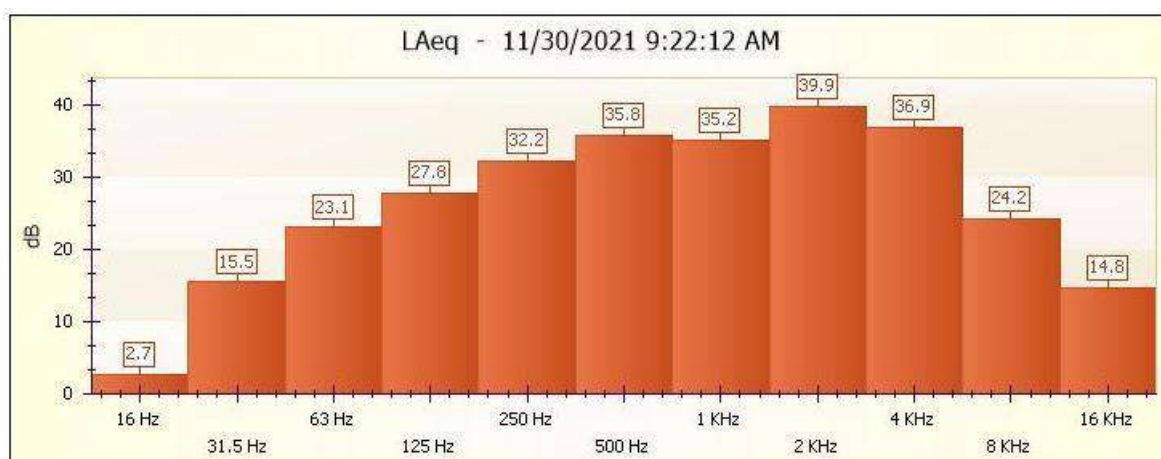
Annex 7: Detailed Noise Level Results

Surface Water Infrastructure

Etejo P/S (Intake – Arra West)

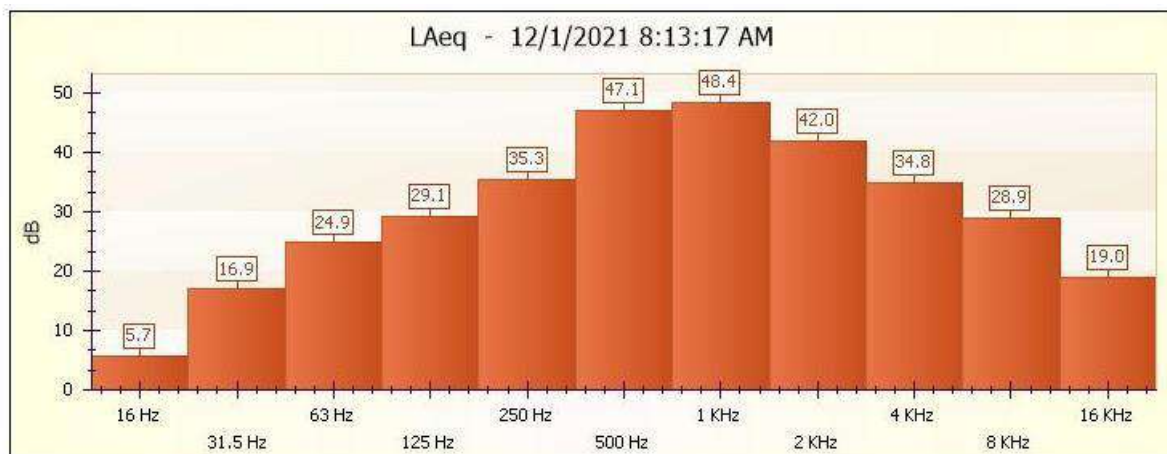
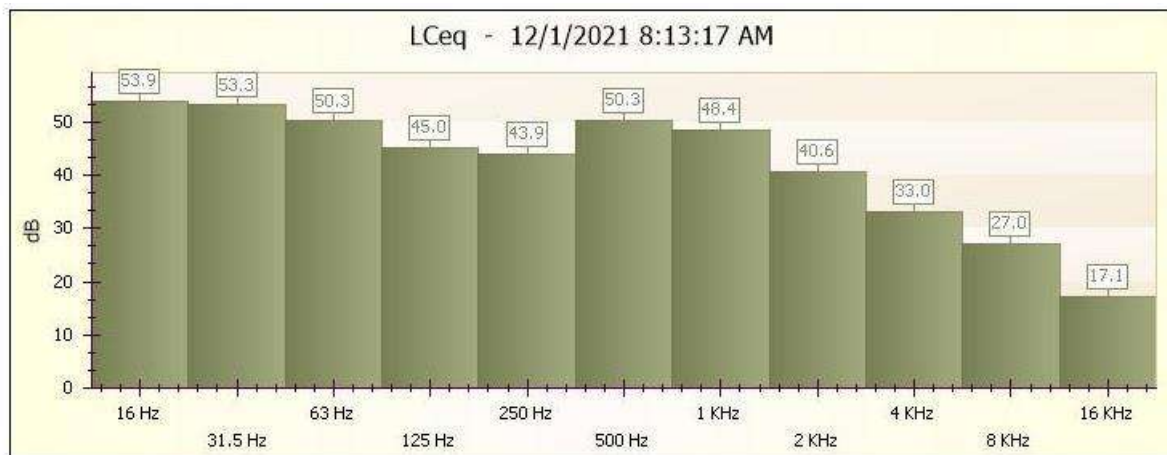
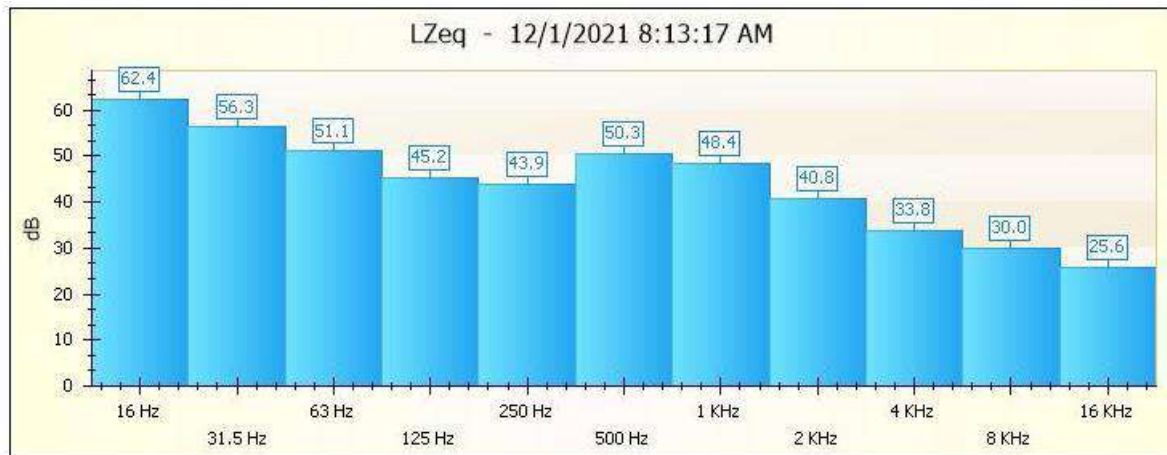
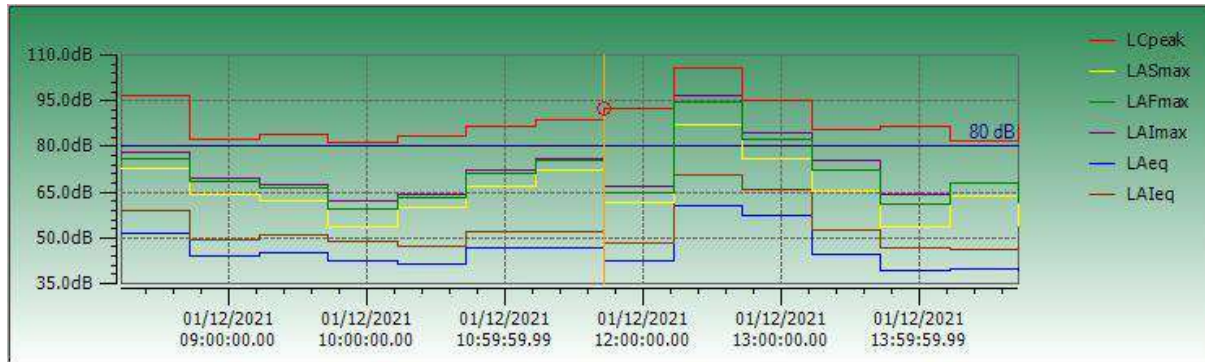
Instrument Model	CEL-633B		
Serial Number	2670936	LCpeak	100.1 dB
LAFmin	26.9 dB	LAF 90%	32.5 dB
LAFmax	74.5 dB	LAF 10%	46.5 dB
Site	Unallocated	LCF 10%	58.5 dB
Run Number	42	LCF 90%	44.5 dB
Start Date & Time	11/30/2021 9:22:12 AM	LAEq	52 dB
Duration	06:00:11 HH:MM:SS	End Date & Time	11/30/2021 3:22:23 PM
LAEq	44 dB	Calibration (Before)	11/30/2021 9:21:51 AM
LCpeak with Time	100.1 dB (11/30/2021 9:44:20)	Calibration (Before) SPL	114 dB
LAFmax with Time	74.5 dB (11/30/2021 9:42:59)	Calibration (After) Date	12/1/2021 8:12:44 AM
LZeq	70.2 dB	Calibration Drift	-0.2 dB
LAFmin with Time	26.9 dB (11/30/2021 1:31:28)	Result	Cumulative
LCeq	56.2 dB		





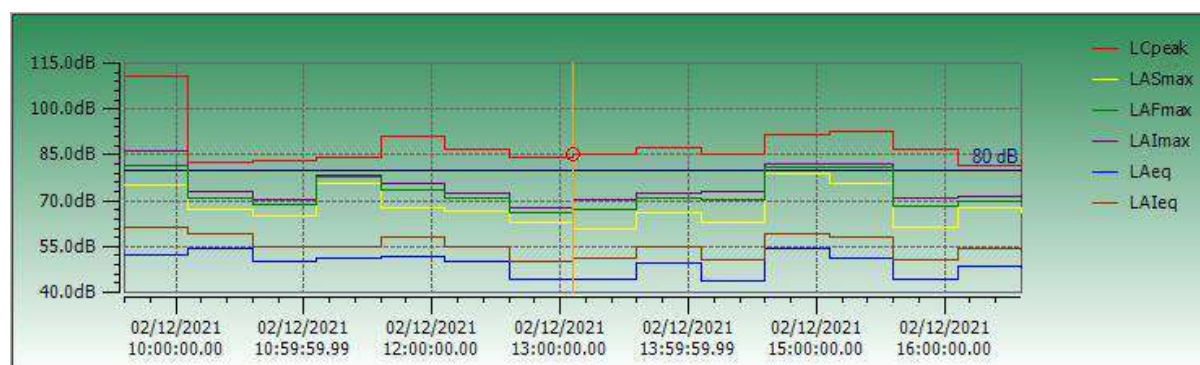
Water Treatment Plant (Mijare)

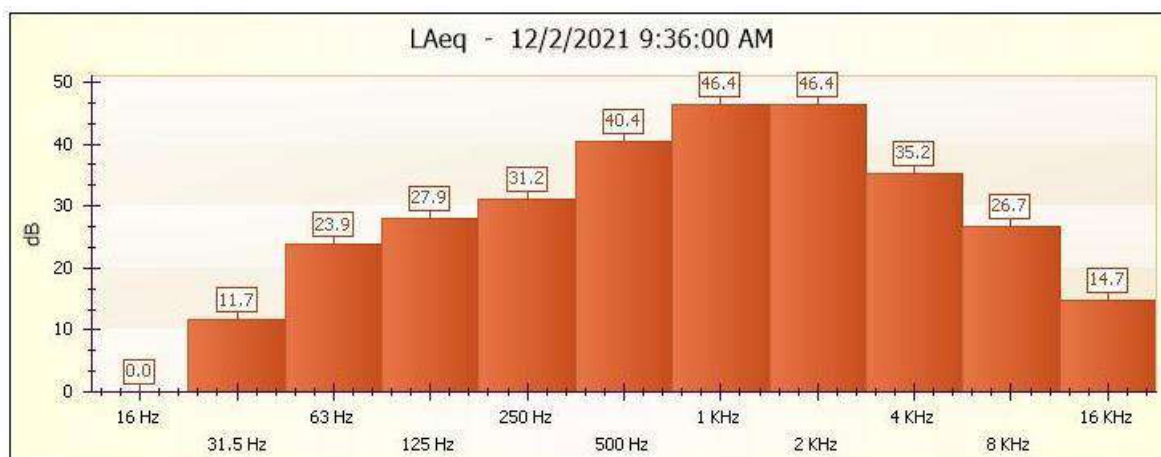
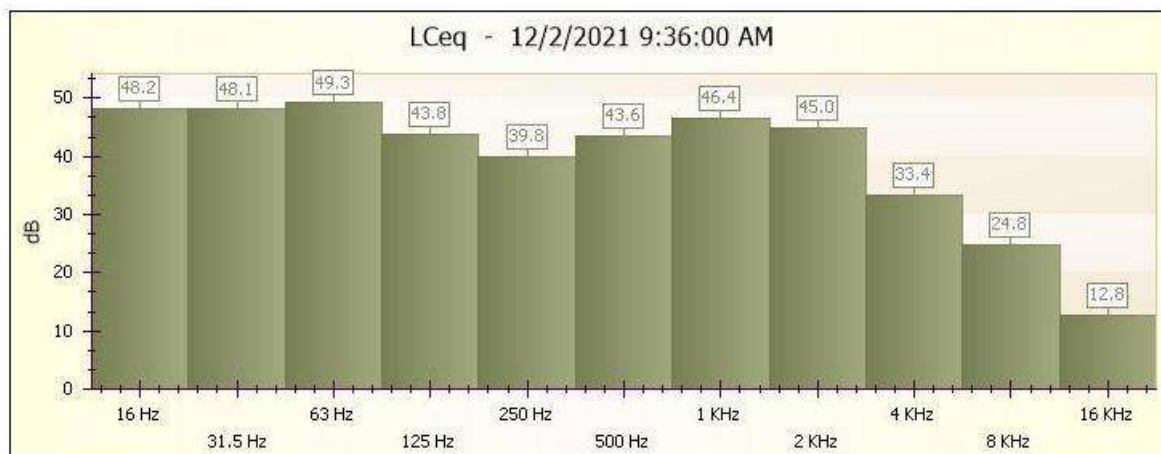
Instrument Model	CEL-633B		
Serial Number	2670936	LCpeak	106 dB
LAFmin	24.5 dB	LAF 90%	33 dB
LAFmax	94.4 dB	LAF 10%	45 dB
Site	Unallocated	LCF 10%	61 dB
Run Number	45	LCF 90%	42.5 dB
Start Date & Time	12/1/2021 8:13:17 AM	LAeq	60.9 dB
Duration	06:57:00 HH:MM:SS	End Date & Time	12/1/2021 3:10:17 PM
LAeq	51.7 dB	Calibration (Before)	12/1/2021 8:12:59 AM
LCpeak with Time	106.0 dB (12/1/2021 12:38:59)	Calibration (Before) SPL	114 dB
LAFmax with Time	94.4 dB (12/1/2021 12:38:59)	Calibration (After) Date	12/2/2021 9:35:20 AM
LZeq	72.9 dB	Calibration Drift	0.1 dB
LAFmin with Time	24.5 dB (12/1/2021 12:32:41)	Result	Cumulative
LCeq	59.3 dB		



MBR - Adjumani (Mukolo West)

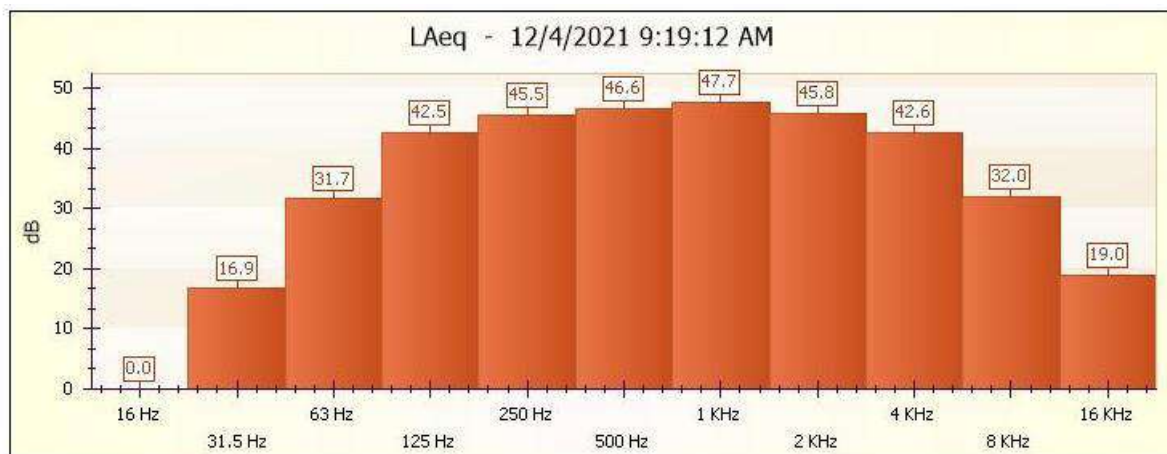
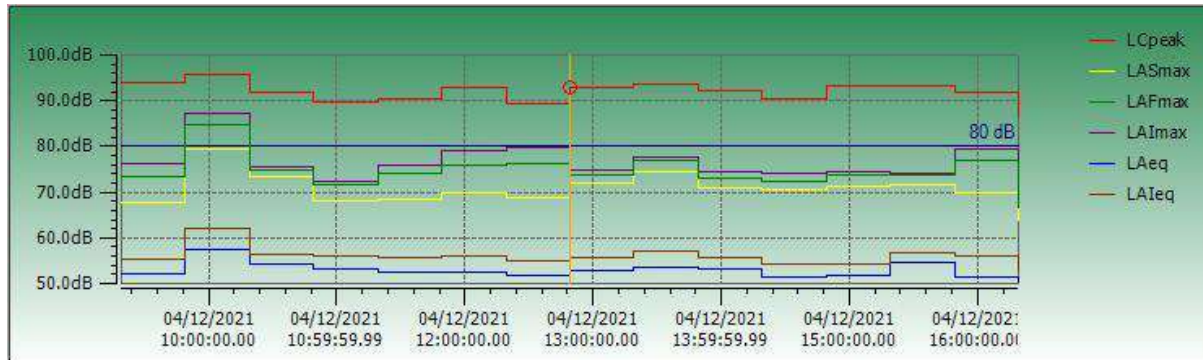
Instrument Model	CEL-633B		
Serial Number	2670936	LCpeak	110.9 dB
LAFmin	30.2 dB	LAF 90%	35 dB
LAFmax	81.4 dB	LAF 10%	48.5 dB
Site	Unallocated	LCF 10%	58 dB
Run Number	47	LCF 90%	44 dB
Start Date & Time	12/2/2021 9:36:00 AM	LAEq	56.4 dB
Duration	07:23:00 HH:MM:SS	End Date & Time	12/2/2021 4:59:00 PM
LAEq	50.4 dB	Calibration (Before)	12/2/2021 9:35:31 AM
LCpeak with Time	110.9 dB (12/2/2021 9:36:04)	Calibration (Before) SPL	114 dB
LAFmax with Time	81.4 dB (12/2/2021 9:36:04)	Calibration (After) Date	12/3/2021 8:54:58 AM
LZeq	67.5 dB	Calibration Drift	0.1 dB
LAFmin with Time	30.2 dB (12/2/2021 9:53:51)	Result	Cumulative
LCeq	55.6 dB		





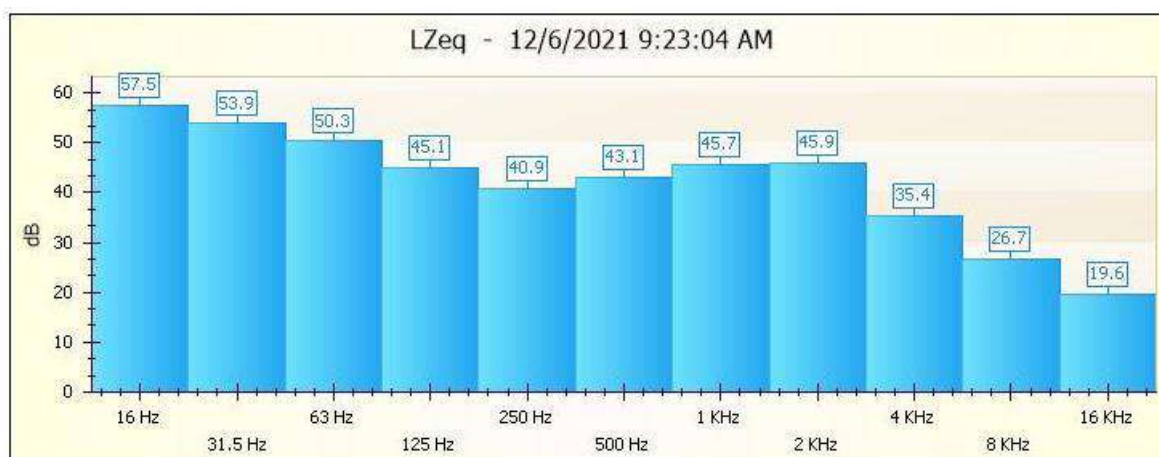
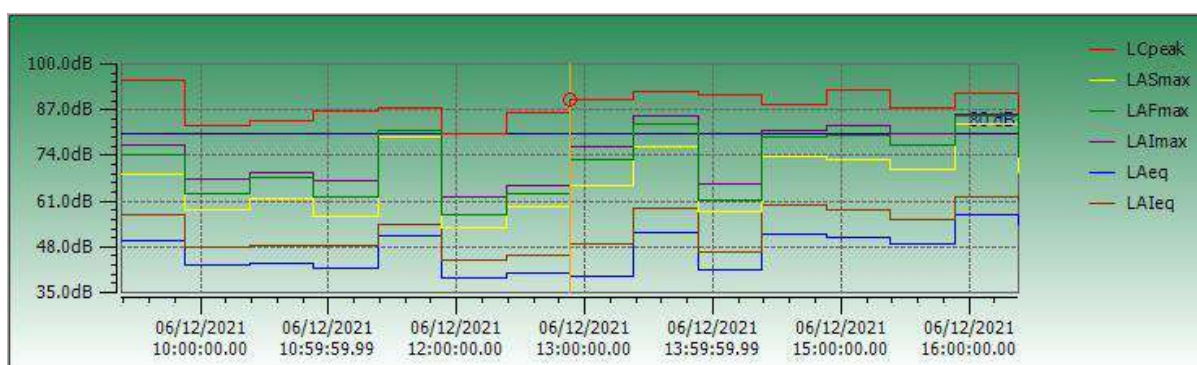
Ciforo ESR

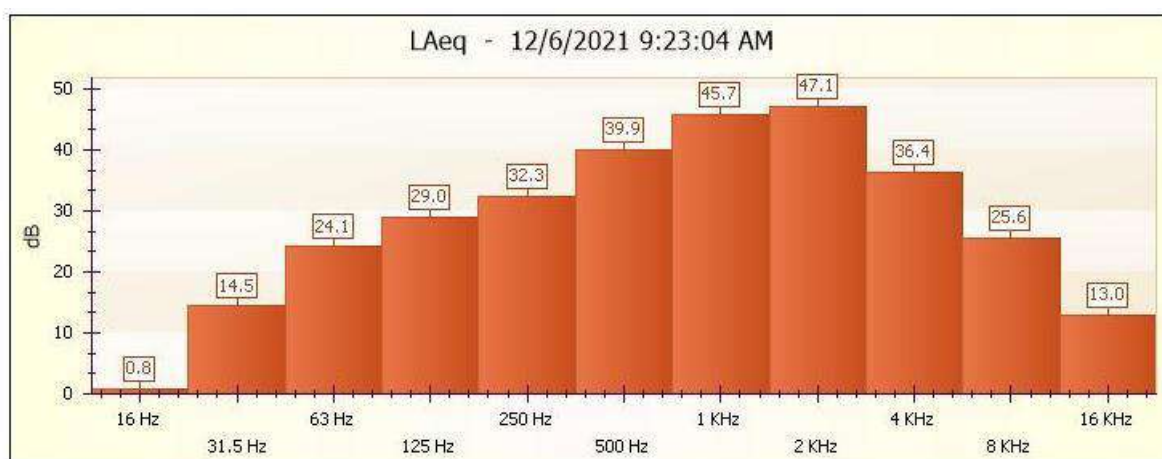
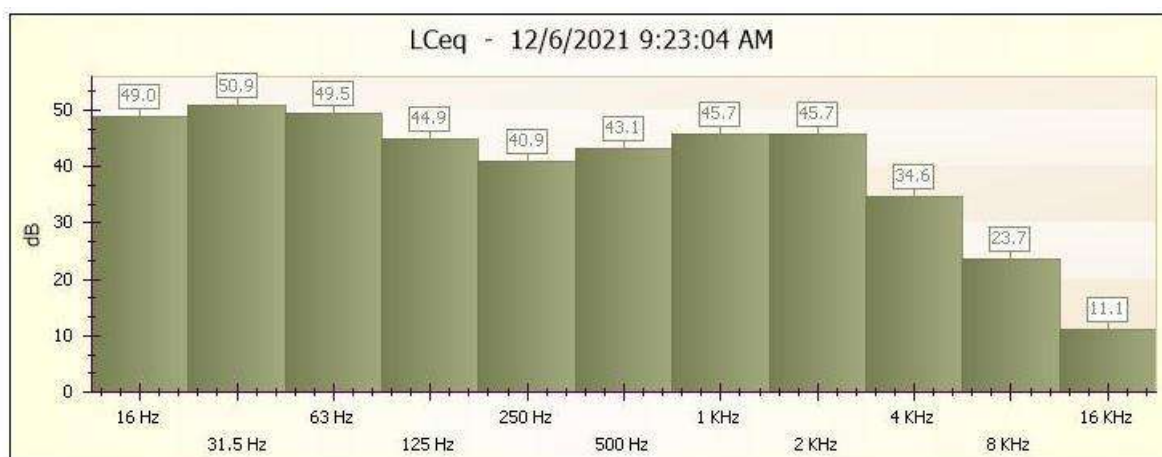
Instrument Model	CEL-633B		
Serial Number	2670936	LCpeak	95.7 dB
LAFmin	32.2 dB	LAF 90%	40 dB
LAFmax	84.9 dB	LAF 10%	55.5 dB
Site	Unallocated	LCF 10%	65.5 dB
Run Number	53	LCF 90%	50.5 dB
Start Date & Time	12/4/2021 9:19:12 AM	LAeq	56.6 dB
Duration	07:16:00 HH:MM:SS	End Date & Time	12/4/2021 4:35:12 PM
LAeq	53.3 dB	Calibration (Before)	12/4/2021 9:17:47 AM
LCpeak with Time	95.7 dB (12/4/2021 10:14:08)	Calibration (Before) SPL	114 dB
LAFmax with Time	84.9 dB (12/4/2021 10:14:09)	Calibration (After) Date	12/5/2021 8:52:26 AM
LZeq	68.1 dB	Calibration Drift	0.0 dB
LAFmin with Time	32.2 dB (12/4/2021 9:21:47)	Result	Cumulative
LCeq	63 dB		



Pekele ESR (Catholic Church)

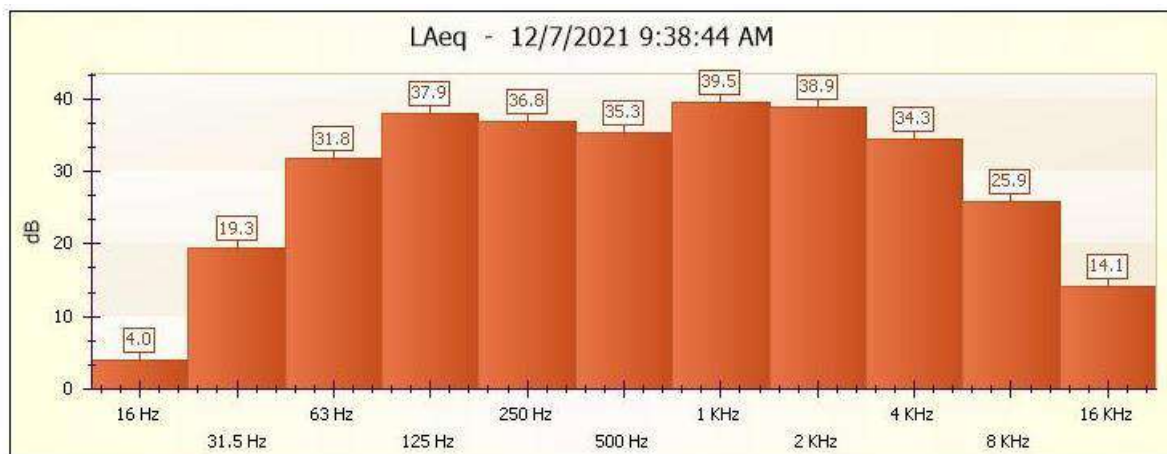
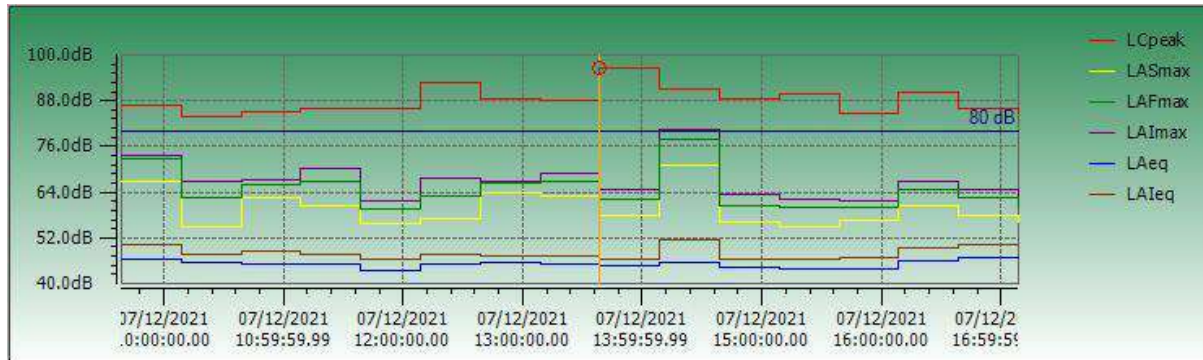
Instrument Model	CEL-633B		
Serial Number	2670936	LCpeak	95.3 dB
LAFmin	30.7 dB	LAF 90%	34.5 dB
LAFmax	85.4 dB	LAF 10%	50 dB
Site	Unallocated	LCF 10%	59 dB
Run Number	59	LCF 90%	47 dB
Start Date & Time	12/6/2021 9:23:04 AM	LAEq	56.4 dB
Duration	07:16:00 HH:MM:SS	End Date & Time	12/6/2021 4:39:04 PM
LAEq	50.2 dB	Calibration (Before)	12/6/2021 9:21:47 AM
LCpeak with Time	95.3 dB (12/6/2021 9:23:05)	Calibration (Before) SPL	114 dB
LAFmax with Time	85.4 dB (12/6/2021 4:11:07)	Calibration (After) Date	12/7/2021 9:37:28 AM
LZeq	67.2 dB	Calibration Drift	-0.1 dB
LAFmin with Time	30.7 dB (12/6/2021 1:15:06)	Result	Cumulative
LCeq	56.4 dB		





Dzaipi ESR (Dzaipi Subcounty)

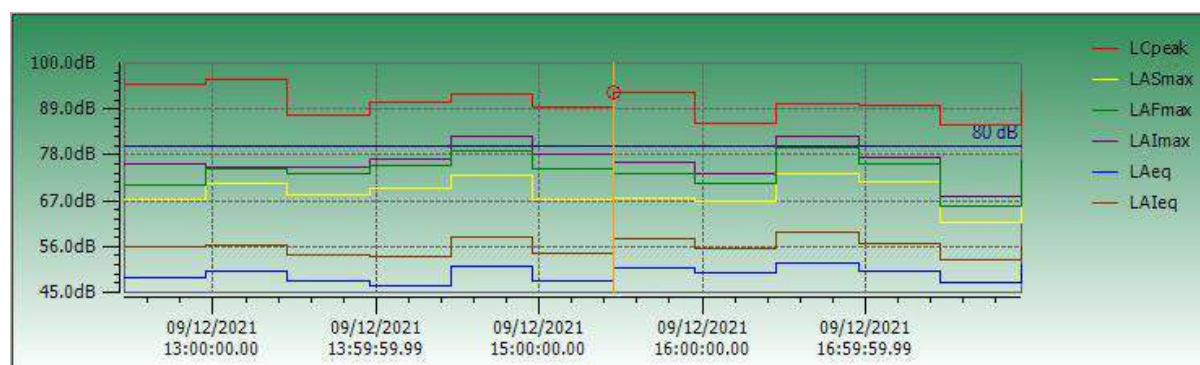
Instrument Model	CEL-633B		
Serial Number	2670936	LCpeak	96.5 dB
LAFmin	34.6 dB	LAF 90%	39.5 dB
LAFmax	78 dB	LAF 10%	48 dB
Site	Unallocated	LCF 10%	64.5 dB
Run Number	61	LCF 90%	52.5 dB
Start Date & Time	12/7/2021 9:38:44 AM	LAeq	48.3 dB
Duration	07:40:00 HH:MM:SS	End Date & Time	12/7/2021 5:18:44 PM
LAeq	45.3 dB	Calibration (Before)	12/7/2021 9:37:46 AM
LCpeak with Time	96.5 dB (12/7/2021 1:55:46)	Calibration (Before) SPL	114 dB
LAFmax with Time	78.0 dB (12/7/2021 2:16:04)	Calibration (After) Date	12/9/2021 12:26:26 PM
LZeq	70.1 dB	Calibration Drift	0.1 dB
LAFmin with Time	34.6 dB (12/7/2021 12:18:48)	Result	Cumulative
LCeq	61.4 dB		

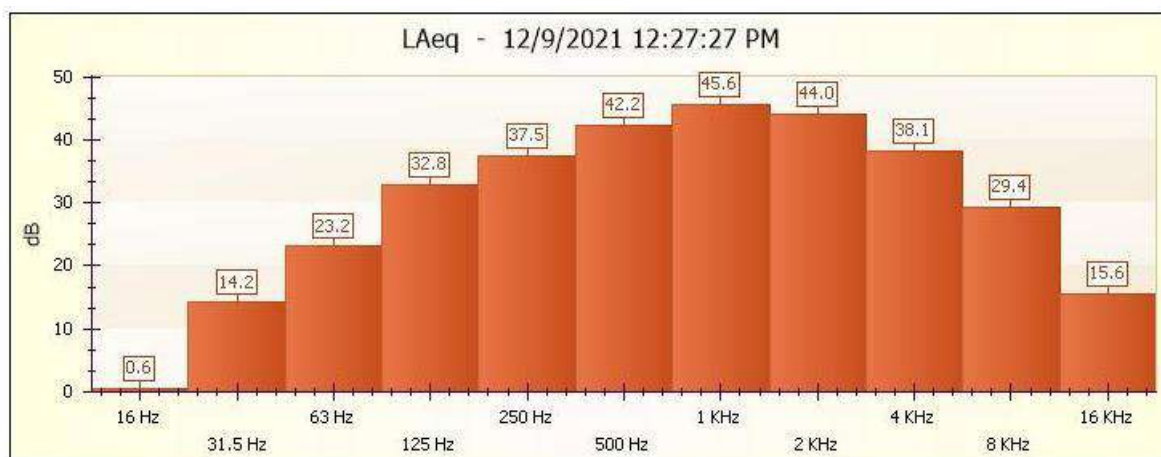
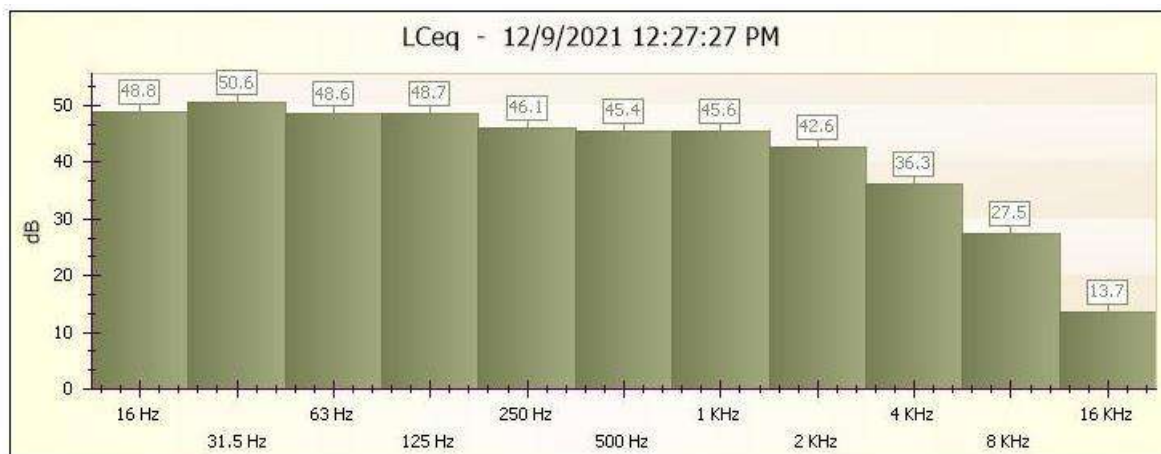


a) Groundwater Infrastructure

Melijo ESR (Olua Church School)

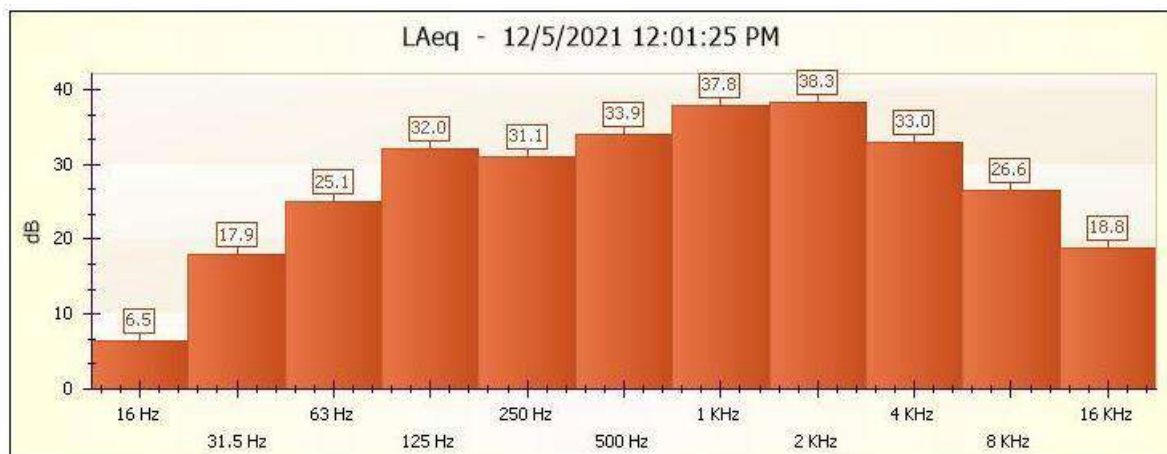
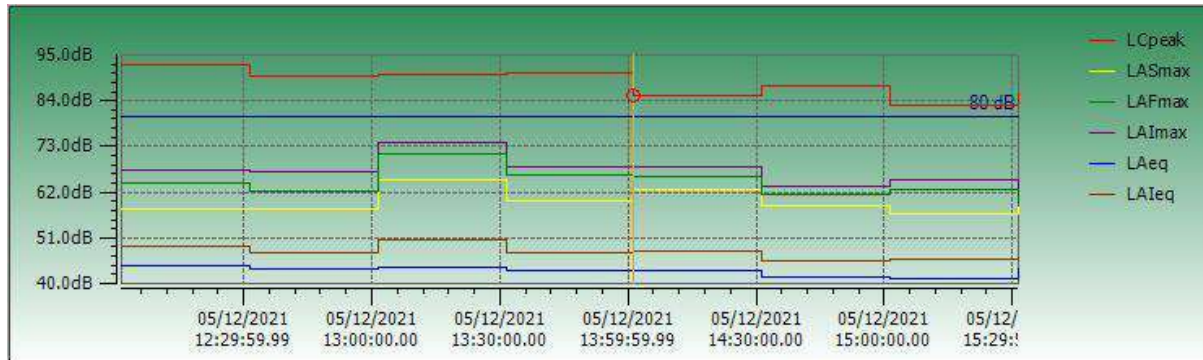
Instrument Model	CEL-633B		
Serial Number	2670936	LCpeak	96.2 dB
LAFmin	30.5 dB	LAF 90%	38 dB
LAFmax	79.8 dB	LAF 10%	50.5 dB
Site	Unallocated	LCF 10%	58 dB
Run Number	66	LCF 90%	45 dB
Start Date & Time	12/9/2021 12:27:27 PM	LAeq	56.4 dB
Duration	05:40:00 HH:MM:SS	End Date & Time	12/9/2021 6:07:27 PM
LAeq	49.7 dB	Calibration (Before) Date	12/9/2021 12:26:42 PM
LCpeak with Time	96.2 dB (12/9/2021 1:15:32)	Calibration (Before) SPL	114 dB
LAFmax with Time	79.8 dB (12/9/2021 4:44:06)	Calibration (After) Date	
LZeq	66.2 dB	Calibration Drift	-11.1 dB
LAFmin with Time	30.5 dB (12/9/2021 2:27:53)	Result	Cumulative
LCeq	56.8 dB		





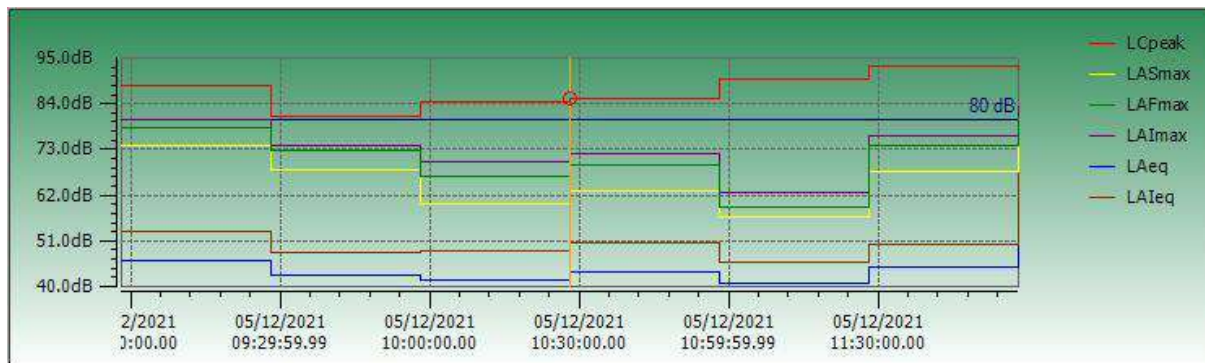
Ajugopi ESR

Instrument Model	CEL-633B		
Serial Number	2670936	LCpeak	92.6 dB
LAFmin	28.4 dB	LAF 90%	38.5 dB
LAFmax	71.3 dB	LAF 10%	44.5 dB
Site	Unallocated	LCF 10%	62 dB
Run Number	57	LCF 90%	46 dB
Start Date & Time	12/5/2021 12:01:25 PM	LAeq	47.9 dB
Duration	03:42:00 HH:MM:SS	End Date & Time	12/5/2021 3:43:25 PM
LAeq	43.1 dB	Calibration (Before)	12/5/2021 12:00:41 PM
LCpeak with Time	92.6 dB (12/5/2021 12:29:28)	Calibration (Before) SPL	114 dB
LAFmax with Time	71.3 dB (12/5/2021 1:27:06)	Calibration (After) Date	12/6/2021 9:21:30 AM
LZeq	73.9 dB	Calibration Drift	0.1 dB
LAFmin with Time	28.4 dB (12/5/2021 12:02:39)	Result	Cumulative
LCeq	59.1 dB		



Logoangwa ESR

Instrument Model	CEL-633B		
Serial Number	2670936	LCpeak	93.1 dB
LAFmin	32.3 dB	LAF 90%	34.5 dB
LAFmax	81 dB	LAF 10%	44 dB
Site	Unallocated	LCF 10%	63 dB
Run Number	55	LCF 90%	42 dB
Start Date & Time	12/5/2021 8:58:11 AM	LAeq	51.9 dB
Duration	03:01:00 HH:MM:SS	End Date & Time	12/5/2021 11:59:11 AM
LAeq	45 dB	Calibration (Before)	12/5/2021 8:52:43 AM
LCpeak with Time	93.1 dB (12/5/2021 11:30:19)	Calibration (Before) SPL	114 dB
LAFmax with Time	81.0 dB (12/5/2021 11:59:04)	Calibration (After) Date	12/5/2021 12:00:22 PM
LZeq	74.8 dB	Calibration Drift	0.0 dB
LAFmin with Time	32.3 dB (12/5/2021 8:59:33)	Result	Cumulative
LCeq	60.3 dB		





Annex 8: Individual Species and Distribution per Plant Species in their Respective Families for Adjumani WSSP

N/S	Family	Species	MBR to Ciforo	Sludge site	T1 & Tank	T3 & Tank	T4 & Tank	TL to MBR	TL to Pakele & Dzaini	Intake to WTP	Status	Lifeform
1	Acanthaceae	Asystasia gangetica	X	1	1	1	1	X	X	1	LC	Herb
2		Barleria ventricosa	X	1	X	X	1	X	X	1	LC	Herb
3		Blepharis integrifolia	X	1	X	X	X	X	X	X	LC	Herb
4		Blepharis maderaspatensis	X	1	X	X	X	X	X	X	LC	Herb
5		Crabbea velutina	X	1	X	X	1	X	X	X	LC	Herb
6		Dyschoriste hildebrandtii	X	X	1	X	X	X	X	X	LC	Herb
7		Dyschoriste radicans	X	X	1	1	1	X	X	X	LC	Herb
8		Hygrophila uliginosa	X	1	X	X	X	X	X	1	LC	Herb
9		Isoglossa rungioides	X	X	X	1	X	X	X	X	LC	Herb
10		Justicia betonica	X	1	X	X	X	X	X	X	LC	Herb
11		Justicia diclipteroides	X	1	X	X	X	X	1	X	LC	Herb
12		Justicia flava	X	X	X	X	1	X	X	X	LC	Herb
13		Monechma subsessile	X	X	X	1	X	X	X	X	LC	Herb
14		Ruellia patula	X	1	1	X	X	X	1	X	LC	Herb
15	Aloaceae	Aloe wollastonii	X	1	X	X	X	X	X	X	LC	Herb
16	Amarantaceae	Achyranthes aspera	X	X	1	X	1	X	X	X	LC	Herb
17	Amarantaceae	Gomphrena celosioides	X	X	X	1	X	X	X	X	LC	Herb
18	Amarantaceae	Achyranthes aspera	X	X	1	X	X	X	1	X	LC	Herb
19		Amaranthus spinosus	X	X	X	X	X	1	1	X	LC	Herb
20		Celosia ssp	X	X	X	X	X	X	1	X	LC	Herb
21		Cyathura achyranthoides	X	X	1	X	X	X	X	1	LC	Herb
22		Gomphrena celosioides	X	X	X	X	X	X	1	1	LC	Herb

23		Pandiaka angustifolia	X	1	1	X	X	X	1	X	LC	Herb
24		Pupalia lappacea	X	X	1	X	X	X	X	X	LC	Herb
25	Anacardiaceae	Anacardium occidentale	1	X	X	X	X	X	X	X	LC	Tree
26		Lannea barteri	X	1	1	1	1	X	X	X	LC	Tree
27		Lannea schweinfurthii	X	1	1	X	1	X	1	1	LC	Tree
28		Mangifera indica	1	X	X	X	1	X	1	1	LC	Tree
29		Rhus natalensis	X	1	1	X	1	X	X	X	LC	Shrub
30		Sclerocarya birrea	X	X	1	X	1	X	1	1	LC	Tree
31	Annonaceae	Annona senegalensis	X	X	1	X	X	X	X	X	LC	Shrub
32		Isolona congolana	X	1	X	X	X	X	1	X	LC	Tree
33	Anthericaceae	Chlorophytum macrophyllum	X	1	X	X	X	X	X	X	LC	Herb
34	Apocynaceae	Adenium obesum	X	1	X	X	X	X	X	X	LC	Herb
35		Cascabela thevetia	X	X	X	X	X	X	X	1	LC	Shrub
36		Cynonchum schistogossum	X	X	X	X	X	X	X	1	LC	Liana
37		Dregea abyssinica	X	X	X	X	X	X	X	1	LC	Liana
38		Orbea cooperi	X	1	X	X	X	X	X	X	LC	Liana
39		Pergularia extensa	X	X	X	1	X	X	X	X	LC	Liana
40		Periploca nigrescens	X	X	X	1	X	X	1	X	LC	Liana
226		Saba comorensis	X	X	1	X	X	X	X	X	LC	Liana
41		Sarcostemma viminale	X	1	X	X	X	X	X	X	LC	Liana
42	Asparagaceae	Asparagus africanus	X	1	X	1	X	X	X	X	LC	Herb
43		Asparagus buehneri	X	X	X	X	1	X	X	X	LC	Herb
44		Asparagus flagellaris	X	1	1	X	X	X	X	1	LC	Herb
45		Asparagus racemosus	X	1	X	X	X	X	X	X	LC	Liana
46	Asteraceae	Acanthospermum hispidum	X	X	X	X	X	X	1	1	LC	Herb
47		Ageratum conyzoides	X	1	1	1	1	1	1	1	LC	Herb
48		Aspilia africana	X	X	1	1	X	X	X	X	LC	Herb

49		<i>Aspilia kotschy</i>	X	1	1	1	1	X	X	1	LC	Herb
50		<i>Bidens pilosa</i>	1	X	1	1	1	1	1	1	Invasive	Herb
51		<i>Chromolaena odorata</i>	1	X	X	X	X	X	X	X	Invasive	Liana
52		<i>Conyza sumatrensis</i>	X	1	1	1	X	X	X	X	LC	Herb
53		<i>Conyza tigrensis</i>	X	X	X	1	X	X	X	X	LC	Herb
54		<i>Guizotia scabra</i>	X	X	X	1	X	X	X	X	LC	Herb
55		<i>Gutenbergia eylesii</i>	1	X	X	1	1	1	1	X	LC	Herb
56		<i>Lactuca inermis</i>	X	X	X	X	X	1	X	X	LC	Herb
57		<i>Laggera crassifolia</i>	X	X	X	1	1	X	1	X	LC	Herb
58		<i>Launaea cornuta</i>	X	X	X	X	X	X	X	1	LC	Herb
59		<i>Synodrella nodiflora</i>	1	X	1	1	X	X	1	1	LC	Herb
60		<i>Tridax procumbens</i>	1	1	1	1	1	1	1	1	LC	Herb
61		<i>Vernonia adoensis</i>	X	X	X	1	1	X	X	1	LC	Shrub
62		<i>Vernonia cinerea</i>	1	X	X	X	1	X	X	X	LC	Herb
63		<i>Vernonia perrottetii</i>	X	X	X	1	1	X	X	1	LC	Herb
64		<i>Xanthium strumarium</i>	X	X	X	X	X	X	X	1	Invasive	Herb
65	Balanitaceae	<i>Balanites aegyptiaca</i>	X	1	X	X	1	X	1	1	LC	Tree
66	Bignoniaceae	<i>Kigelia africana</i>	X	X	X	1	1	X	X	1	LC	Tree
67		<i>Markhamia lutea</i>	X	X	X	X	X	X	1	X	LC	Tree
68		<i>Sambucus ebulus</i>	X	X	X	X	X	X	X	1	LC	Shrub
69		<i>Stereospermum kunthianum</i>	X	1	X	1	1	1	X	X	LC	Tree
70	Boraginaceae	<i>Cynoglossum lanceolatum</i>	X	X	X	1	1	X	1	1	LC	Herb
71	Burseraceae	<i>Boswellia papyrifera</i>	1	X	X	X	X	X	X	X	LC	Tree
72	Capparidaceae	<i>Crateva adansonii</i>	X	X	X	X	X	X	X	1	LC	Tree
73		<i>Maerua angolensis</i>	X	1	X	X	X	X	X	1	LC	Tree
74		<i>Maerua triphylla</i>	X	1	X	X	X	X	X	X	LC	Liana
75	Celastraceae	<i>Maytenus heterophylla</i>	X	X	X	X	1	X	X	X	LC	Shrub

76		Maytenus senegalensis	X	1	1	1	1	X	X	X	LC	Shrub
77	Combretaceae	Combretum aculeatum	X	1	X	X	1	X	X	1	LC	Liana
78		Combretum adenogonium	X	1	1	1	1	X	X	1	LC	Tree
79		Combretum collinum	X	1	1	X	1	X	X	X	LC	Tree
80		Combretum molle	X	1	X	X	X	X	X	X	LC	Tree
81		Combretum mucronatum	X	X	1	X	X	X	X	X	LC	Shrub
83		Terminalia brownii	X	1	X	X	X	X	X	X	LC	Tree
84		Terminalia glaucescens	X	1	1	1	1	X	X	1	LC	Tree
85		Terminalia mollis	X	X	1	1	X	X	X	X	LC	Tree
86	Commelinaceae	Commelina aficana	X	1	X	X	X	X	X	X	LC	Herb
87		Commelina benghalensis	X	X	1	1	X	1	1	1	LC	Herb
88		Commelina latifolia	X	X	1	X	X	X	X	X	LC	Herb
89		Cyanotis lanata	X	1	X	X	X	X	X	X	LC	Herb
90	Convolvulaceae	Astripomoea malvacea	X	1	1	1	X	X	X	X	LC	Herb
91		Convolvulus farinosus	X	X	X	X	X	X	X	1	LC	Herb
92		Evolvulus alsinoides	X	1	X	X	X	X	X	X	LC	Herb
93		Hewittia scandens	X	X	X	1	X	X	X	X	LC	Liana
94		Ipomoea aquatica	X	X	X	X	X	X	X	1	LC	Herb
95		Ipomoea eriocarpa	X	1	X	X	X	1	X	X	LC	Liana
96		Ipomoea heterosepala	X	1	X	X	1	X	X	X	LC	Herb
97		Ipomoea mauritiana	X	X	X	1	X	X	X	X	LC	Liana
98		Ipomoea obscura	X	1	X	X	X	X	X	X	LC	Liana
99		Lepistemon owariense	X	X	1	1	1	X	X	X	LC	Liana
100	Crassulaceae	Kalanchoe lateritia	X	1	X	X	X	X	X	X	LC	Herb
101	Cucurbitaceae	Kedrostis foetidissima	X	1	1	X	X	X	X	X	LC	Liana
102		Luffa cylindrica	X	X	1	1	X	X	X	X	LC	Liana
103		Mukia maderaspatana	X	X	X	1	X	1	X	X	LC	Liana

104	Cyperaceae	Cyperus denudatus	X	X	X	1	X	X	X	1	LC	Herb
105		Cyperus diformis	X	X	X	1	X	X	X	X	LC	Herb
106		Cyperus distans	X	X	X	X	X	1	1	X	LC	Herb
107		Cyperus dives	X	X	1	1	X	X	X	1	LC	Herb
108		Cyperus papyrus	X	X	X	X	X	X	X	1	LC	Herb
109		Fimbristylis dichotoma	X	X	X	X	X	1	X	X	LC	Herb
110		Fimbristylis pilosa	X	X	X	X	X	X	X	1	LC	Herb
111		Kyllinga nervosa	X	X	1	1	X	X	X	X	LC	Herb
112		Mariscus dubius	X	X	X	X	X	X	1	X	LC	Herb
113		Mariscus sumatrensis	X	X	X	1	X	X	X	X	LC	Herb
114		Pycreus mertonii	X	X	1	X	X	X	X	X	LC	Herb
115		Pycreus pumilus	X	X	X	X	X	1	X	1	LC	Herb
116	Dioscoreaceae	Dioscorea bulbifera	X	X	1	X	X	X	X	X	LC	Liana
117		Dioscorea minutiflora	X	1	X	X	X	X	X	X	LC	Liana
118	Dracaenaceae	Sansevieria conspicua	X	1	X	X	X	X	X	1	LC	Herb
119	Ebenaceae	Diospyros mespiliformis	X	1	1	X	X	X	X	X	LC	Tree
120	Euphorbiaceae	Acalypha bipartita	X	1	X	X	X	X	X	X	LC	Herb
121		Acalypha ciliata	X	X	X	X	1	X	X	X	LC	Herb
122		Acalypha cordata	X	X	1	X	X	X	X	X	LC	Herb
123		Acalypha ornata	X	X	1	X	X	X	X	X	LC	Herb
124		Acalypha villicaulis	X	1	1	1	X	X	X	X	LC	Herb
125		Antidesma venosum	X	X	X	X	1	X	X	X	LC	Tree
126		Bridelia scleroneura	X	1	1	1	1	X	1	X	LC	Tree
127		Euphorbia candelabrum	X	1	X	X	X	X	X	X	LC	Tree
128		Euphorbia heterophyllus	X	X	1	1	X	X	1	X	Invasive	Herb
129		Euphorbia hirta	1	1	1	1	1	1	1	1	LC	Herb
130		Flueggea virosa	X	X	1	1	1	X	X	1	LC	Shrub

131		<i>Jatropha curcas</i>	X	X	X	X	X	X	1	X	LC	Shrub
132		<i>Micrococca mercurialis</i>	X	X	X	1	X	X	X	X	LC	Herb
133		<i>Phyllanthus amarus</i>	X	X	X	1	X	X	X	1	LC	Herb
134		<i>Phyllanthus fraternus</i>	X	1	X	X	X	X	X	X	LC	Herb
135		<i>Phyllanthus muellerianus</i>	X	1	X	1	X	X	X	X	LC	Herb
136		<i>Phyllanthus sufrutescens</i>	X	X	X	X	X	X	X	1	LC	Liana
137		<i>Ricinus communis</i>	X	X	X	X	X	X	X	1	Invasive	Shrub
138	Fabaceae	<i>Acacia gerrardii</i>	X	X	X	X	1	X	X	X	LC	Tree
139		<i>Acacia hockii</i>	X	1	1	1	1	1	1	1	Invasive	Tree
140		<i>Acacia polyacantha</i>	X	X	X	X	1	X	X	1	LC	Tree
141		<i>Acacia senegal</i>	X	1	X	X	1	X	X	1	LC	Tree
142		<i>Acacia sieberiana</i>	X	X	X	1	1	X	1	X	LC	Tree
143		<i>Aeschynomene indica</i>	X	X	1	1	X	1	X	1	LC	Herb
144		<i>Azelaia africana</i>	X	1	X	1	X	X	X	X	LC	Tree
145		<i>Alysicarpus ferrugineus</i>	X	X	X	X	X	X	X	1	LC	Herb
146		<i>Alysicarpus glumaceus</i>	1	X	1	X	1	X	1	1	LC	Herb
147		<i>Amphicarpaea africana</i>	X	X	X	X	X	1	X	X	LC	Liana
148		<i>Caesalpinia pulcherrima</i>	X	X	X	X	X	1	X	X	LC	Shrub
149		<i>Caliandra ssp</i>	1	X	X	X	X	X	X	X	LC	Herb
150		<i>Canavalia gladiata</i>	X	X	X	X	X	X	X	1	LC	Herb
151		<i>Cassia mimosoides</i>	X	1	X	X	X	X	X	X	LC	Herb
152		<i>Cassia nigrescens</i>	1	1	X	1	1	X	X	1	LC	Herb
153		<i>Cassia obtusifolia</i>	X	X	X	1	1	X	X	1	LC	Herb
154		<i>Cassia occidentalis</i>	X	X	1	X	X	X	1	X	LC	Herb
155		<i>Cassia siamea</i>	X	X	X	X	X	X	1	1	LC	Tree
156		<i>Cassia singueana</i>	X	1	X	X	X	X	X	X	LC	Shrub
157		<i>Crotalaria brevidens</i>	X	X	X	X	X	X	X	1	LC	Herb

158		<i>Crotalaria cylindrica</i>	X	X	X	X	X	X	X	1	LC	Herb
159		<i>Crotalaria incana</i>	1	X	X	X	X	X	X	X	LC	Herb
160		<i>Crotalaria leptoclada</i>	X	1	X	X	X	X	X	X	LC	Herb
161		<i>Crotalaria sp</i>	X	X	X	X	X	X	X	1	LC	Herb
162		<i>Crotalaria spinosa</i>	X	X	X	1	X	X	X	X	LC	Herb
163		<i>Dalbergia melanoxydon</i>	X	1	X	X	X	X	X	1	LC	Tree
164		<i>Daniella oliveri</i>	X	X	X	X	X	1	X	X	LC	Tree
165		<i>Delonix regia</i>	X	X	X	X	X	1	X	1	LC	Tree
166		<i>Desmodium gangeticum</i>	X	1	1	X	X	X	X	X	LC	Herb
167		<i>Desmodium hirtum</i>	X	X	X	X	X	X	X	1	LC	Herb
168		<i>Desmodium tortuosum</i>	X	X	X	1	X	X	1	X	LC	Herb
169		<i>Desmodium triflorum</i>	1	X	X	X	X	X	X	X	LC	Herb
170		<i>Desmodium velutina</i>	X	X	1	1	1	X	X	X	LC	Herb
171		<i>Dichrostachys cinerea</i>	X	1	X	X	X	X	X	X	Invasive	Shrub
172		<i>Entada wahlbergii</i>	X	1	1	X	X	X	X	X	LC	Liana
173		<i>Eriosema psoraleoides</i>	X	X	1	1	X	X	X	X	LC	Herb
174		<i>Erythrina abyssinica</i>	X	X	X	X	X	X	X	1	LC	Tree
175		<i>Glycine wightii</i>	1	1	1	X	1	1	X	X	LC	Liana
176		<i>Indigofera arecta</i>	X	X	1	1	X	X	X	X	LC	Herb
177		<i>Indigofera emarginella</i>	X	1	X	X	X	X	X	X	LC	Herb
178		<i>Indigofera gackeana</i>	X	1	1	X	X	X	X	X	LC	Herb
179		<i>Indigofera hirsuta</i>	X	X	X	1	1	1	X	X	LC	Herb
180		<i>Indigofera mimosoides</i>	X	X	X	1	1	X	1	X	LC	Herb
181		<i>Indigofera oblongifolia</i>	X	X	X	X	X	X	X	1	LC	Herb
182		<i>Indigofera paniculata</i>	X	X	X	X	X	X	X	1	LC	Herb
183		<i>Indigofera spicata</i>	X	X	1	1	X	X	1	X	LC	Herb
184		<i>Indigofera spp</i>	X	1	X	X	X	X	X	X	LC	Herb

185		Indigofera trachyphylla	X	X	X	X	X	X	X	1	LC	Herb
186		Lonchocarpus laxiflorus	X	1	1	1	1	1	X	1	LC	Tree
187		Macrotyloma axillare	X	X	X	1	X	X	X	X	LC	Liana
188		Mimosa pigra	X	X	1	1	X	X	X	X	LC	Shrub
189		Piliostigma thonningii	1	1	1	1	1	1	X	1	LC	Tree
190		Prosopis africana	X	1	1	1	X	X	X	X	LC	Tree
191		Pterocarpus lucens	X	1	X	X	X	X	X	X	LC	Tree
192		Rhynchosia minima	X	X	1	X	X	X	X	X	LC	Liana
193		Rhynchosia sublobata	X	X	1	X	X	X	X	X	LC	Liana
194		Sesbania sesban	X	X	1	X	X	X	X	1	LC	Shrub
195		Tamarindus indica	X	1	1	1	X	X	1	1	LC	Herb
196		Tephrosia elegans	X	X	X	1	X	X	X	X	LC	Herb
197		Tephrosia interrupta	X	1	X	X	X	X	X	1	LC	Herb
198		Tephrosia pumila	X	X	X	1	1	X	X	1	LC	Herb
199		Tephrosia rhodesica	X	1	X	X	X	X	X	X	LC	Herb
200		Uraria picta	X	X	1	X	X	X	X	X	LC	Herb
201		Vigna luteola	1	X	X	X	X	X	X	X	LC	Herb
202		Vigna membranacea	X	1	1	1	1	X	X	X	LC	Herb
203		Vigna multinervis	X	X	X	X	1	X	X	X	LC	Herb
204		Vigna parkeri	1	X	X	X	X	X	X	X	LC	Herb
205		Vigna schimperi	X	X	X	1	X	1	X	X	LC	Herb
206		Vigna vexillata	X	X	X	1	X	X	X	X	LC	Herb
207		Zornia setosa	X	X	X	X	X	X	X	1	LC	Herb
208	Lamiaceae	Hoslundia opposita	X	1	1	X	1	X	X	X	LC	Shrub
209		Hyptis suaveolens	1	X	1	1	1	1	1	1	LC	Herb
210		Leonotis nepetifolia	X	X	X	X	1	X	X	1	LC	Herb
211		Ocimum lamiifolium	X	X	X	1	1	1	1	1	LC	Herb

212		<i>Pycnostachys linifolia</i>	X	X	X	X	1	X	X	X	LC	Herb
213		<i>Solenostemon shirensis</i>	X	1	X	X	1	X	1	X	LC	Herb
214		<i>Triumfetta trichocarpa</i>	X	X	1	X	X	X	X	X	LC	Herb
215	Loganiaceae	<i>Strychnos innocua</i>	X	X	1	X	X	X	X	X	LC	Tree
216		<i>Strychnos spinosa</i>	X	1	X	X	X	1	X	X	LC	Tree
217	Malvaceae	<i>Abutilon longicuspe</i>	X	X	X	X	X	X	1	X	LC	Herb
218		<i>Azanza ssp</i>	X	1	X	X	X	X	X	X	LC	Herb
219		<i>Corchorus trilocularis</i>	X	X	X	X	X	X	X	1	LC	Herb
220		<i>Corchorus tridens</i>	X	X	X	1	1	X	1	X	LC	Herb
221		<i>Grewia mollis</i>	X	1	1	1	1	1	X	1	LC	Herb
222		<i>Grewia similis</i>	X	X	X	X	X	X	X	1	LC	Shrub
223		<i>Grewia trichocarpa</i>	X	X	1	X	X	X	X	X	LC	Shrub
224		<i>Hibiscus aethiopicus</i>	X	X	X	X	X	X	X	1	LC	Herb
225		<i>Hibiscus palmatus</i>	X	1	1	1	X	1	X	1	LC	Herb
227		<i>Sida acuta</i>	1	X	1	1	1	X	1	1	Invasive	Herb
228		<i>Sida alba</i>	X	1	1	1	X	X	X	1	LC	Herb
229		<i>Sida cordifolia</i>	X	X	1	1	X	X	X	X	LC	Herb
230		<i>Sida rhomboidea</i>	1	X	X	1	X	X	X	X	LC	Herb
231		<i>Sterculia setigera</i>	1	1	1	1	X	X	X	X	LC	Tree
232		<i>Triumfetta trichocarpa</i>	1	1	1	1	1	X	1	X	LC	Herb
233		<i>Urena lobata</i>	X	X	1	1	1	X	1	1	LC	Herb
234		<i>Waltheria indica</i>	X	X	X	1	X	X	X	X	LC	Herb
235		<i>Wissadula amplissima</i>	X	1	1	X	1	X	X	1	LC	Herb
236	Meliaceae	<i>Azadirachta indica</i>	X	X	X	X	X	1	1	1	LC	Tree
237		<i>Khaya senegalensis</i>	X	X	X	X	X	X	X	1	EN	Tree
238		<i>Pseudocedrela kotschy</i>	X	1	1	X	1	X	X	X	LC	Tree
239	Menispermaceae	<i>Chasmanthera dependens</i>	X	X	1	X	X	X	1	1	LC	Liana

240	Moraceae	Antiaris toxicaria	X	X	X	X	X	X	1	1	LC	Tree
241		Ficus conraui	X	X	1	X	X	X	X	X	LC	Tree
242		Ficus glumosa	X	1	1	X	X	X	X	X	LC	Tree
243		Ficus ingens	X	X	X	X	1	X	X	1	LC	Tree
244		Ficus sycomorus	X	X	1	1	1	1	1	1	LC	Tree
245		Milicia excelsa	1	X	X	X	X	1	1	1	LC	Tree
246	Moringaceae	Moringa oliefera	1	X	X	X	X	X	X	1	LC	Tree
247	Myrtaceae	Psidium guajava	X	X	X	1	X	X	1	X	LC	Tree
248	Nyctaginaceae	Commicarpus pedunculatus	X	X	X	X	X	X	1	X	LC	Herb
249		Commicarpus pentandrus	X	X	X	X	X	X	1	X	LC	Herb
250	Oleaceae	Jasminum pauciflorum	X	1	X	X	X	X	X	1	LC	Liana
251		Ximenia americana	X	1	X	X	X	X	X	X	LC	Shrub
252	Onagraceae	Ludwigia prostrata	X	X	X	X	X	1	X	X	LC	Herb
253	Opiliaceae	Opilia amentacea	X	X	1	1	X	X	X	1	LC	Liana
254	Orchidaceae	Habenaria ssp	X	1	X	X	X	X	X	X	LC	Herb
255	Oxalidaceae	Biophytum petersianum	X	X	X	1	X	X	X	X	LC	Herb
256	Palmae	Borassus aethiopicum	1	X	1	X	1	X	1	1	LC	Tree
257	Passifloraceae	Passiflora quadrangularis	X	1	X	X	X	X	X	X	LC	Liana
258	Pedaliaceae	Sesamum angustifolium	X	X	X	X	1	X	X	1	LC	Herb
259		Sesbania sesban	X	X	X	1	X	X	X	X	LC	Shrub
260	Poaceae	Andropogon gayana	X	1	1	X	X	X	X	X	LC	Herb
261		Andropogon schirensis	X	1	X	X	X	X	X	X	LC	Herb
262		Aristida adscensionis	X	1	X	X	1	X	1	1	LC	Herb
263		Bothriochloa insculpta	X	X	X	X	1	X	X	X	LC	Herb
264		Brachiaria brizantha	X	X	1	1	1	1	1	1	LC	Herb
265		Brachiaria comata	1	1	1	1	1	1	1	1	LC	Herb
266		Brachiaria documbens	X	1	1	1	X	X	X	X	LC	Herb

267	Brachiaria leersioides	X	X	X	1	X	X	X	1	LC	Herb
268	Chloris gayana	X	X	X	1	1	X	X	X	LC	Herb
269	Chloris pilosa	X	X	X	1	1	X	X	X	LC	Herb
270	Chloris virgata	1	X	X	X	X	1	X	1	LC	Herb
271	Ctenium concinnum	X	1	X	X	X	X	X	X	LC	Herb
272	Cynodon dactylon	1	X	X	X	X	1	X	X	LC	Herb
273	Cynodon nlemfuensis	X	X	1	1	1	1	1	1	LC	Herb
274	Dactyloctenium aegypticum	X	X	X	X	X	X	X	1	LC	Herb
275	Digitaria abyssinica	X	X	1	X	X	X	X	X	LC	Herb
276	Digitaria longiflora	X	1	X	1	1	X	1	1	LC	Herb
277	Digitaria pearsonii	X	1	X	X	X	X	X	X	LC	Herb
278	Digitaria scalarum	X	X	X	X	1	X	X	X	LC	Herb
279	Digitaria velutina	X	X	X	X	X	1	1	1	LC	Herb
280	Echinochloa pyramidalis	X	X	X	1	1	X	X	X	LC	Herb
281	Eleusine indica	X	X	1	1	X	1	1	X	LC	Herb
282	Eragrostis aspera	X	X	X	X	X	X	1	X	LC	Herb
283	Eragrostis ciliaris	X	X	X	1	X	X	1	1	LC	Herb
284	Eragrostis tremula	X	X	X	1	X	X	X	X	LC	Herb
285	Eriochloa fatmensis	X	X	X	X	X	X	X	1	LC	Herb
286	Eriochloa procera	X	X	X	X	1	X	1	X	LC	Herb
287	Harpachne schimperii	X	1	X	X	X	X	X	X	LC	Herb
288	Heteropogon contortus	X	X	1	X	1	X	X	1	LC	Herb
289	Hyparrhenia bracteata	1	1	1	1	1	1	1	1	LC	Herb
290	Hyparrhenia collinum	1	X	1	1	1	X	1	1	LC	Herb
291	Hyparrhenia diplandra	X	X	X	X	X	X	1	X	LC	Herb
292	Hyparrhenia figariana	1	1	1	1	1	1	1	1	LC	Herb
293	Hyparrhenia filipendula	X	X	X	X	X	X	X	1	LC	Herb

294		Hypertheria dissoluta	1	1	1	X	1	1	X	1	LC	Herb
295		Imperata cylindrica	1	X	X	1	X	1	X	1	Invasive	Herb
296		Leersia hexandra	X	X	X	1	X	X	X	X	LC	Herb
297		Melinus repens	X	X	1	1	X	X	X	1	LC	Herb
298		Panicum maximum	X	X	1	1	1	X	1	1	LC	Herb
299		Paspalum scrobiculatum	1	X	1	1	1	X	X	X	LC	Herb
300		Pennisetum polystachion	1	1	1	1	1	1	1	1	LC	Herb
301		Pennisetum ssp	X	X	X	1	X	X	X	X	LC	Herb
302		Pennisetum unisetum	X	X	X	X	1	X	X	X	LC	Herb
303		Perotis patens	X	X	X	1	X	X	X	1	LC	Herb
304		Phragmites corniculatus	X	X	1	1	X	X	X	1	LC	Herb
305		Rhytachne rottboelloides	X	X	X	X	X	1	X	X	LC	Herb
306		Rottboellia cochinchinensis	1	1	X	X	1	1	X	X	LC	Herb
307		Sclerocarya birrea	X	X	X	X	X	X	1	X	LC	Herb
308		Setaria incrassata	X	1	1	1	X	X	X	X	LC	Herb
309		Setaria kagerensis	1	X	1	X	X	X	1	X	LC	Herb
310		Setaria pumila	X	X	X	1	X	X	X	X	LC	Herb
311		Setaria sphacelata	X	X	X	X	1	X	X	X	LC	Herb
312		Setaria verticillata	X	X	X	1	X	X	1	X	LC	Herb
313		Sorghum arundinaceum	1	X	1	1	X	1	X	X	LC	Herb
314		Sporobolus festivus	X	X	X	X	X	X	X	1	LC	Herb
315		Sporobolus pyramidalis	1	1	1	1	X	1	1	1	LC	Herb
316		Sporobolus stapfianus	X	1	X	X	X	X	X	X	LC	Herb
317		Vossia cuspidata	X	X	X	X	X	X	X	1	LC	Herb
318		Zea mays	X	X	X	X	1	X	X	X	LC	Herb
319	Polygalaceae	Polygala albida	X	1	X	1	X	X	X	X	LC	Herb
320	Polygonaceae	Oxygonum sinuatum	X	X	X	X	X	X	1	X	LC	Herb

321		Polygala albida	X	X	1	X	X	X	X	X	LC	Herb
322		Polygonum setosulum	X	X	X	1	X	X	X	X	LC	Herb
323	Pontederiaceae	Eichhornia crassipes	X	X	X	X	X	X	X	1	Invasive	Herb
324	Ranunculaceae	Clematis hirsuta	X	1	X	X	X	X	X	X	LC	Liana
325	Rhamnaceae	Ziziphus mauritianum	X	X	X	1	1	X	X	X	LC	Shrub
326		Ziziphus mucronata	X	1	X	X	1	X	X	1	LC	Shrub
327		Ziziphus pubescens	X	X	X	X	X	1	X	1	LC	Shrub
328	Rubiaceae	Gardenia ternifolia	X	1	X	1	1	X	X	1	LC	Shrub
329		Meyna tetraphylla	X	1	X	X	X	X	X	X	LC	Shrub
330		Mitracarpus virosa	X	1	1	1	X	X	1	1	LC	Herb
331		Musaenda microdonta	X	X	1	X	X	X	X	X	LC	Shrub
332		Oldenlandia scopulorum	X	X	X	1	X	X	X	X	LC	Herb
333		Pavetta radicans	X	1	X	X	X	X	X	X	LC	Shrub
334		Richardia grandiflora	X	X	X	1	X	X	X	X	LC	Herb
335		Spermacoce chaetocephala	X	1	1	1	1	X	X	1	LC	Herb
336		Spermacoce pusilla	X	1	1	X	X	X	X	X	LC	Herb
337		Tricalysia niamniamensis	X	1	X	X	X	X	X	X	LC	Shrub
338	Sapindaceae	Allophylus chaunostachys	X	1	1	X	1	X	X	X	LC	Shrub
339	Saportaceae	Vitellaria paradoxa	X	X	1	1	X	X	X	X	VU A2ad	Tree
340	Scrophulariaceae	Alectra sessiliflora	X	X	X	1	X	X	X	X	LC	Herb
341		Striga sp	1	X	X	X	X	X	X	X	Invasive	Herb
342	Simaroubaceae	Harrisonia abyssinica	X	1	1	X	1	X	X	1	LC	Shrub
343	Solanaceae	Capsicum annum	X	X	X	X	X	X	X	1	LC	Herb
344		Physalis angulata	X	X	X	X	X	X	1	1	LC	Herb
345		Solanum incanum	X	X	X	1	1	X	1	1	LC	Herb
346	Tribulaceae	Tribulus terrestris	X	X	1	X	X	X	X	X	LC	Herb
347	Typhaceae	Typha domingensis	X	X	X	X	X	X	X	1	LC	Herb

348	Verbenaceae	Clerodendrum capitatum	X	X	X	X	X	X	1	X	LC	Liana
349		Clerodendrum umbellatum	X	X	X	X	1	X	X	1	LC	Herb
350		Gmelina arborea	X	X	X	X	X	X	1	1	LC	Tree
351		Lantana camara	X	X	X	X	X	X	1	X	Invasive	Shrub
352		Lippia javanica	X	X	1	X	X	1	X	X	LC	Herb
353		Tectona grandis	1	X	X	1	X	1	1	1	LC	Tree
354		Vitex doniana	1	X	X	1	X	1	1	X	LC	Tree
355	Vitaceae	Ampelocissus abyssinica	X	1	X	X	X	X	1	X	LC	Liana
356		Cissus bussei	X	1	X	X	X	X	X	X	LC	Liana
357		Cissus oliveri	X	X	X	1	X	X	X	X	LC	Liana
358		Cissus petiolata	X	1	X	X	X	X	X	X	LC	Liana
359		Cissus ssp	X	X	X	1	X	X	X	X	LC	Liana
360		Cyphostemma adenocaulis	X	1	X	1	X	X	X	X	LC	Liana
361		Cyphostemma adenopodum	X	X	X	X	X	X	X	1	LC	Liana
362	Zingiberaceae	Aframomum albobviolaceum	X	X	X	1	X	X	X	X	LC	Herb
363		Renealmia africana	X	1	X	X	X	X	X	X	LC	Herb

Annex 9: Detailed Checklist of Bird Species Recorded During the Survey

Family	Species Scientific and Common Names	IUCN Red List	Water Intake	WTP	TL and DL	MBR	Ciforo ESR	Pakele ESR	Dzaipi ESR
ACCIPITRIDAE	119 - AFRICAN HAWK-EAGLE <i>Aquila spilogaster</i> - F	Least Concern			2				
Accipitridae	122 - <i>Lophaetus occipitalis</i> Long-crested Eagle – f	Least Concern	1	1					
Accipitridae	73 - <i>Elanus caeruleus</i> Black-shouldered Kite - G	Least Concern							
Accipitridae	75 - <i>Milvus migrans</i> Black Kite – pA (widespread)	Least Concern PM	10		4	1	1		
ACCIPITRIDAE	76 - <i>Haliaeetus vocifer</i> African Fish Eagle - W	Least Concern	1						
Accipitridae	77 - <i>Gypohierax angolensis</i> Palm-nut vulture – f	Least Concern	1						
ACCIPITRIDAE	85a - <i>Circaetus pectoralis</i> Black-Chested Snake Eagle - f	Least Concern						1	
Accipitridae	88 - <i>Terathopius ecaudatus</i> Bateleur - G	R-NT	1	1					
Alcedinidae	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher - A	Least Concern	1						
Apodidae	358 - <i>Cypsiurus parvus</i> Palm Swift - G	Least Concern	23	5	16	7			
ARDEIDAE	17 - <i>Bubulcus ibis</i> Cattle Egret - G	Least Concern	1					1	
ARDEIDAE	21 - <i>Egretta garzetta</i> Little Egret - W	Least Concern	3						
ARDEIDAE	22 - <i>Ardea intermedia</i> (Yellow-billed Egret) Intermediate Egret - W	Least Concern	1						
ARDEIDAE	26 - <i>Ardea melanocephala</i> Black-Headed Heron - w	Least Concern	2		1				
Bucerotidae	420 - <i>Lophoceros nasutus</i> African Grey Hornbill - O	Least Concern		1					
Charadriidae	211 - <i>Charadrius hiaticula</i> Common Ringed Plover - PW	PM	1						
CHARADRIIDAE	226 - <i>Vanellus coronatus</i> Crowned Lapwing - G	Least Concern	8						
Cisticolidae	644 - <i>Cisticola aberrans</i> Rock-loving Cisticola - O	Least Concern			1			1	
Cisticolidae	645 - <i>Cisticola chiniana</i> Rattling Cisticola - O	Least Concern	1	2	1		1		
Cisticolidae	677 - <i>Camaropectera brachyura</i> Grey-backed Camaropectera – f	Least Concern	1		1		1	1	
Coliidae	369 - <i>Colius striatus</i> Speckled Mousebird – O	Least Concern	3						
Columbidae	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	Least Concern	9	4	2				
Columbidae	271 - <i>Turtur afer</i> Blue-spotted Wood Dove - f	Least Concern					1		

Columbidae	284 - <i>Streptopelia decipiens</i> African Mourning Dove - O	Least Concern	1					2	
Columbidae	289 - <i>Streptopelia senegalensis</i> Laughing dove - O	Least Concern	1			1			
Corvidae	855 - <i>Corvus albus</i> Pied Crow - f	Least Concern	1	1	4			1	
Cuculidae	309 - <i>Cuculus solitarius</i> Red-chested Cuckoo - AF	Least Concern	1						
Cuculidae	323 - <i>Centropus superciliosus</i> White-browed Coucal - O	Least Concern	3		1				
ESTRILIDIDAE	959 - <i>Lagonosticta senegala</i> Red-billed Firefinch - O	Least Concern					1		
Estrilididae	974 - <i>Uraeginthus bengalus</i> Red-cheeked Cordon-bleu - O	Least Concern	3						
ESTRILIDIDAE	981 - <i>Spermestes bicolor</i> Black-and-White Mannikin - f	Least Concern			12			2	2
FALCONIDAE	139 - <i>Falco peregrinus</i> Peregrine Falcon - F	Least Concern							
Hirundinidae	507 - <i>Hirundo fuligula</i> African Rock Martin - O	Least Concern			1				
Laniidae	815 - <i>Lanius excubitoroides</i> Grey-Backed Fiscal - Afw	Least Concern	10			1		1	1
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	Least Concern	5						
MEROPIDAE	385 - <i>Merops pusillus</i> Little Bee-eater - G	Least Concern	1						
MEROPIDAE	391 - <i>Merops orientalis</i> Little Green Bee-eater - P	PM	1						
MONARCHIDAE	739 - <i>Terpsiphone viridis</i> Paradise Flycatcher - f	Least Concern						1	
MOTACILLIDAE	516 - <i>Motacilla capensis</i> Cape Wagtail - W	Least Concern	1						
MOTACILLIDAE	527 - <i>Anthus trivialis</i> Tree Pipit - Pf	PM							
MUSCICAPIDAE	601 - <i>Myrmecocichla nigra</i> Sooty Chat - O	Least Concern							
MUSCICAPIDAE	713 - <i>Melaenornis edoloides</i> Black Flycatcher - f	Least Concern							
MUSOPHAGIDAE	296 - <i>Corythaeola cristata</i> Great Blue Turaco - F	Least Concern	1						
Musophagidae	376 - <i>Crinifer zonurus</i> Eastern Grey Plantain Eater – Wide spread	Least Concern	2		1				
NECTARINIIDAE	784 - <i>Cyanomitra olivacea</i> Olive Sunbird - FF	Least Concern			3				
NECTARINIIDAE	802 - <i>Cinnyris mariquensis</i> Marico Sunbird - F	Least Concern	1						
Numididae	142 - <i>Numida meleagris</i> Helmeted Guineafowl - O	Least Concern							
PHASIANIDAE	154 - <i>Dendroperdix sephaena</i> Crested Francolin - F	Least Concern							
PHOENICULIDAE	404 - <i>Phoeniculus purpureus</i> Green Wood Hoopoe - O	Least Concern	1						
PICIDAE	430 - <i>Pogoniulus chrysoconus</i> Yellow-fronted Tinkerbird - FF	Least Concern					1	1	

Ploceidae	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver - G	Least Concern	14						
PLOCEIDAE	928 - <i>Euplectes hordeaceus</i> Black-Winged Bishop - G	Least Concern	2						
PLOCEIDAE	933 - <i>Euplectes macrourus</i> Yellow-mantled Widowbird - G	Least Concern	1						
Pycnonotidae	562 - <i>Pycnonotus barbatus</i> Common Bulbul - f	Least Concern	8	4	10		1	4	
Rallidae	178 - <i>Zapornia flavirostra</i> Black Crane - W	Least Concern	9						
Sturnidae	872 - <i>Lamprotornis purpuroptera</i> Ruppell's Starling - O	Least Concern	2						
TURDIDAE	612 - <i>Turdus pelios</i> African Thrush - f	Least Concern							
ZOSTEROPIDAE	811 - <i>Zosterops senegalensis</i> Yellow White-eye - f	Least Concern					1		
			38	8	15	4	8	11	2

Annex-10: Detailed Checklist of Butterfly Species Recorded During the Survey

Family	Species Scientific and Common Names	IUCN Red List	Water Intake	WTP	TL and DL	MBR	Ciforo ESR	Pakele ESR	Dzaipi ESR
Lycaenidae	<i>Euchrysops subpallida</i> African cupid - O	Least Concern	7		5	2			
Nymphalidae	<i>Acraea encedon</i> Encedon Acraea - W	Least Concern	1						
Nymphalidae	<i>Acraea serena</i> Orange Acraea - W	Least Concern							
Nymphalidae	<i>Acraea sotikensis</i> Sotik Acraea - F	Least Concern		1	5				
Nymphalidae	<i>Acraea uvui</i> Tiny Acraea - W	Least Concern		8	18	8	3	4	2
Nymphalidae	<i>Danaus chrysippus</i> African Queen- M	Least Concern	1		2				1
Nymphalidae	<i>Hamanumida Daedalus</i> Guineafowl Butterfly - W	Least Concern	1	1	4	1		1	
Nymphalidae	<i>Hypolimnas misippus</i> Diadem - M	Least Concern				2			
Nymphalidae	<i>Junonia oenone</i> Blue Pansy W	Least Concern	4	2	4	2		1	1
Nymphalidae	<i>Junonia stygia</i> Brown Pansy – f	Least Concern			1			1	
Nymphalidae	<i>Junonia sophia</i> Little Commodore - W	Least Concern							
Nymphalidae	<i>Junonia terea</i> Soldier Commodore – W	Least Concern			2			1	
Nymphalidae	<i>Neptidopsis ophione</i> Scalloped Sailer - f	Least Concern	2		3	1		2	
Nymphalidae	<i>Pardopsis punctatissima</i> Polka Dot - W	Least Concern	1						
Nymphalidae	<i>Precis octavia</i> Gaudy Commodore - W	Least Concern	1						
Papilionidae	<i>Papilio demodocus</i> Citrus Swallowtail - M	Least Concern			2	3	1	4	
Papilionidae	<i>Papilio nireus</i> Narrow Blue-Banded Swallowtail - f	Least Concern			1			6	
Pieridae	<i>Belenois aurota</i> Brown-Veined White (Caper White) – M	Least Concern	1						
Pieridae	<i>Belenois creona</i> Common White (African Caper) - M	Least Concern	10						
Pieridae	<i>Catopsilia florella</i> African Migrant – M	Least Concern	9	3	19	3	4	5	6
Pieridae	<i>Colotis antevippe</i> Large Orange Tip – O	Least Concern	4		1		1		
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow – W	Least Concern	12	9	31	3	4	12	2
			13	6	14	9	5	10	5

Annex 11: Socio-Economic Survey Questionnaire

SOCIO-ECONOMIC SURVEY QUESTIONNAIRE TO BE ADMINISTERED TO HOUSEHOLDS WITHIN PROJECT AREA AS PART OF DETAILED ESIA BASELINE STUDY

Environmental and Social Impact Assessment For Adjumani Water Supply and Sanitation Project

Prepared for:



NATIONAL WATER & SEWERAGE CORPORATION

Plot 3, Nakasero

P.O. Box 7053

Kampala

NOVEMBER 2021

The interviewer is part of the Development of **Adjumani Water and Sanitation Infrastructural Project** team assessing the socio-economic baseline conditions in the project area. The information collected will be used for environmental & social impact assessment (ESIA). Your responses to questions herein will be treated with utmost confidentiality.

1: Interview Details

- 1.1 Interviewer's Name: _____
- 1.2 Date of interview: ____/____/2021
- 1.3 Name of respondent: _____
- 1.4 Phone number of respondent: _____ (Upon permission)

2: General Information of Household

- 2.1 District: _____
- 2.2 Sub-county: _____
- 2.3 Parish: _____
- 2.4 Village/zone/LC1: _____
- 2.8 Name of household head: _____
- 2.9 Nationality of the household head: _____
- 2.10 Age of household head
- | | | | |
|------------|--------------------------|-------------------|--------------------------|
| 1. (15-25) | <input type="checkbox"/> | 4. (46-55) | <input type="checkbox"/> |
| 2. (26-35) | <input type="checkbox"/> | 5. (56 and above) | <input type="checkbox"/> |
| 3. (36-45) | <input type="checkbox"/> | | |
- 2.11 Type of household head
- | | | |
|--------------------------------|--------------------------|---------------------|
| 1. Female headed | <input type="checkbox"/> | |
| 2. Male headed | <input type="checkbox"/> | |
| 3. Child headed below 18 years | <input type="checkbox"/> | Male____ Female____ |
- 2.12 Marital status of household head
- | | | |
|-----------------------|--------------------------|------------------------|
| 1. Single | <input type="checkbox"/> | |
| 2. Married | <input type="checkbox"/> | (No. of spouses): ____ |
| 3. Divorced/separated | <input type="checkbox"/> | |
| 4. Widowed | <input type="checkbox"/> | |
- 2.13 Household members living in the homestead
- | | |
|-------------------------------|-------------------------------|
| 1. 0-4years: _____ persons | 5. 20-24: years _____ persons |
| 2. 5-9 years: _____ persons | 6. 25-29: years _____ persons |
| 3. 10-14 years: _____ persons | 7. 30-34 years _____ persons |
| 4. 15-19 years: _____ persons | 8. 35-39 years _____ persons |

9. 40-44 years _____ persons
10. 45-49 years _____ person
11. 50-54 years _____ persons
12. 55-59 year _____ persons
13. 60+ years _____ persons
- 2.14 What is the total number of person in your household: _____ persons?
- 2.15 Vulnerability of household head:
- | | | | |
|------------------------|--------------------------|------------------------|--------------------------|
| 1. Physical Impairment | <input type="checkbox"/> | 6. Mental Disorder | <input type="checkbox"/> |
| 2. Hearing Disorder | <input type="checkbox"/> | 7. Any other (specify) | <input type="checkbox"/> |
| 3. child headed | <input type="checkbox"/> | | <input type="checkbox"/> |
| 4. Blindness | <input type="checkbox"/> | 8. None of the above | <input type="checkbox"/> |
| 5. Old age | | | |
- 2.16 Does your household have people with disability or chronically ill? YES / NO If YES, How many? _____
- 2.17 If YES: - Type of disability/illness: (Blind, deaf, lame, dumb, mental) (HIV/AIDS, Asthma, sickle cells, cancer, diabetes, Hypertension)
- 2.18 Of what Religious Affiliation is your household?
- | | | | |
|---------------|--------------------------|---------------------------|--------------------------|
| 1. Catholic | <input type="checkbox"/> | 4. Pentecostal/born again | <input type="checkbox"/> |
| 2. Protestant | <input type="checkbox"/> | 5. SDA | <input type="checkbox"/> |
| 3. Islam | <input type="checkbox"/> | 6. Others (specify) | <input type="checkbox"/> |
- 2.19 Ethnic group
- | | | | |
|--------------------|--------------------------|----------|--|
| 1. Madi | <input type="checkbox"/> | 4. Kakwa | |
| 2. Kuku | <input type="checkbox"/> | 5. Bari | |
| 3. Lugbara | <input type="checkbox"/> | | |
| 6. Other (specify) | <input type="checkbox"/> | | |
- 2.20 What is your Homestead size? (acre).....
- 2.21 What is the nature of your dwelling ?
- | | | | |
|---------------------------|--------------------------|----------------------------|--------------------------|
| 1. Brick wall | <input type="checkbox"/> | 5. Concrete blocks | <input type="checkbox"/> |
| 2. Mud Block | <input type="checkbox"/> | 6. Reeds, Thatch or Sticks | <input type="checkbox"/> |
| 3. Mud and wattle | <input type="checkbox"/> | 7. Stone | <input type="checkbox"/> |
| 4. Mud Block with plaster | <input type="checkbox"/> | | |
- 2.21 Tenure of homestead
- | | |
|--------------|--------------------------|
| 1. Customary | <input type="checkbox"/> |
| 2. Freehold | <input type="checkbox"/> |
| 3. Mailo | <input type="checkbox"/> |
| 4. Leasehold | <input type="checkbox"/> |
- 2.22 Assets/property owned by household (Tick multiple answer)
- | | | | |
|---------------------|--------------------------|-----------|--------------------------|
| 1. Land | <input type="checkbox"/> | 4. TV set | <input type="checkbox"/> |
| 2. House | <input type="checkbox"/> | 5. Radio | <input type="checkbox"/> |
| 3. Domestic animals | <input type="checkbox"/> | 6. Car | <input type="checkbox"/> |
| | <input type="checkbox"/> | | |

7. Motorcycle
8. Bicycle

9. Mobile phone

2.23 Are there any important cultural sites? ☐ 1=Yes ☐ 2=No

2.24 If yes, list sites: _____

3: Land Use, Land Ownership, and Crops

3.1 In what capacity do you live on this land?

- | | | | |
|---------------------|--------------------------|----------------------|--------------------------|
| 1. Landowner | <input type="checkbox"/> | 4. Squatter | <input type="checkbox"/> |
| 2. Tenant (Kibanja) | <input type="checkbox"/> | 5. Licensee(renting) | <input type="checkbox"/> |
| 3. Co-owner | <input type="checkbox"/> | 6. Encroacher | <input type="checkbox"/> |

3.2 How did you own this land?

- | | |
|---------------------------|--------------------------|
| 1. Bought | <input type="checkbox"/> |
| 2. Inherited from parents | <input type="checkbox"/> |
| 3. Renting | <input type="checkbox"/> |
| 4. Squatter | <input type="checkbox"/> |

3.3 How long have you used this land? _____ months/years Note if season, month, etc.

3.3 Do you use any other land apart from the one you own? ☐ 1=Yes ☐ 2=No
(Household head)

3.4 If Yes, list location (village, parish, or sub-county)

Condition of rented land

3.5 If land is rented, from whom?

- | | | | |
|--------------------------------------|--------------------------|------------------------------|--------------------------|
| 1. Relatives/clan members | <input type="checkbox"/> | 3. Land owner living outside | <input type="checkbox"/> |
| 2. Land owner in the same community. | <input type="checkbox"/> | 4. Government | <input type="checkbox"/> |
| | | 5. Others (specify | <input type="checkbox"/> |

3.6 Duration of contract of renting _____ years/months Note if season, month, etc.

3.7 Rent in case of cash/acre UGX _____ per year Note if season, month, etc.

3.8 Rent in other forms of payment (e.g., crops, livestock and animal produce)
_____ Describe

4: Livelihood activity

4.1 What is the Primary (main) Livelihood Activity of household head?

- | | | | |
|---|--------------------------|--------------------|--------------------------|
| 1. Farming | <input type="checkbox"/> | 6. Student | <input type="checkbox"/> |
| 2. Formal Employment | <input type="checkbox"/> | 7. Fishing | <input type="checkbox"/> |
| 3. Casual labour | <input type="checkbox"/> | 8. Brickmaking | <input type="checkbox"/> |
| 4. Trading | <input type="checkbox"/> | 9. other (specify) | <input type="checkbox"/> |
| 5. Service provision (salon, transport) | <input type="checkbox"/> | | |

4.2 What is the secondary Livelihood Activity of household head?

- | | | | |
|---|--------------------------|--------------------|--------------------------|
| 1. Farming | <input type="checkbox"/> | 6. Student | <input type="checkbox"/> |
| 2. Formal Employment | <input type="checkbox"/> | 7. Fishing | <input type="checkbox"/> |
| 3. Casual labour | <input type="checkbox"/> | 8. Brickmaking | <input type="checkbox"/> |
| 4. Trading | <input type="checkbox"/> | 9. other (specify) | <input type="checkbox"/> |
| 5. Service provision (salon, transport) | <input type="checkbox"/> | | |

4.3 If your primary livelihood is farming, specify the crops you grow?

- | | | | |
|-----------------|--------------------------|-----------------|--------------------------|
| 1. Beans | <input type="checkbox"/> | 6. Sorghum | <input type="checkbox"/> |
| 2. Maize | <input type="checkbox"/> | 7. Vegetables | <input type="checkbox"/> |
| 3. Irish Potato | <input type="checkbox"/> | 8. Others | <input type="checkbox"/> |
| 4. Sweet potato | <input type="checkbox"/> | (specify) _____ | |
| 5. Cassava | <input type="checkbox"/> | | |

4.4 In case **you rear** animals, specify (Tick Multiple answer).

- | | | | |
|------------|--------------------------|---------------------------|--------------------------|
| 1. Goat | <input type="checkbox"/> | 5. Sheep | <input type="checkbox"/> |
| 2. Cattle | <input type="checkbox"/> | 6. Rabbits | <input type="checkbox"/> |
| 3. Poultry | <input type="checkbox"/> | 7. Others (specify) _____ | |
| 4. Pigs | <input type="checkbox"/> | | |

4.5 In case of **tree planting**, specify which trees grown (Tick Multiple answer).

- | | | | |
|---------------------------|--------------------------|------------|--------------------------|
| 1. Pine | <input type="checkbox"/> | 4. Guava | <input type="checkbox"/> |
| 2. Eucalyptus | <input type="checkbox"/> | 5. Avocado | <input type="checkbox"/> |
| 3. Grevillea | <input type="checkbox"/> | 6. Orange | <input type="checkbox"/> |
| 7. Others (specify) _____ | | | |

4.6 In case of **fishing**, specify the fishing place: (Tick Multiple answer)

- | | |
|-------------------|--------------------------|
| 1. River | <input type="checkbox"/> |
| 2. Inland pond | <input type="checkbox"/> |
| 3. Lake (specify) | <input type="checkbox"/> |

4.8 Where do you sell your produce?

- | | | | |
|-------------------------|--------------------------|---------------------|--------------------------|
| 1. Local trading center | <input type="checkbox"/> | 4. Cooperative | <input type="checkbox"/> |
| 2. local produce buyer | <input type="checkbox"/> | 5. Market | <input type="checkbox"/> |
| 3. Farm gate | <input type="checkbox"/> | 6. Others (specify) | <input type="checkbox"/> |

5: Income and Expenditure

Income and Expenditure			
	Question	Answer	Remarks
5.1	Average Annual Income	UGX per year	Household head
Source of Income:			
5.2	Farming	UGX per month/season	
5.3	Formal employment	UGX per month	
5.4	Casual labour	UGX per month	
5.5	Trading	UGX per month	
5.6	Service provision	UGX per month	
5.7	Fishery	UGX per month	
5.8	Brick making	UGX per month	
5.9	Others (Specify)	UGX per month	
Expenditure:			
5.10	School fees	UGX per month (usually per term not month)	
5.11	Medical bills	UGX per month	
5.12	Food	UGX per month	
5.13	Transport	UGX per month	
5.14	Clothing	UGX per month	
5.15	Water	UGX per month	
5.16	Energy	UGX per month	
5.17	Rent	UGX per month	
5.18	Others (Specify)	UGX per month	

6: Health

6.1A what is the type of nearest health facility?

- | | | | |
|---------------------------|--------------------------|-------------------------------------|--------------------------|
| 1. Referral Hospital | <input type="checkbox"/> | 6. Maternity Clinic | <input type="checkbox"/> |
| 2. Church run hospital | <input type="checkbox"/> | 7. Community Health Centre | <input type="checkbox"/> |
| 3. privately run Hospital | <input type="checkbox"/> | 8. privately run clinic / Drug shop | <input type="checkbox"/> |
| 4. Health centre III | <input type="checkbox"/> | 9. Other (specify) | <input type="checkbox"/> |
| 5. Health centre II | <input type="checkbox"/> | | |

6.1 What is the distance to nearest health facility?

- | | |
|-------------------|--------------------------|
| 1. 100 meters | <input type="checkbox"/> |
| 2. 100-500 meters | <input type="checkbox"/> |
| 3. 1-1.5km | <input type="checkbox"/> |
| | <input type="checkbox"/> |

4. Over 5km
- 1.2 What is the distance to health referral facility?
1. 100 meters ☐
 2. 100-500 meters ☐
 3. 1-1.5km ☐
 4. Over 5km ☐
- 1.3 What are the most common diseases that affect the family?
- | | | | |
|----------------------------------|--------------------------|-----------------------------|--------------------------|
| 1. Malaria | <input type="checkbox"/> | | |
| 2. Cough | <input type="checkbox"/> | 5. Intestine Infection | <input type="checkbox"/> |
| 3. Water related diseases | <input type="checkbox"/> | 6. Ulcers | <input type="checkbox"/> |
| 4. Sexually transmitted diseases | <input type="checkbox"/> | 7. Skin diseases | <input type="checkbox"/> |
| | | 8. Other diseases (specify) | <input type="checkbox"/> |

7: Education

- 7.1 Education level of the household head
- | | | | |
|----------------------|--------------------------|-----------------------|--------------------------|
| 1. Primary Education | <input type="checkbox"/> | 5. University/college | <input type="checkbox"/> |
| 2. Ordinary level | <input type="checkbox"/> | 6. None | <input type="checkbox"/> |
| 3. A' level | <input type="checkbox"/> | 7. Junior | <input type="checkbox"/> |
| 4. Vocational | <input type="checkbox"/> | | |
- 6.2 Distance to the nearest primary school
- | | | | |
|-------------------|--------------------------|-------------|--------------------------|
| 1. 100 meters | <input type="checkbox"/> | 3. 1-1.5kml | <input type="checkbox"/> |
| 2. 100-500 meters | <input type="checkbox"/> | 4. Over 5km | <input type="checkbox"/> |
- 6.3 Distance to the nearest Secondary school
- | | | | |
|-------------------|--------------------------|-------------|--------------------------|
| 1. 100 meters | <input type="checkbox"/> | 3. 1-1.5kml | <input type="checkbox"/> |
| 2. 100-500 meters | <input type="checkbox"/> | 4. Over 5km | <input type="checkbox"/> |

8: Water supply and Energy

- 8.1 Primary (main) water source *(Tick appropriate response)*
- | | | | |
|-----------------------|--------------------------|-------------------------|--------------------------|
| 1. Communal borehole, | <input type="checkbox"/> | 5. Piped water in house | <input type="checkbox"/> |
| 2. Protected spring | <input type="checkbox"/> | 6. Open stand pipes | <input type="checkbox"/> |
| 3. Unprotected spring | <input type="checkbox"/> | 7. Piped water | <input type="checkbox"/> |
| 4. River/lake | <input type="checkbox"/> | 8. Rain water | <input type="checkbox"/> |
- 8.2 Sufficiency of water source
1. Sufficient throughout the year ☐
 2. Insufficient during dry seasons ☐
- 8.3 Distance to water sourced
1. 100 meters ☐
 2. 100-500meters ☐
 3. 1-1.5km ☐
 4. Over 5km ☐

8.4 Major Energy sources for cooking:

1. Firewood ☐
2. Gas ☐
3. Charcoal ☐
4. Solar ☐
5. Kerosene ☐

6. Biogas ☐
7. Electricity ☐
8. Other ☐

8.5 Major Energy sources for lighting

1. Firewood ☐
2. Gas ☐
3. Charcoal ☐
4. Solar ☐
8. Biogas ☐

5. Kerosene ☐
6. Electricity ☐
7. Other ☐

9 Gender and domestic violence

9.1 How would you rate the prevalence of domestic violence in this area?

1. None
2. Very rear
3. Relatively common
4. Rampant
5. Don't know

9.2 What are common abuses in this community? (Multiple response)

1. Battering/beating
2. Burning
3. Verbal abuses/insults
4. Attempted murder
5. Forced sex
6. Unwanted sexual touches
7. Marrying off girls early
8. Threatening violence against spouse or children
9. Use of proceeds/money without spouse consent
10. Preventing spouse from owning property
11. Preventing spouse from using family land
12. Stop spouse from talking/community meetings
13. Preventing spouse from working outside home
14. Engaging children in work instead of school
15. Not economically supporting family
16. Locking spouse or children out of house
17. Other.....

9.3 Who are the main victims of domestic violence in the area? (Multiple responses allowed)

1. Girls
2. Married women
3. Boys
4. Men
5. Children
6. Maids
7. Other _____
8. Don't know

9.4 Who are the perpetrators of the abuses? (Multiple)

1. Male spouse
2. Female spouse
3. Other relative
4. Clan elder
5. Community leader
6. Stranger

- | | |
|---------------------|------------------------|
| 7. Employer/boss | 10. Police man/soldier |
| 8. Male teacher | 11. Other..... |
| 9. Community member | 12. Male teacher |

9.5 Where are cases of gender and domestic abuses normally reported/referred?

(Multiple)

- | | |
|-------------------------------------|------------------|
| 1. Police | 7. Courts of law |
| 2. LC/community leaders | 8. Head-teacher |
| 3. Religious leader | 9. Health worker |
| 4. Clan leader | 10. Media |
| 5. NGO/CBO | 11. Others |
| 6. Sub-county/probation officer/CDO | |

10. HIV/AIDS

10.1 What is the prevalence of HIV/AIDS infection in this area?

- | | |
|-------------|---------------|
| 1. Very low | 4. Very high |
| 2. Low | 5. Don't know |
| 3. High | |

10.2 What factors are likely to contribute to the spread of HIV/AIDS in this area?

- | | |
|------------------------------|-----------------------------|
| 1. Poverty | 8. No HIV service providers |
| 2. Lack of information | 9. GBV |
| 3. Peer pressure | 10. Prostitution |
| 4. Alcohol abuse | 11. Early marriage |
| 5. Drug abuse | 12. Other _____ |
| 6. Parental neglect | 13. Don't know |
| 7. No antenatal care service | |

10.3 How can HIV/AIDS be controlled or reduce avoided? (Allow multiple responses)

- | | |
|--------------------------------------|----------------------------------|
| 1. Sensitization activities | 7. Engage HIV service providers |
| 2. Prevention of GBV | 8. Bylaws against early marriage |
| 3. Bylaws against prostitution | 9. Gender empowerment |
| 4. Promotion of ABC | 10. Testing & counselling |
| 5. Bylaws against drug/alcohol abuse | 11. Other (specify) _____ |
| 6. Improve antenatal care services | |

10.4 What are the sources of information about HIV/AIDS? (Multiple response)

- | | |
|-------------------------|-------------------------------------|
| 1. Television | 9. NGO/CBO/CSO |
| 2. Radio | 10. Religious leaders |
| 3. Newspapers | 11. Traditional leaders |
| 4. Billboards | 12. Local leaders/Political leaders |
| 5. Posters/brochures | 13. Family members |
| 6. Community outreaches | 14. Friends/peers |
| 7. Drama performances | 15. Others..... |
| 8. Health facilities | |

11. Credit:

11.1 Most important form of saving

- | | |
|---------------------|--|
| 1. Crops in storage | 4. Save with a local SACCO, |
| 2. Buy livestock | 5. Keep it with a friend/relative/at home, |
| 3. Deposit in bank | 6. other (specify) |

11.2 For answer 3 in Q 9.1 (Deposit in bank), Please specify.

Bank name, location, distance (Answer all)

1. Bank name _____
2. Location _____
3. Distance _____

11.3 Do you have access to credit service 1 ☐ Yes 2 = No ☐

11.4 If yes, what is the main source of credit service? (Tick multiple answer)

- | | |
|---|--|
| 1. Commercial banks <input type="checkbox"/> | 7. Government <input type="checkbox"/> |
| 2. Micro finance institutions <input type="checkbox"/> | 8. SACCO <input type="checkbox"/> |
| 3. Moneylenders <input type="checkbox"/> | 9. NGO <input type="checkbox"/> |
| 4. Input supply <input type="checkbox"/> | 10. Other (specify) <input type="checkbox"/> |
| 5. Self-help group <input type="checkbox"/> | 11. Not available <input type="checkbox"/> |
| 6. Internal (family and friends) <input type="checkbox"/> | |

10.5 If yes, main purpose of credit service

- | | |
|---|---|
| 1. Agricultural labor employment <input type="checkbox"/> | 6. Irrigation equipment <input type="checkbox"/> |
| 2. Seeds purchase <input type="checkbox"/> | 7. Livestock rearing <input type="checkbox"/> |
| 3. Fertilizer <input type="checkbox"/> | 8. Aquaculture <input type="checkbox"/> |
| 4. Agro-chemicals <input type="checkbox"/> | 9. Trading agricultural products <input type="checkbox"/> |
| 5. Farm machinery <input type="checkbox"/> | 10. Other (specify) <input type="checkbox"/> |

12. Project Awareness and Remark or opinion on the impacts

10.6 Have you been informed about the project in your area? 1=Yes 2=No

10.7 If yes, from whom did you learn about the project?

- | | |
|---|----------------------|
| 1. NWSC | 3. News |
| 2. Local Government (Parish chief, LCs, District/SC officers) | 4. Neighbors/Friends |
| | 5. Relatives |
| | 6. Others |

What is the project impact? Positive ☐

Negative ☐

A) If Positive,

1. will improve quality of life
2. will provide electricity accessibility
3. will improve agricultural productivity

4. will Increase job opportunity
5. will boost business in trading area
6. Others

B) Negative

1. will will displace people
2. will lose income/land
3. will invite community split/ conflict

4. Others

10.8 Are you in favor of the project? ☐ 1=Yes ☐ 2=No ☐
3=Undecided

10.9 If yes, are you willing to join or cooperate with project activities? (If they don't understand easily, explain by giving e.g.) ☐ 1=Yes ☐ 2=No ☐

10.10 Other concerns about project

Thank you for your valuable responses

Annex 12: Handling of Chemicals and Other Potentially Harmful Materials

Chlorine, a harmful and toxic chemical, will be employed at the storage reservoirs during project operation. Thus, it must be safely handled to prevent any accidents, including health and safety issues. This section analyses the handling aspects of this chemical.

a) Design and Management of Chlorination Storage and Dosing Areas

The following special storage and handling features should be utilized and maintained during the water supply project 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 in contact with gaseous or liquid chlorine, and keep this equipment free from contaminants, including oil and grease;
- (iv) Store chlorine away from all sources of organic chemicals, and protect from sunlight, moisture, and high temperatures.

b) 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 labelled and appropriate hazard warning should be posted in accordance with site specific operating procedures;

- (v) 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;
- (vi) Containers should be stored and used above ground level and always in a vertical position;
- (vii) Chlorine gas containers should be stored in marked areas shielded from external heat sources;
- (viii) 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;
- (ix) Empty cylinders should be clearly marked and segregated from unused cylinders

Annex 13: Police Reports

CRIMINAL REPORT FROM JAN - MAY 2022.						
SL NO	NUMBER OF CASE	JAN	FEB	MARCH	APRIL	MAY
	DOMESTIC VIOLENCE	25	30	40	19	15
	DEFILEMENT	14	10	10	09	10

03 JUN 2022

ADJUMANI DISTRICT POLICE STATION.
TRAFFIC AND ROAD SAFETY ACCIDENT STATISTICS AS AT JANUARY 2022
MAY 2022.

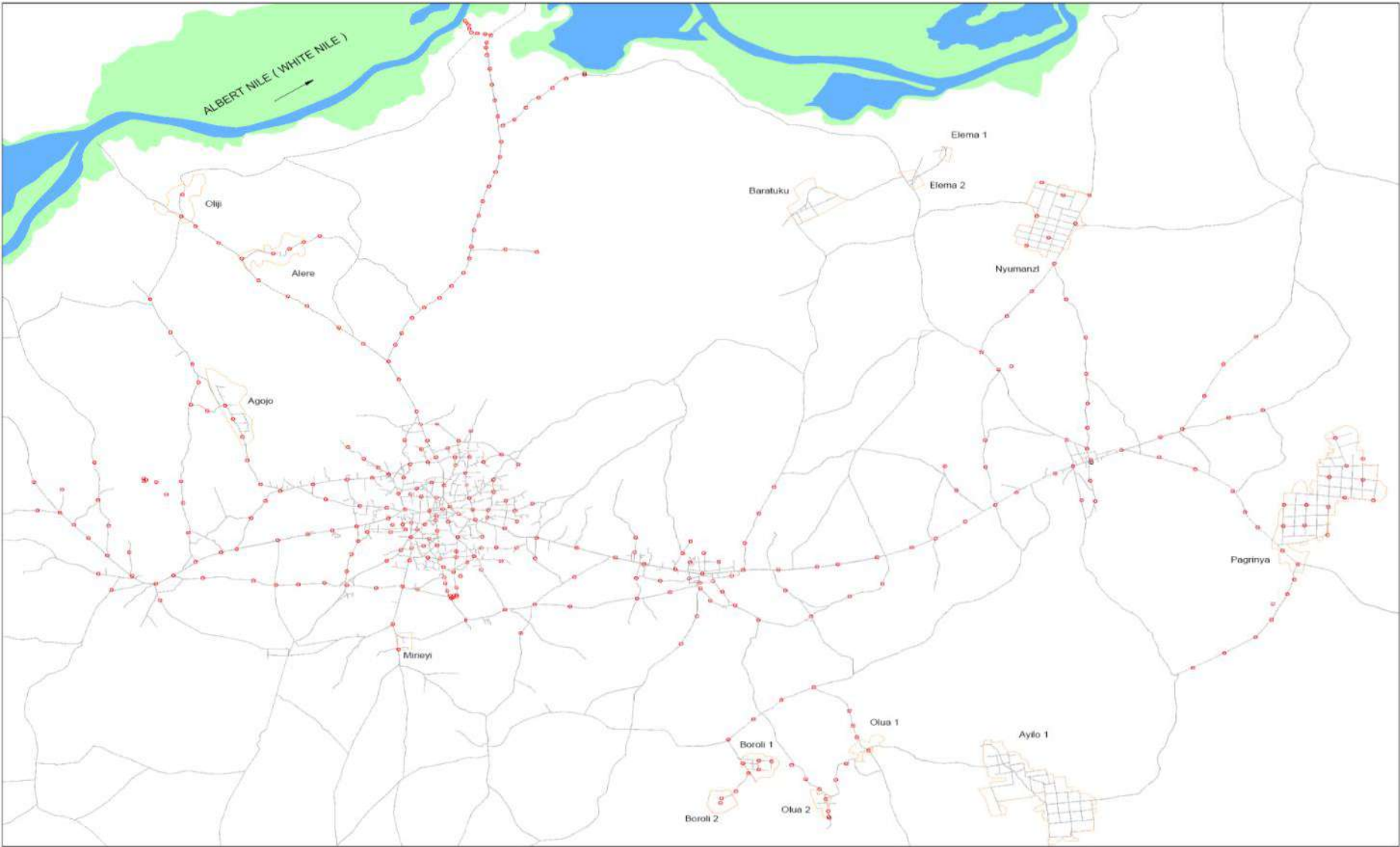
MONTH	MINOR	SERIOUS	FATAL	TOTAL
JANUARY	02	06	01	09
FEBRUARY	05	10	01	16
MARCH	01	12	—	13
APRIL	02	06	02	10
MAY	03	10	01	14
G/TOTAL	13	44	05	62

03 JUN 2022

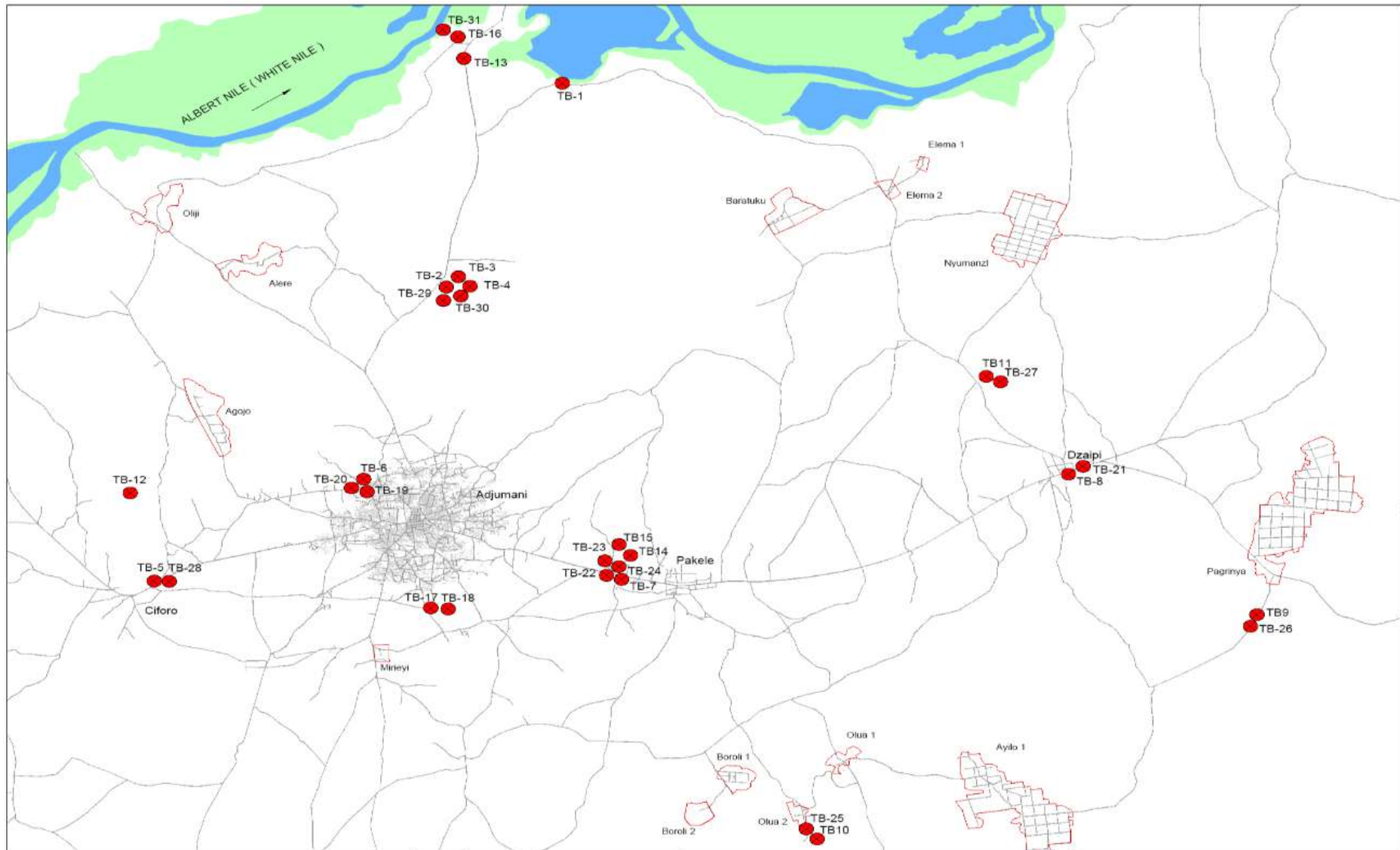
Annex 14: Geotechnical Reports

Geotechnical investigations were carried out in the project area by the Feasibility team for both test pits along the pipeline alignment and trial bores at important locations of water and sanitation infrastructure. The test pits were taken up to 2m depth and at some locations up to 3m depth. The tests were used for soil classifications and checking soil characteristics. The trial bores were drilled up to 10-15 m depth depending on the type of proposed structure. The trial bore samples are tested to get the safe bearing capacity of the soil at important infrastructure locations. The locations for test pits and trial bores are shown in below

Test pits drilled the project area



Trail bores taken in the project area



Annex 15: Meeting Minutes for Adjumani WSSP

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT		
PROJECT ACTIVITY NAME/PLACE:	Adjumani ESIA/Meeting with the Deputy RDC Adjumani Town Council Adjumani district	
Consultant	JBN Consult & Planners Ltd	
Minutes by:	Ainembabazi Joshua	
Reviewed by:	Pamela Tashobya	
Date of Meeting:	29 th /11/2021	
Meeting Venue:	Council Chambers	
Meeting Minutes Version number:	001	
Meeting Start Time:	9:30 am	
ATTENDEES (See attendance register attached)		
Name	Position	Email
AGENDA		
<ol style="list-style-type: none">1. Prayer2. Self-Introductions3. Remarks from the Chairman of the meeting4. Communication from JBN about the project5. Reactions and Answers6. Way Forward		
MEETING MINUTES and PROCEEDINGS		
Min 1: Prayer Mr Epecu led the prayer for the meeting.		
Min 2 Introduction of members present The members from JBN Consult & Planners Ltd and NWSC introduced themselves and this was followed by introduction from the local government members (See appended list)		
Min 3: Welcome Remarks from the Adjumani District LC5 Chairman In his welcome remarks, the Adjumani District LC 5 Chairman thanked JBN Consult & Planners Ltd and NWSC for coming to do ESIA consultation with Adjumani local government. He stressed that this was a good step going forward. He also thanked the Government of Uganda (GU) and the World Bank for proposing to rehabilitate and maintain the water supply points noting that it will improve economic development of Adjumani district and the entire North Western		

region. He added that Adjumani local government is ready to cooperate with NWSC given that the contractor has taken a good step to come and consult them about the anticipated social and environmental challenges that will impact on the project implementation. He further noted that the water extension, rehabilitation and maintenance is long of due given the many water related issues as a result of the poor maintenance and monitoring systems in some communities. He also pointed that the community expects clean and hygienic water because the previous contractor did not compile with some social and environmental aspects.

Min 4: Remarks from the Deputy RDC.

In his opening remarks, he appreciated the time invested in by the government and the relevant project stakeholders to come to the community to listen to the voices of the local people regarding the water issues which are faced.

He highlighted the urgent need for the consistent flow of water and further stressed the complaints and issues regarding the compensation details from the government.

Min 5: Remarks for the Consultant

In his project brief, the ESIA Team Leader thanked the Adjumani District LC 5 Chairman and his team for convening. He pointed that JBN Consult & Planners Ltd and NWSC were here to set a pace as required by the World Bank who is the funding of the Adjumani ESIA Water Supply and Sanitation Project. He also stressed that the stakeholder consultation is key in project preparation in order for the project to be successful and to be acceptable in the project area. And therefore, emphasized the need of consulting the district political and technical team to gather their views about the water and sanitation project. He also pointed that JBN Consult and Planners has been contracted by NWSC to undertake the social and environmental studies and these studies can only be fruitful if the views/fears of the respective stakeholders that are affected by the project are gathered and addressed. He noted that social and environmental concerns pertaining to the project should be discussed out without fear by the local government staff.

The Team Leader made a presentation of the Project including:

- Project Background
- Project Description
- Potential Project Impacts

Min 6: Issues raised by the RDC regarding the water projects

The RDC pointed out that the water within Adjumani Town Council mixes with the septic tank waste which pollutes the clean water and in the long it will affect the health of the community members. He also said that they have 2 flash toilets in Adjumani market since 2015 to date which are not in use by the community. He also stated that they don't have a sewage system in Adjumani but only have septic tanks which are not long lasting. He further stated that there is a plan in place for the construction of lagoons and other locations for water points but there

is inadequate finances therefore NWSC should consider helping the community in constructing the lagoons.

He highlighted out saying that there is a high rate of water shortage and further stated that the machines used usually breakdown and this forces the community members to move long distances in search for water.

Min 7: Reactions and Way Forward

Comments	Responses
1. The District Labour Officer wondered if the contractor will pay compensation for the workers that will be affected by accidents at the work place?	NWSC will follow guidelines written in the Workers Compensation Act 2000 which state that: “if personal injury by accident arises out of and in the course of a worker’s employment, the injured worker’s employer shall be liable to pay compensation in accordance with the Act.
2. The Adjumani District LC5 Chairman inquired if promotion of gender equality and empowerment will be considered in project implementation?	Gender is a key component of the project. The World Bank is aware that women in the project area are vulnerable and for that reason, the project would want to leave them better than it found them. As part of women empowerment women will be considered when recruiting workers so as to improve their livelihoods.
3. The Resident District Commissioner Adjumani District (RDC) was concerned that some workers at NWSC office are not approachable. This will affect the exchange of information between the local government and the contractor.	The project manager responded that he was not aware of such instance and that it is unfortunate if they are happening. He promised to ensure that social relations between the contractor and host communities are cordial.
4. The Adjumani District LC 5 Chairman inquired if local people will be recruited by the contractor?	The project manager acknowledged that some local people will be employed on the project especially if they meet the requisite qualifications. The ESIA Team Leader further cautioned that the locals who will be employed on the project need to be hard working.
5. The district councilor and youth deputy speaker sought clarification on compensation of an employee in case of accident and even death on site.	The ESIA team leader cautioned the members present that, there is need for proper documentation in case a worker dies or is injured on site. This allows for processing proper compensation as stipulated in the laws of Uganda.

	He also observed that there is normally poor documentation of accident cases which renders it difficult to follow up compensation for the victims.
6. The District Probation Officer inquired if child protection will be adhered to during the rehabilitation works?	The ESIA Team Leader informed the meeting that child labor will not be allowed by the contractor. He further pointed that World Bank is very keen of issues of child abuse.
7. The Adjumani District LC5 Chairman cautioned the contractor against the spread of HIV/AIDS in the community.	<p>The ESIA team leader responded that the caution of contract workers speeding HIV/AIDS has been noted. He added that it will be recommended that the contractor formulates mitigation measures on the spread of HI/AIDS and this will include; Voluntary Testing and Counseling, provision of ART and condoms etc. for the workers.</p> <p>The contractors will have HIV/AIDS policy and programs for the community and the workers.</p>
8. The District LC 5 Chairman requested that the construction time table be shared with district officials for easy monitoring of the project.	The ESIA team leader added that according the National Water and Sewerage Cooperation (NWSC) guidelines the district technical team has a mandate and responsibility to attend site meetings and he hopes this will be the case for this project.
<p>Way Forward</p> <p>There is need for National Water and Sewerage Corporation (NWSC) to do continuous sensitization in the communities.</p>	
<p>Closing Remarks</p> <p>The Resident District Commissioner (RDC) noted that Adjumani district local government is glad for the ESIA stakeholder consultation because some contractors do not bother to come for consultations and this result into conflict with the host communities. He pledged to support the project implementation.</p> <p>And there being no other business, the RDC adjourned the meeting at 12:20 pm</p>	

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT

PROJECT ACTIVITY NAME/PLACE: ADJUMANI ESIA/Yihwa Parish-Adjumani District

Consultant JBN Consult & Planners Ltd

Minutes by: Ainembabazi Joshua

Reviewed by: Pamela Tashobya

Date of Meeting: 30th /11/2021

Meeting Venue: Adjumani District Local Government Council Chambers

Meeting Minutes Version number: 002

Meeting Start Time: 11:00 am

ATTENDEES (See attendance register attached)

No	Name	Position	Email Address

AGENDA

7. Prayer
8. Self-Introductions
9. Remarks from the Chairman of the meeting
10. Communication from JBN about the project
11. Reactions and Answers
12. Way Forward

MEETING MINUTES and PROCEEDINGS

Min 1: Payer

Prayer was led by the LC1 Chairman.

Min 2: Introduction of members present

The team from JBN Consult & Planners Ltd introduced themselves which was followed by introduction of the local government members.

Min 3: Welcome Remarks from the Deputy Chief Administrative Officer (CAO)

He thanked the team for consulting with the district officials. He also thanked the Government of Uganda and the World Bank for financing the water project because it is a fundamental water undertaking that connects the entire District of Adjumani and above all he thanked NWSC and JBN Consult & Planners Ltd for consulting because other contractors never come for such activities.

Min 4: Remarks from JBN and NWSC

In her opening remarks, Pamela the social development specialist thanked the Deputy Chief Administrative (CAO) and all district local government staff for convening. She pointed that JBN Consult

& Planners Ltd and NWSC were here to set a pace as required by the World Bank who is the one funding the Adjumani ESIA Water Supply and Sanitation Project. He also stressed that the ESIA Water Project cannot go forward without consulting the district political and technical team to gather their views about the water extension, rehabilitation and maintenance works. He added that the stakeholder consultation comes against the backdrop of similar water projects in the country that run into problems because there was inadequate compliance with environmental and social issues and it is important that this Water Project does not fall victim. She also pointed that JBN Consult and Planners has been contracted by NWSC to undertake the social and environmental studies and these studies can only be fruitful if the views/fears of the respective stakeholders that are affected by the project are gathered and addressed. she noted that social and environmental concerns pertaining to the project should be discussed out without fear by the local government staff

In her project brief, the project manager described that this project is a rehabilitation and maintenance project. Thus, it will take place on the existing water alignment. Given that, the water is existing no further land will be acquired for this purpose. He pointed that rehabilitation works will include; improvement in better pipe materials, billing systems and charges.

Min 5: Issues raised by the Deputy Chief Administration Officer (CAO)

The CAO stated that the project has been long overdue since its proposal by the government and he also said that the community at large has been suffering while getting water boreholes. He added that the power supply is irregular.

He said that the town of Adjumani district is big and there is no sufficient water supply especially during the period between November-March which experiences a severe dry spell therefore getting the water is not an easy process.

He went on to say that the women need water for the purpose of cooking, drinking, washing and further added that considering the population and the influence of the refugees who are about 236,000 and the host community members of about 245,000 in number respectively rely on the bore holes and the few springs which are available.

He also pointed out that the Adjumani has been partnering with UNICEF who have been providing the water to the community and added that River Nile which is less than 12Km is untapped and concluded that this can be an opportunity.

He further said that the current water supply is paid for and they use boreholes which supply water using motorized mechanism. He also added the water project will lead to the destruction of the ecosystem since the project activities such as cutting down the trees will lead encroachment of the green environment.

He also proposed that there should be the need to plant trees where necessary especially for the trees that will be cut.

He emphasized that the water project contractors should consider to employ the local community members and he also urged the contractors and other project workers to refrain from engaging in sexual related activities.

He pointed out that the rate of teenage pregnancies is high as a result of Covid-19 and he later on said that the children have now been engaged in the farming activities.

Min 6: Remarks about the Grievances.

The Chief Administrative Officer (CAO) stated that there is a GRC composed of seven members and the CAO is the chairman. He said that they address concerns such as labor issues, under payment of workers, under payment of workers, sexual harassment.

He said that they use the same administrative structure composed of the Deputy Chief Administrative Officer (CAO) as the chairman, 2 women representatives and others.

He went on to say that they have a grievance log book to record all the issues and added by saying that incase the members are not satisfied, they can go to court or police.

Min 7: Remarks on the social issues by the Chief District Officer (CDO) and the Labor Officer.

The CDO said that the prevalence rate for child labor is high and the children are working for money at quarries, sand mining sites and landing sites. He further stated that there are children in town who are selling foods such as maize, eggs chapattis etc. on behalf of their families.

He emphasized that the rate at which family members engage the young children in productive activities such as farming and rearing of animals is high but highlighted that they don't work for money.

He said that the registered number of child marriage and teenage pregnancies is about 800 cases. He added that Adjumani Town Council has one of the highest child marriages in the whole district and he went on to say that this high rate of child marriages, has been triggered by poverty, the illiteracy levels and the Covid-19 pandemic especially during the lockdown that kept the children at their homes.

He highlighted that the levels of school dropout are very high.

Min 8: Remarks about the GBV by the CDO

The CDO pointed out saying that the GBV rates were high and this is attributed to the Covid-19 pandemic which called for the lockdown hence further worsening the GBV rates. This in turn increased physical and sexual cases which were reported more often. He highlighted that rate of sexual abuse of young girls and the married women has drastically increased and went on to encourage the project contractors and engineers to work as a team to sensitize the communities and other project workers on the issue sexual abuse. He later on emphasized that the issues of non-payments and under payments should be addressed by the project contractors. He added the problems associated with land for example land acquisition and the borrow pits which are left wide open after deep excavations within the land surfaces should be filled to overcome any incidental accidents.

He cautioned that the issues of alcohol intake such as drunkenness should be controlled by the project contractors and the workers to be able to mitigate certain vices like sexual harassment cases.

He also encouraged the project contractors to issue contracts to the project workers and added by saying that termination of the workers' contract without justification or notification should be reported and handled by the concerned personnel.

He urged that during the commencement and implementation phases of the water project, nepotism should highly be discouraged and prohibited therefore considering to recruit and employ the locally based community members who seek for job opportunities with the aim of bettering their standards of living.

Min 9: Remarks about the Grievances by the CDO

The CDO highlighted out that there is urgent need to screen employees as a remedy for mitigating HIV/AIDS and urged that there should be an HIV/AIDS policy in place which creates awareness about the disease. He further added that the workers with HIV/AIDS should ensure that they have access to ART services.

He suggested that the water project contractors should involve the district officials when monitoring the project activities and the project proceedings and he further stated that there should be use of the PPE'S to ensure that workers are given PPE'S to be protected during the project proceedings pf the work.

He went on to say that there should be strong codes Of conduct by the water project contractors for the workers to abide to.

Min 10: Remarks from the Office of The Prime Minister (OPM)

Mr Andeyee Robert mentioned that Adjumani District has 19 sub-settlements with different tribes and he also added that tribal conflicts are not there and common since day because they were sensitized about being unified and living in harmony. He said that the total population is made up of 230,000 people.

He pointed out that the community has different project partners as relevant stakeholders like the LWF who is the main partner. He stated that initially they have boreholes which supply the community with water and they have been upgraded to motorized water system though the motorized water system doesn't cover the entire settlements.

He stressed that the community has been having a challenge of water shortages and said that it would be good if the water project was brought to the community and extended to other communities. He further pointed out that the selected settlements are the ones which have WSCs and they have a monthly fee charge for the water paid by all community households. He added that they hire trained pump technicians/mechanics who fix the damaged or broken-down boreholes majorly by the LWF. He also said that the motorized system of pumping the water uses solar and the generators.

He stated that when the pipe lines pass in settlements, they won't have issues of compensation since only the crops will be affected most. He urged that the water contractors and all the stakeholders involved should engage with the leaders in each settlement to talk to the communities addressing them about the water project. He added that the different camp commandants are involved to support the team in case of any challenges.

He proposed that in the event when the water project has commenced when there are job opportunities, the project contractors should ensure that they consider the local based community

members inclusive of the refugees especially those living within the settlements. He further added that they don't encourage the employment of the children since it's against the laws of Uganda.

About the GBV, he highlighted that the situation is bad and the GBV rate increased especially during the surge of the Covid-19 pandemic. These cases have been witnessed within the settlement camps. He also added that the community leaders should be involved so as to sensitize the communities on the likely social risks.

He also encouraged the water contractors to partner with and also involve Lutheran World Federation (LWF) when implementing the water project since the hygiene and the sanity of the water is handled by LWF.

He stated that the Refugee Welfare Councils is composed of 11 members who form the Local Council System and therefore the project should continue using the existing structures. He proposed that the water contractors should work hand in hand with the field camp commandants and the police, he also added that they have a service provider for example the Medical Teams International (MTI) who is responsible and is in charge of handling all the health-related issues.

Min 11: Remarks by the Lutheran World Federation (LWF)

He pointed out that the distance taken for going to collect the water from the water source is far and this leads to the ease of sexual harassment by the adolescent boys and some men unto the girl child. He added that there should be installation of solar lights within the camps to illuminate the water collection points during night hours.

He further stated that the girl child is usually sent to go to fetch water and he went on to say that there should also be restrictions in place to use the water points. He went on to highlight that there is a challenge of accessing water from the boreholes when they breakdown and he added that they have water use committees where each household contributes a monthly water fee to have access to the water.

He also highlighted that they have a motorized system within the settlements which assist in the process of pumping water and he added that large institutions like the schools, the health service centers are supported by LWF

Min 12: Reactions and Way Forward

Comments	Responses
1. The District Assistant Chief Administrative Officer inquired how many local people will be employed on the project.	The project manager pointed that there is no specific employment quota that will go the local people in the district but, he acknowledged that local people in Adjumani will be given employment on the project. He also clarified the employment will be given on competitive basis especially as far as the requisite skills are

	concerned. He also pointed women will be employed so they should be proactive and apply for the available jobs.
2. The Deputy Chief Administrative Officer inquired if the contractor will have an HIV/AIDS training program for the employs given that the majority of the workers will be sexually active age?	Pamela from JBN Consult & Planners Ltd acknowledged that HIV/AIDS testing and voluntary counseling will be integrated in the social management plan during project implementation. This plan will include the HIV/AIDS mitigation measures.
3. The Mayor inquired if the borrow pits will be restored to support agriculture given that it is the main economic activity along the project?	Pamela from Consult and Planners pointed that all borrow pits will be restored as per the guidelines stipulated by National Environment Management Authority when the approval certificate was issued.
4. The Deputy CAO observed that the previous contractor did a poor job on the water systems and facility therefore there is a lot of anxiety and expectation from NWSC. How is NWSC going to manage this anxiety?	Pamela from JBN Consult & Planners Ltd pointed that the contractor (NWSC) will engage with all stakeholders to sensitization them about the scope of the project. It will also ensure that the relevant authorities are updated on the progress of the project.
5. The mayor pointed that there is poor drainage at Yihwa trading center when the rains fall.	The project manager (NWSC) pointed the design has captured some of these troublesome spots and they will be improved during the water project implementation phase.
6. The senior hospital administer Adjumani inquired if the NWSC has a Corporate Social Responsibility (CSR) plan to renovate hospitals in the area that will handle the influx of workers?	The NWSC Project Manager informed the meeting that there was no such CSR plan at present. In regards to their workers who may be in need of health care, the company will offer a good medical package on health insurance of all employees. He further noted that the CSR issues need further engagement with the relevant officials.
7. The Deputy (CAO) pointed that there are many utility services that are going to be disrupted by the implementation phase works. Does the contract have a plan to ensure that utilities are not affected?	The project manager noted that this observation is important. He added that all utilities along the area where the pipelines will be laid and aligned are going to be identified before construction commences this will enable the contractor to minimize disrupting them.

13. One of the community members inquired if the labor force will be employed and recruited from the local based community population and further expressed about the worry of the contractors underpaying the locals?	Pamela responded that there will be a gazetted point in Adjumani town where the community members will submit in their application details and added that about 65% of the local population would be recruited by the water project contractors.
14. One of the community members inquired if the water is extended to big institutions and organizations such as the schools, churches and other medium enterprises, will they also be charged the same rate of the bills as the individual stakeholder for water usage?	Yes, water will be connected to institutions once it is treated.
Way Forward There is need for National Water and Sewerage Corporation (NWSC) to do continuous sensitization in the communities.	
Closing Remarks In his closing remarks, the LC5 Chairman Adjumani District noted that the ESIA Water Project is an indication that the president of the Republic of Uganda is committed to social and economic development of country through implementation of vision 2040. He further noted that it is good to consult the communities so as to mitigate social and environmental challenges that may arise from development projects and he thus thanked the team JBN Consult & Planners Ltd and NWSC for taking the responsibility to come for ESIA consultation with the local government. He urged the contractor to ensure there is continuous engagement with local government as this will make his work easier. Closure: There being no other business, the RDC adjourned the meeting at 1:00 pm.	

Community

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT	
PROJECT ACTIVITY NAME/PLACE:	Community meeting with the ladies at Unna Bakari Market. [Pacara Sub-County, Unna Central, Unna Village, Adjumani District.]
Consultant	JBN Consult & Planners Ltd
Minutes by:	Ainembabazi Joshua

Reviewed by:	Pamela Tashobya
Date of Meeting:	31 th /11/2021
Meeting Venue:	Bakari Market
Meeting Minutes Version number:	003
Meeting Start Time:	9:00 am

ATTENDEES(See attendance register attached)

No	Name	Position	Email Address

AGENDA

1. Prayer
2. Self-Introductions
3. Remarks from the Chairman of the meeting
4. Communication from JBN about the project
5. Reactions and Answers
6. Way Forward

MEETING MINUTES and PROCEEDINGS

Min 1: Prayer

Prayer was led by the LC1 chairman

Min 2: Introductions and remarks from the chairman

Members from JBN team introduced themselves. Parish chiefs and the Local Council leaders present also introduced themselves.

Min 3: Welcome Remarks from Chairman

The Chairman LC 3 Pacara Sub-County thanked the team from JBN Consult and Planners for consulting with the community and he pointed that the project was timely. He noted that his community is besieged by social problems which include prostitution and child pregnancy. For this reason, JBN has taken a good step to come and consult the community before the contractor can commence his road works.

Min 4: Communication from JBN Consult & Planners Ltd

In her opening remarks, Pamela thanked the members present for convening on short notice. She pointed out that the Adjumani ESIA Water Supply and Sanitation project is about the extension, rehabilitation and maintenance of the Water Supply Points. The just mentioned water project is meant to cover the entire district of Adjumani. Pamela informed the meeting that the team from JBN was

contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of water projects that have run into problems due to poor compliance to environmental and social issues. She pointed that the community members in Pacara Sub-County are crucial stakeholders in this water project whose input to the ESIA formulation is highly welcome. In her conclusion, she begged the community members to be forthright and point out the social and environmental issues that would impact on the project implementation.

Min 5: Challenges raised by the ladies about the water.

One of the ladies highlighted that there is lack of sewerage pipes to connect to the ecos and further stated that during the wet conditions, the land becomes wet up and the latrines fall in. She further stated that the number of boreholes is less and sometimes there is no money to replace the boreholes.

Some ladies don't receive money for borehole charges from their husbands and further went on to state that the distance from the water source is too far. The water is insufficient and not clean usually stained with a brownish/orange like colour.

Another lady, stated that some borehole water dries out during the dry season.

Min 6: GBV issues raised by the ladies.

The ladies responded positively by saying that they are willing to co-operate with the activities of the project since they believe that there won't be any cases of violence.

Min 7: Recommendations from the community ladies.

The ladies requested that the youth in the community should be given the opportunity to work/take part in the project activities. The ladies stated that the contractors don't want to pay cash for what they buy from the community traders. Therefore, they request that the contractors and project workers should pay them the cash for their bought items.

The ladies are worried that the contractors may take alcohol and abuse it, therefore harassing them sexually. The ladies also proposed that, they wish to provide catering services to the contractors.

Min 8: Hygiene issues raised by the ladies

The ladies have handwashing facilities which they use after latrine usage [defecation]. The ladies highlighted that majority of the community members use spade and put in latrines. They further stated that they dig small holes for children under 5 years of age where they can dispose of their human excreta. Regarding the water storage, they keep it in jerry cans and store it in pots [2-3 jerry cans].

The ladies stated they don't boil water for drinking therefore the water should be treated properly since they are not used to cooking. The ladies within the community normally collect and burn the solid wastes. The ladies pointed out that they have a VHT worker in UNNA village.

Min 9: The presence of the VHT worker in UNNA village.

Roles	Advise	Limitations
The VHT stated that the primary role is to move around the community while monitoring the sanitation of the home.	The VHT stated that if the sanitation condition of the home is poor, she advises them to clean around and also sensitize them about the danger involved in the process.	The VHT stated that some community members don't pick up information early enough. The VHT has to visit them yet the transport is not adequate enough to facilitate movement throughout the whole village which is big.
The VHT further stated that she also visits the sick people and monitor their health conditions		The VHT also noted that time keeping is a major challenge in case of any problems.

Min 10: Remarks from the Medical Teams International (MTI).

One of the members of the MTI highlighted that in Adjumani district, the overall water distribution is about 17.4% per capita i.e. 1.20 liter jerry can per day. He also highlighted out that the settlements have low water supply

He also stated that there is flooding in Adjumani which ended up affecting some settlements (Brolali and Pagrinya) and this led to the destruction of the water sources which were being used by the community members. He added that at the different health facilities, they use tap water which is run by a motorized mechanism.

He highlighted out the prevalence rates of the common wash and sanitation diseases according the UNHCR report in 2021 in the settlement as acute watery diarrhea, skin diseases at 6% and added that they have got 2% of the OPDS, eye conditions diseases related to hygiene and water at 2%, intestinal worms at 2%. He further stated that malaria is the highest burden with a percentage between 30%-50% which is always at a peak during the month of September and the respiratory diseases at 14%.

He pointed out that in Adjumani district, the overall prevalence rate of HIV/AIDS is at 2.9% with the positivity rate of HIV/AIDS at 0.9% in the last financial year and added that positivity is higher and common in nationals at 1.8% while for the refugees, the positivity rate stands to be at 0.8%.

The MTI provide preventative services to the community members such as the distribution of condoms to the different settlements and added that they have different distribution points for the condoms.

He also said that they get condoms from UNHCR and IDI which is the main supplier and leading partner within the region.

They said that there is existence of awareness by the community members through various forms such as using different structures with the adolescent groups, peer leaders and educators to sensitize the community members about the diseases and other health related issues.

They went to say that they male champions who help in enhancing the awareness programs and who help in bringing the women for antenatal care. He also added that they use VHTs to sensitize the community members and in the distribution of condoms.

He also stated that focus has been on the adolescents since they have stayed at for a long time.

About Covid-19 pandemic, they said that the district level had more Covid-19 cases during the second wave between the periods June and August with Dzaipi Sub-county having the highest number of Covid-19 cases. He added that according to the Covid-19 surveillance report, the overall Covid-19 cases were 1021 cases in Adjumani district with 156 cases from the refugee settlement camps, 860 cases from the nationals and 5 cases from the foreigner and also there was a recorded death rate of 19 community members who died, 14 reported deaths from the host community, 4 reported deaths from the Refugee Settlement Camps and 1 reported death of a partnering member of the community who was a staff of Plan International.

From the District Council Surveillance report 2021, they stated that Covid-19 testing services are available at Health Service centers and the outreach service centers and added that the uptake of vaccination has improved and this is attributed to the tremendous sensitization efforts and input from the VHTs, the political leaders and other key stakeholders like the Resident District Commissioner (RDC), the Covid-19 task force and the implementing partners.

About the SGBV, due to the negative impact paused by the lockdown and the Covid-19 pandemic, Adjumani district has had a high rate of SGBV cases with the victims coming from the refugee and the host communities.

Min 11: Reactions and Way Forward

Comments	Responses
1. One of the community members inquired about the duration and when the project will start?	The project will commence after the ESIA study has been complete and the necessary clearance for the project are secured by the contractor. This could take some few months.

2. One of the community members inquired about if there will be water taps distributed in all the villages?	Pamela responded that there will be community taps distributed within the different settlements for easy and quick access of water
3. One of the community members inquired if NWSC won't affect other water lines that have already been implemented?	Pamela responded that the existing water lines and pipes will be re-installed to better conditions by using materials that don't rust.
4. The ladies inquired whether there will be opportunities for the community in the project area.	Pamela pointed that there will be enormous benefits and opportunities influenced by the water project such as the catering service provision, clean water and employment opportunities.
7. The community members inquired about whether the project contractors are going to bring ladies from Buganda to cook food for them?	Pamela responded that it wouldn't be possible and therefore this gives chance to the women of Adjumani district to provide these catering services to the project contractors and the workers.
8. Mr Adiku Maciliuci inquired how local people will benefit from the project.	Pamela responded that Local people will benefit in several ways; first they will get a better road, secondly there will be opportunities for employment during the road works which could increase household incomes, it will also lead to women empowerment especially for those that will be employed or do business with the contractor.
9. Mr Oduku James inquired how the contractor is going to manage the risk of spread of HIV/AIDS in the community given that there will be an influx of people to the area.	Pamela pointed that the issues of HIV/AIDS management during project implementation will be taken seriously and the contractor will be have an elaborate HIV/AIDS management framework which among other will include Testing and Voluntary Counseling of the workers, provision of ART and condoms etc.
10. Eguloyibi was concerned that National Water Sewerage Cooperation (NWSC) formed grievance management committees but they are not facilitated to do their work?	This issue will be raised to NWSC however, they will carry out Facilitation in terms of stationary & training for the GMCs to be able to do the work.
11 Namire inquired if women who get employment on the project be protected from sexual harassment?	Pamela reassured the women present that they will be protected against sexual harassment at the work place. Women harassment at the work place

	<p>can result into the project running into problems and it therefore discouraged. The laws of Uganda also panelize the perpetrators of sexual harassment. There will be GRCs at village level where incase this happens women should come forward and report such cases so that the culprits held accountable.</p> <p>In addition, the contractor will also a establish GRM where all grievances including issues of sexual harassment can be reported.</p>
12. Mr Omucung inquired how the contractor is going to manage safety of the children who live within the project area given that there will be increased deployment of cranes which carry heavy load and certain materials are dangerous.	<p>Pamela informed the meeting that the contractor will erect sign posts and also have a health and safety officers on site to continuously ensure that safety issues are adhered to by both the contractor and the community. In specific key area like school crossing, a traffic control person will be stationed there.</p> <p>However, parents are urged to protect their children from being close to the water project sites as these may have a risk on their lives.</p>
13. Citing the example of Dong dong, the LC 3 Chairman was concerned that some contractors do not pay employees and this may be the case with NWSC?	<p>Pamela allayed the LC3 Chairman's fear by assuring the meeting that NWSC is will adhere to the labor laws of Uganda.</p>
14. Mrs. Omongole Charles inquired how are borrow pits going to be acquired given most of them are located on private land?	<p>Pamela pointed that after a potential borrow pit has been identified, a study will be conducted to assess its worthiness. A report will then be forwarded to NEMA for approval. In case NEMA approves the borrow pit, a license will then be issued for excavation works to go ahead. The contractor will then enter into a MoU with land owner where the borrow pit is situated.</p>
<p>Closing Remarks</p> <p>The chairman LC 3 Pacara Sub-County thanked the team from JBN Consult & Planners Ltd for consulting with the community in Pacara Sub-county about the anticipated environmental and social impacts of NERAMP. He pledged to support the project implementation. There being no other business he adjourned the meeting.</p>	

CLOSURE: The LC3 Chairman closed the meeting with appreciation remarks and a word of prayer at 12.00 pm.

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT

PROJECT ACTIVITY NAME/PLACE:	Community meeting at Dzaipi Parish.[Villages represented include Silili, Dzaipi Central, Aboki and Parinyo]
Consultant	JBN Consult & Planners Ltd
Minutes by:	Ainembabazi Joshua
Reviewed by:	Pamela Tashobya
Date of Meeting:	4 th /12/2021
Meeting Venue:	Dzaipi Central Village
Meeting Minutes Version number:	004
Meeting Start Time:	2:00 pm

ATTENDEES(See attendance register attached)

No	Name	Position	Email Address

AGENDA

1. Prayer
2. Self-Introductions
3. Remarks from the Chairman of the meeting
4. Communication from JBN about the project
5. Reactions and Answers
13. Way Forward

14. MEETING MINUTES and PROCEEDINGS

Min 1: Prayer

Prayer was led by LC 1 chairman Silili Village.

Min 2: Introductions and remarks from the chairman

Members from JBN team introduced themselves. Parish chiefs and the Local Council leaders present also introduced themselves.

Min 3: Welcome Remarks From the Sub-County Chief

In his opening remarks, the sub-county chief thanked the members present for taking the initiative to attend this community meeting. He also welcomed the team from JBN Consult and Planners for coming to share about the proposed ESIA for Adjumani water supply and sanitation project.

Min 4: Communication from JBN about the project

In her opening remarks, Pamela thanked the members present for convening on short notice. She pointed out that the ESIA for Adjumani water supply and sanitation project is about rehabilitation and maintenance of the water facilities and water sources within Adjumani district. Pamela informed the community meeting that the team from JBN was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of water projects that have run into problems due to poor compliance to environmental and social issues. She pointed that the community members in Dzaipi Parish are crucial stakeholders in this water project and their contributions to the ESIA formulation will be highly appreciated. In her conclusion, she begged the community members to be forthright and point out the social and environmental issues that would impact on the project implementation.

Min 5: Views about the Sanitation of the water facilities

Dzaipi will have a public toilet/latrine facility at the market and at the sub county.

Min 6: Social impact of the project on the community

Positive impact	Negative impact
High employment opportunities such as digging, slashing and the women cooking for the project contractors.	People's crops and projects may be affected by the project but a surveyor will identify them and will be compensated.
Installation of clean water, construction of public toilets/latrines and the open water stand pipes where people earn by selling water.	Land will not be compensated but they will lay pipes beneath the dug ground [trenches] and they will cover them. They pay an easement so that you are not allowed to use the land in case of maintenance

Adequate water supply that is relatively cheap.	The young girls and the women may be hired by the project contractors or even other project workers especially the men after getting money from project salary which in turn lures them into dubious acts such as sexual activities.
Min 7: Reactions from the community members.	
Comments	Responses
2. One of the respondents inquired whether there is an extension of the water project pipelines and other water related facilities plus other water sources to other villages	The ESIA team leader responded that there will be extension of the water supply facilities throughout the entire district of Adjumani.
3. The respondents inquired whether the corresponding project contractors are forming communities to handle issues arising from the project.	Pamela responded that there will be GBV and grievance committees formed where issues like incidental accidents, sexual harassment cases would be reported.
4. One of the respondents inquired about those with existing water pipes and the water tap source, what will they do for the new water supply?	Those with existing water pipes will continue to use them. Unless if one is interested in the new water pipe connection, they will apply to NWSC and be connected.
5. One of the community members further inquired if this water is for billing?	Pamela responded that there will be small charges which are paid on a monthly basis for the purpose of maintaining the water supply points and facilities.
6. One of the community members also inquired about how the recruitment of the local community members will be managed in case a contractor comes from a different region?	Pamela pointed out that there will be application points and offices within Adjumani town where the local community members will submit their applications
7. Another community member inquired whether the water pressure of the water system will be good enough to pump water across the hilly landscapes within Dzaipi Parish?	The ESIA team leader pointed out that the pressure to pump the water across the hilly landscape will be good and strong because the water will be run and pumped using the motorized mechanism.
8. Mr. James inquired about the criteria of employment that will be adopted by the contractor especially for the unskilled labor?	Pamela pointed that recruitment will be done in conjunction with the district labor officer to ensure that the right people are recruited from the local communities.

9. Mr. James inquired if people will be compensated incase their crops are affected by construction works?	Pamela acknowledged that incase crops are destroyed by the contractor there will be adequate compensation. However, the contractor will take extra precaution to minimize the distraction of people's crops and property. She also advised the community to report complaints of destroyed property and crops to the village grievance management committees (GMC) that were set up by National water and Sewerage Corporation
10. Mrs. Asiyo inquired if there will be business opportunity for women? Miss Asiyo Josephine inquired where to report incase her food is eaten by the contract workers and payment is not given?	Pamela acknowledged that there will be business opportunities like selling food to the contract workers. Miss Pamela cautioned the women who have small business around the area of water project implementation to be straight forward with the contract workers that payment for any services should be in cash.
11. Mr Okello inquired if he will be eligible for employment on the project yet he has never gone to school?	Pamela from JBN Consult & Planers affirmed that even uneducated will be eligible for employment on the project.
12. Mrs. Akuru Mary inquired what sort of skills will be needed to get a job on the project.	Pamela clarified that both skilled and non-skilled workers will be employed on the project.
13. Mr Ocwo inquired if he will be compensated in case he gets an accident at work?	Pamela acknowledged that there will be works man compensation for any employee that gets accident at the work place and this will be done in line with the laws of Uganda. She cautioned the community members against faking accidents because they will not be compensated if the employer proves that the accident was faked.
14. Mrs. Watela was concerned that her house is along the area where the pipeline will pass and it may get damaged during the rehabilitation works?	Pamela reassured the meeting that the contactor will take extra precaution to ensure that people's property is not damaged during construction however, in the event it is damaged, adequate and fair compensation will be given to the affected people.
Closing Remarks The chairman LC 3 Dzaipi Sub-County thanked the team from JBN Consult & Planners Ltd for the stakeholder engagement with the community and answering the questions/fears that were posed by the community. He cautioned that there is high community anxiety because the previous contractors	

had poor social relations. He pledged to support the project implementation whenever he is called upon. There being no other business he adjourned the meeting.

CLOSURE: The Chairman closed the meeting with appreciation remarks and a word of prayer at 4.00 pm.

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT

PROJECT ACTIVITY NAME/PLACE:	ESIA community meeting at Pagrinya Refugee Settlement Camp
Consultant	JBN Consult & Planners Ltd
Minutes by:	Ainembabazi Joshua
Reviewed by:	Pamela Tashobya
Date of Meeting:	5 th /12/2021
Meeting Venue:	Trading Center
Meeting Minutes Version number:	005
Meeting Start Time:	9:00 am

ATTENDEES(See attendance register attached)

No	Name	Position	Email Address

AGENDA

1. Prayer
2. Self-Introductions
3. Remarks from the Chairman of the meeting
4. Communication from JBN about the project
5. Reactions and Answers
6. Way Forward

MEETING MINUTES and PROCEEDINGS

Min 1: Prayer

Prayer was led by a community member the LC 1 Chairman.

Min 2: Introductions and remarks from the chairman

Members from JBN team introduced themselves. Parish chiefs and the Local Council leaders present also introduced themselves.

Min 3: Remarks from Sub-county Chief

The Sub-County Chief thanked the team from JBN Consult and Planners for consulting with the community and he pointed that the project was timely. He noted that his community is besieged by social problems which include; teenage prostitution and child pregnancy. For this reason, JBN Consult & Planners Ltd has taken a good step to come and consult the community.

Min 4: Communication from JBN Consult & Planners Ltd about the project

In her opening remarks, Pamela thanked the members present for convening on short notice. She pointed out that the Adjumani ESIA Water Supply and Sanitation Project is about the extension, rehabilitation and maintenance of the water supply points within the entire communities of Adjumani. Pamela informed the meeting that the team from JBN was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of water projects that have run into problems due to poor compliance to environmental and social issues. She pointed that the community members in Pagrinya Refugee Settlement Camp are crucial stakeholders in this water project whose input to the ESIA formulation is highly welcome. In her conclusion, she begged the community members to be forthright and point out the social and environmental issues that would impact on the project implementation.

Min 5: Challenges faced by the refugee settlers

Mr Oblejo highlighted out the challenges met by the community members in Pagrinya Refugee Settlement Camp. He said that water is not enough for all the 37-40,000 settlers and some of the existing boreholes broke down. He further stated that many activities such as brick laying that require water have come up due to increase in population and the rate of consumption has increased.

Min 6: Reactions and Way Forward

comments	Responses
1. One of the respondents inquired whether the water will be free to the community.	
2. One of the respondents further inquired about when the water project will commence?	The project will commence after the ESIA study has been complete and the necessary clearances for the project are secured by the contractor. This could take some few months.

3. The respondent further inquired about if the person will be given a tap incase a borehole is put in someone's land?	Pamela responded that there will be gazetted places where the boreholes and the water supply points will be stationed for the community.
4. The respondent inquired if Pagrinya will be entirely supplied with the water since its large?	Pamela responded that the purpose of the water project is for the communities to have easy access to water therefore the community of Pagrinya will be entirely distributed with the water.
5. The respondents inquired about how the project contractors are going to deal with the issue of employment and recruitment of the local based community members for jobs?	Pamela pointed out that there will be application points and offices within Adjumani town where the local community members will submit in their applications
6. Mr Odong inquired what is the scope of the rehabilitation of the existing water systems and facilities because there is a rumor that people along the road are going to be compensated for the land that is going to be acquired?	Pamela responded that rehabilitation works will mean that improvement works will take place on the existing road and it is anticipated that no more land will be acquired.
7. Mr Abraham noted that contractors have a tendency of not paying workers.	Pamela indicated that NWSC is committed to the welfare of its workers and for that reason it respects national labor laws.
8. Mrs. Ongole observed that the previous contractor) lacked social manners and they behaved like soldiers at war.	Miss Pamela noted that the employees of NWSC will be cautioned to have good manners in the community and more so the company has a code of conduct that stipulates good conduct of workers. Therefore, it is anticipated that NWSC workers they will be good mannered in the community.
9. Mrs. Ogole added that the contractors' workers have a habit of taking people's women which breaks up homes.	<p>Pamela assured the meeting that such vices of taking away married women will be discouraged among the contractors' workers.</p> <p>Workers will be required to sign Code of Conduct (covering among others aspects SEA, elopement of women) as part of Employment Contract. Workers shall be frequently sensitized on proper behavior and community leaders shall be involved. A nominated service provider shall also be hired to undertake GBV/SEA work in the Community and Workers.</p>

10. Alido was concerned that there is a perception in the community that large construction projects sacrifice children?	Pamela assured the meeting the child sacrifice is a criminal offence and it will be discouraged in the strongest terms possible. Sensitization of the workers will be done to discourage this practice.
11. Miss Pauline was also concerned that the contract workers have a habit of luring young girls into sexual activities, how is NWSC going to manage this vice?	Pamela affirmed that the workers will be sensitized on the dangers of engaging in sexual activities with young girls. She further cautioned the community to be vigilant and report such cases to the police because the practice of sleeping with underage girls is a criminal offense
12. Mr Okwirl noted that what is shared in the Environmental and Social Impact Assessment reports is never implemented?	Pamela disagreed that it is not true views of the community views are never implemented. She added that an ESIA cannot be approved by National Environmental Management Authority (NEMA) if stakeholder consultations are not included in the report.
Closing Remarks	
The Diso thanked JBN Consult and Planners for consulting with the community and informing them about their role in the project implementation.	
CLOSURE: Meeting was closed	

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT	
PROJECT ACTIVITY NAME/PLACE:	ESIA community meeting at Abirichaku Village Adjumani District
Consultant	JBN Consult & Planners Ltd
Minutes by:	Ainembabazi Joshua
Reviewed by:	Pamela
Date of Meeting:	5 th /12/2021
Meeting Venue:	Abirichaku Market
Meeting Minutes Version number:	006
Meeting Start Time:	4:00 pm

ATTENDEES(See attendance register attached)			
No	Name	Position	Email Address

AGENDA
<ol style="list-style-type: none"> 1. Prayer 2. Self-Introductions 3. Remarks from the Chairman of the meeting 4. Communication from JBN about the project 5. Reactions and Answers 6. Way Forward

MEETING MINUTES and PROCEEDINGS
<p>Min 1: Prayer</p> <p>Prayer was led by a community member Mr Shaban Obote.</p> <p>Min 2: Introductions and Remarks from the Chairman</p> <p>Members from JBN team introduced themselves. The Local Council leaders present also introduced themselves.</p> <p>Min 3: Welcome Remarks Chairman</p> <p>The Chairman thanked the team from JBN Consult and Planners for consulting with the community and he pointed that the project was timely. He noted that his community is besieged by social problems which include the high HIV/AIDS prevalence among the youth. For this reason, JBN has taken a good step to come and consult the community.</p> <p>Min 4: Communication from JBN Consult & Planners Ltd</p> <p>In her opening remarks, Pamela thanked the members present for convening on short notice. She pointed out that the ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT is about the water extension, rehabilitation and maintenance of the water pipes, the water facilities and water sources. Pamela informed the community meeting that the team from JBN was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of water projects that have run into problems due to poor compliance to environmental and social issues such as child labor and impregnating of underage girls. She pointed that the community members in Abirichaku village are crucial stakeholders in this water project whose input to the ESIA formulation is highly welcome. In her conclusion, she begged the community members to be forthright and point out the social and environmental issues that would impact on the project implementation.</p>

Min 5: Reactions and Way Forward

Comments	Responses
1. Mr. Obote Shaban inquired about the actual size of the pipes which will be used during the water project implementation stages?	The ESIA team leader pointed out that the water project engineers and contractors will use pipes with diameter measurements of 3 meters.
3. Mr. Isa Abdu positively appreciated the tremendous efforts and input invested in by the government and the contractors for this water project?	Pamela acknowledged this.
4. Mr. Musagali inquired about whether the water project is going to have a billing system as a way of catering for the water charges?	Pamela responded that there will only be monthly charges which will be paid by the different households to cater for the maintenance
5. Mr. Abdulah Muhamad inquired about the period when the water project and the implementation phase would commence because it has been 6 years since they were last promised water.	The project will commence after the ESIA study has been complete and the necessary clearance for the project are secured by the contractor. This could take some few months.
6. Mr. Mustafa inquired if the project contractors/engineers will employ the local based communities?	The ESIA team leader affirmed that there will be recruitment of the local based community members.
7. Mr. Isha Hussein requested and called for the sensitization to the contractors about the girl child in regard to the issue of luring the female gender into sexual activities which could lead to pregnancy cases?	Pamela responded that there will be high focus on the vices involved such as the sexual harassment etc. by forming GBV committees where these cases will be reported and she further added that there will be involvement of the police in the effort of mitigating these vices.
8. Mr. Latib Kemisi expressed his grievances stating that the community has been grieving for water since 1997.	Pamela noted this and urged the community members to be ready to receive clean and hygienic water which will be supplied in large quantities.
9. One of the community members further inquired about the cost of connection charges and where the connection forms to be filled in would come from?	
10. Mr. Thomas Hassan acknowledged the importance of carrying out the ESIA for Adjumani water supply and sanitation project.	

11. Mrs. Maimuna Noah requested for the fair water billing charges compared to the previous billings of the previous periods.		
12. Mrs. Muroa inquired about who would face the cost charges after channeling the water to a house hold from the main pipe which supplies the water?		
13. Mrs. Muroa further added by inquiring whether the old system would be disconnected or maintained?	Pamela pointed out that the old water system will be improved and rehabilitated to a better state.	
14. Mrs. Sarah inquired whether it's fine for people to use one tap by contributing money together with the aim of reducing the water connection fee which reduces the cost burden of paying the bills.	Pamela acknowledged this.	
15. One of the Community members requested that the drainage should be improved?	Miss Pamela pointed that the scope of rehabilitation works will include the improvement of drainage along the project road.	
16. One of the community members further inquired if borrow pits be restored this time?	Pamela acknowledged that all borrow pits that will be acquired by the contractor will be restored in accordance with National Environment Management Authority (NEMA) guidelines. She further tasked the community leaders to be vigilant and monitor the activities of the contractor at the borrow pits.	
17. Mrs. Akello inquired where she can report in case the contract worker defiles her girl.	Pamela guided the meeting that defilement cases should be reported to police. Police will commence investigations and the culprit will be arrested and prosecuted in the courts of law. More so, such an employee will be expelled from work and deported out of the country for the case of foreign workers.	
18. Miss Florence was concerned that the contract workers will increase the spread of HIV/AIDS and other STD's in the community given that they will have disposable income to lure women into sexual activities?	Pamela assured the meeting that workers will be sensitized about the dangers of spreading HIV/AIDS and other STD's in the community. This will also include VCT and provision of free ART services.	
Closing Remarks The Chairman LC1 thanked JBN Consult and Planners for consulting with the community and informing them about their role in the project implementation.		

He pointed that the contractor should ensure to mitigate the issue of HIV/AIDS. Otherwise, he is worried of the young vulnerable girls in the community who will be seduced by the contract workers.

CLOSURE: Meeting was closed.

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT

PROJECT ACTIVITY NAME/PLACE:	ESIA community meeting held at Lajope Cesia and Lajope Ginnery Villages Adjumani District
Consultant	JBN Consult & Planners Ltd
Minutes by:	Ainembabazi Joshua
Reviewed by:	Pamela Tashobya
Date of Meeting:	6 th /12/2021
Meeting Venue:	Lajope Ginnery village
Meeting Minutes Version number:	007
Meeting Start Time:	2:30 pm

ATTENDEES(See attendance register attached)

No	Name	Position	Email Address

AGENDA

1. Prayer
2. Self-Introductions
3. Remarks from the Chairman of the meeting
4. Communication from JBN about the project
5. Reactions and Answers
6. Way Forward

MEETING MINUTES and PROCEEDINGS

Min 1: Prayer

Prayer was led by Mr Bran the chairman Lajope Ginnery

Min 2: Introductions and remarks from the chairman

Members from JBN team introduced themselves. The Local Council leaders present also introduced themselves. Mr. Bran went on to thank World bank for accepting the community prayers; Mr. Bran requested that priority regarding the project employment and recruitment should be given to the local based people.

He further emphasized that the project opportunities should be given to the community especially the unskilled labor personnel; he stated that evaluation of compensation should be carried out by a trusted personnel and it should be fair enough.

Min 3: Welcome Remarks Chairman

The Chairman thanked the team from JBN Consult and Planners for consulting with the community and he pointed that the project was timely. He noted that his community is besieged by social problems which include the high youth unemployment, HIV/AIDS prevalence among the youth and vulnerable women. For this reason, JBN should ensure that the recommendations they make in the report should address the just mentioned social challenges when construction works commence.

Min 4: Communication from JBN about the project

In her opening remarks, Pamela thanked the members present for convening on short notice. She pointed out that the Adjumani ESIA Water Supply and Sanitation Project is about the water extension to the entire district, rehabilitation and maintenance of the water project. Pamela informed the community meeting that the team from JBN was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of water projects that have run into problems due to poor compliance to environmental and social issues such as child labor and contract workers impregnating of underage girls in the host communities. She pointed that the community members in Lajope Cesia Village are crucial stakeholders in this road project whose input to the ESIA formulation is highly welcome. In her conclusion, she begged the community members to be forthright and point out the social and environmental issues that would impact on the project implementation.

Min 5: Reactions and Way Forward

Comments	Responses
1. The community members inquired if he will be compensated if his crops are destroyed by the construction works?	Pamela acknowledged that any crops that will be destroyed by the contractor will be compensated however; the contractor will ensure that there is limited effect or no effect at all.

2. The community members Charles was concerned that the contractors do not restore borrow pits which is a danger to the community.	Pamela assured the meeting that all borrow pits will be fully restored in accordance with National Environment Management Authority (NEMA) guidelines.
3. Mr Oluka inquired what the project duration is.	The project will last 8 and half years; this will include half a year for the design, 2 years for construction and 6years for maintenance.
4. Mr Johnson inquired why the reports submitted to NWSC through GMC's take forever to get feedback.	Pamela indicated that she does not know the exact reason why such reports take long to be addressed by NWSC. She promised to follow up this concern with NWSC.
5. Mr Johnson inquired whether the contractor will have an HIV/AIDS mitigation plan given that girls and women in the community will be exposed to HIV/AIDS by the contract workers.	Pamela pointed that the risk of community exposure to HIV/AIDS by the contact workers is of paramount concern. Thus, the contractor will have an HIV/AIDS awareness plan. This will include; continuous HIV/AIDS sensitization, provision of condoms, VCT and provision of ART for those who are positive.
6. The community members observed that some of the road construction workers use the bush for their toiletry activities. This is creates a serious public health fear in the community.	Pamela responded that this has been noted. Going forward, it will be recommended to the contractor to have a mobile toilet so as to reduce the spread of communicable diseases in the host communities.
There was an inquiry from the community if a PAP would be compensated incase their crops and destroyed under routine repair.	Yes, the PAP would be compensated.
Closing Remarks The Chairman LC1 thanked JBN Consult and Planners for consulting with the community and informing them about their role in the project implementation. He pointed that the contractor should ensure to mitigate the issue of HIV/AIDS and drug abuse among the contract workers.	
CLOSURE: Meeting was closed	

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT			
PROJECT ACTIVITY NAME/PLACE:		Adjumani ESIA community meeting at Biyaya Village, Adjumani District	
Consultant		JBN Consult & Planners Ltd	
Minutes by:		Ainembabazi Joshua	
Reviewed by:		Pamela Tashobya	
Date of Meeting:		7 th /12/2021	
Meeting Venue:		Biyaya Trading Center	
Meeting Minutes Version number:		008	
Meeting Start Time:		2:30 pm	
ATTENDEES(See attendance register attached)			
No	Name	Position	Email Address
AGENDA			
<ol style="list-style-type: none"> 1. Prayer 2. Self-Introductions 3. Remarks from the Chairman of the meeting 4. Communication from JBN about the project 5. Reactions and Answers 6. Way Forward 			
MEETING MINUTES and PROCEEDINGS			
<p>Min 1: Prayer</p> <p>Prayer was led by councilor</p> <p>Min 2: Introductions and remarks from the chairman</p> <p>Members from JBN team introduced themselves. The Local Council leaders present also introduced themselves.</p> <p>Min 3: Welcome Remarks Chairman</p>			

The chairman LC 1 welcomed all the members present. He noted that this consultation is timely because the water project has many sections that are prone to different issues. The Chairman added that the area is grappling with many unemployed youth and this is compounded by the high teenage pregnancy.

Min 4: Communication from JBN about the project

In her opening remarks, Pamela thanked the members present for convening. She pointed out that the Adjumani ESIA Water Supply and Sanitation Project is about rehabilitation and maintenance of the water systems, supply points and the other water facilities. Pamela informed the community meeting that the team from JBN was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of water projects that have run into problems due to poor compliance to environmental and social issues such as child labor and contract workers impregnating of underage girls in the host communities. She pointed that the community members in Adjumani Town Council are crucial stakeholders in this water project whose input to the ESIA formulation is highly welcome. In her conclusion, she requested the community members to be forthright and point out the social and environmental issues that would impact on the project implementation.

Min 5: Reactions and Way Forward

Comments	Responses
1. Mrs. Mary requested to know whether the water project is for free? She further inquired whether the project is initiated by the government or by private company.	Pamela responded that there will be some charge for the purpose of maintaining the water source in good working conditions and catering for the repair charges for the broken down water facilities.
2. Mr Patrick inquired how the scourge of HIV/AIDs going to be managed since there will be an influx of sexually active people during the construction phase.	Pamela assured the meeting that the contractor will develop an HIV/AIDS management plan and among other things. The plan will include measures like; continuous sensitization of both the community and contract workers on the danger of HIV/AIDS, provision of VCT service and condoms. This will be done in association with some HIV/AIDS service providers in the area.
3. Mr Moses was concerned that the influx of sexually active contract workers will results into increase in commercial sex workers in the community.	Pamela indicated that the contact workers will be sensitized on the dangers of engaging in sexual activities with commercial sex workers.

4. Mr Moses further pointed that the previous contractor left fatherless children in the community and to date their clans are not known.	Pamela noted that it is unfortunate to learn of the clan less and fatherless children in the community. In the upcoming road project, this will be mitigated through sensitization of workers on the dangers of fathering unwanted children.
7. Mr Kassim inquired if local people will be employed on the project?	Pamela acknowledged that locals will be employed on the project and this will comprise skilled and unskilled. She further guided that women will also be employed on the project so they should not shy away from applying.
8. Mrs. Janette inquired if the contractor has a plan to restore the borrow pits that will be opened?	Pamela indicated that all borrow pits will be restored in accordance with NEMA guidelines. She further requested the landlords to work consult with the local council leaders when they are entering memorandum of understanding with the contractor.
9. Mr Akol inquired if community sensitization and engagement will be continuous given that some people have not been able to attend this meeting?	Pamela responded that it will be recommended to the contractor to always sensitize the community on matters concerning the project.
10. Miss Florence was concerned that HIV/AIDS is going to increase in the community due to the influx of contract workers who have disposable income yet they are working far from their homes.	Pamela allayed Florence's fears that workers will be sensitized about the dangers of HIV/AIDS. More so, they will be provided with condoms and only that but, VCT will be encouraged and those found positive free ART will be provided.
Closing Remarks On behalf of the mayor, the councilor for women thanked the members present for fruitful deliberations. She also thanked the Government of Uganda (G.O.U) and her development partners for proposing to rehabilitate the water systems and facilities and she promised to support the project implementation.	
CLOSURE: Meeting was closed	

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT

PROJECT ACTIVITY NAME/PLACE:

Community meeting at Central 1 & 2

Consultant	JBN Consult & Planners Ltd		
Minutes by:	Ainembabazi Joshua		
Reviewed by:	Pamela		
Date of Meeting:	8 th /12/2021		
Meeting Venue:	RDC's Office		
Meeting Minutes Version number:	009		
Meeting Start Time:	4:00 pm		
ATTENDEES(See attendance register attached)			
No	Name	Position	Email Address
AGENDA			
<ol style="list-style-type: none"> 1. Prayer 2. Self-Introductions 3. Remarks from the Chairman of the meeting 4. Communication from JBN about the project 5. Reactions and Answers 6. Way Forward 			
MEETING MINUTES and PROCEEDINGS			
<p>Min 1: Prayer</p> <p>Prayer was led by the LC 1 representative from Central 1 Adjumani District</p> <p>Min 2: Introductions and remarks from the chairman</p> <p>Members from JBN team introduced themselves. The district security leaders present also introduced themselves.</p> <p>Min 3: Welcome Remarks From the Resident District Commissioner</p> <p>The RDC welcomed all the members present. He noted that this consultation is timely because Adjumani District has many social challenges that are likely to impact on the project implementation. He noted cases of theft of construction materials as the biggest challenge that awaits the contractor. The RDC noted he was pleased that the NRM government is implementing the manifesto that envisions infrastructure development to boost economic growth. He also thanked JBN Consult & Planners Ltd and NWSC for coming to consult the security arm of Adjumani District. This is because on many occasions the RDC's office is not consulted until a problem has occurred.</p>			

Min 4: Communication from JBN Consult & Planners Ltd.

In her opening remarks, Pamela thanked the members present for coming to share their experiences. She pointed out that the Adjumani ESIA Water Supply and Sanitation Project is about rehabilitation and maintenance of the water systems and the water facilities. Pamela informed the members present that the team from JBN Consult & Planners Ltd was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of water projects that have run into problems due to poor compliance to environmental and social issues such as child labor, spread of HIV/AIDS and contract workers impregnating of underage girls in the host communities. She pointed that the community leaders in Adjumani district are crucial stakeholders in this water project whose input to the ESIA formulation is highly appreciated. In her conclusion, she requested the security leaders to be forthright and point out the social and environmental issues that would impact on the project implementation so that mitigation measures can be developed ahead of the project implementation.

Min 5: Reactions and Way Forward

Comments	Responses
1. Mr. Lawrence inquired if the toilet facility is going to be VIP because the community members want a facility which is standard?	Pamela responded that there will be establishment of modernized toilet facilities to improve on the welfare of the community.
2. Mr. Lawrence further inquired about where the contractors and workers would come from?	These will be hired by NWSC
3. Mr. Lawrence went on to suggest that grievance committees should be set up early enough in time.	This was noted by the ESIA team leader.
4. Mr. Ogwang Emmanuel inquired if the project contractor will use gravity flow mechanism or apply the motorize mechanism?	The ESIA team leader responded the water project contractors will use the motorized mechanism and a system to pump the water.
5. He further inquired if the distribution phase was going to be undertaken by NWSC?	Pamela affirmed that the distribution phase for the water will be undertaken by the NWSC
6. He also inquired if there will be public water tents gazetted in the village?	
7. He added by saying that the waste management in Adjumani is not right.	Pamela pointed out that there will be establishment of dumping sites within the community to manage the waste disposal and she added that there will be community vehicle trucks which collect the waste from different business and household premises; she emphasized that there will be

	restrictions in place to foster proper waste management and disposal.	
8. Mr. Abdulah inquired about the duration period for the commencement of the water project?		
9. Mr. Azidu inquired about what will happen to the current pipelines that are being used?	The ESIA team leader emphasized that the existing water pipes will be replaced by bigger pipes of diameter measurement of 3 meters.	
10. The RDC observed that even though most of the contractors who come to Adjumani have private guards, there is need to include the government security agencies given that they are better positioned to address security challenges.	Pamela noted this point.	
11. The District Police Commander inquired how the contractor will manage the increase in gender based domestic violence which has a tendency to increase during large construction works projects.	Pamela from JBN Consult & Planners Ltd pointed that sensitization of workers about gender based domestic violence will be conducted. She also added that local and national NGO's that are operating within the region will be approached to do community-based sensitization about the evils of gender based domestic violence.	
12. The Resident District Commissioner (RDC) was concerned that contractors are involved in sexual relationships with underage girls which is criminal and also disorganizes homes.	Pamela pointed that it unfortunate that road contractors engage in sexual relationships with underage girls and she assured the member present that such behavior will not be acceptable during the rehabilitation and maintenance works. More so, workers will be sensitized about the dangers of engaging in sexual relationships with underage girls.	
13. The District Police Commander (DPC) cautioned the contractor not to employ drug abusers as is the case with many contractors who come to Adjumani District.	This was noted	
14. The District Police Commander observed that sexual crimes normally increase when there is an influx of young men in the community.	Pamela responded that the contractors' workers will be continuously sensitized about sexual crimes.	

12.The DISO pointed that there is constant engagement of the contractor with the security leaders to update them on the progress of the project otherwise conmen will take advantage e.g. in recruitment	Pamela responded that this submission has been noted.
Closing Remarks <p>In his closing remarks, the Resident District Commissioner thanked the Government Of Uganda (G.O.U) and her development partners for proposing to rehabilitate the water systems and water facilities. He reaffirmed that the district security leadership will ensure that the project is well implemented. This however, calls for continuous engagement by the contractor.</p>	
CLOSURE: Meeting was closed at 6:00 pm	

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT			
PROJECT ACTIVITY NAME/PLACE:		Community meeting with members in Olua 1 & 2 villages.	
Consultant		JBN Consult & Planners Ltd	
Minutes by:		Ainembabazi Joshua	
Reviewed by:		Pamela Tashobya	
Date of Meeting:		9 th /12/2021	
Meeting Venue:		Olua 1 village center	
Meeting Minutes Version number:		010	
Meeting Start Time:		2:30 pm	
ATTENDEES (See attendance register attached)			
No	Name	Position	Email Address
AGENDA			
1. Prayer			
2. Self-Introductions			
3. Remarks from the Chairman of the meeting			
4. Communication from JBN about the project			
5. Reactions and Answers			
6. Way Forward			
MEETING MINUTES and PROCEEDINGS			

Min 1: Prayer

Prayer was led by LC1 Chairman

Min 2: Introductions and remarks from the chairman

Members from JBN team introduced themselves to the community members present.

Min 3: Welcome Remarks From the Chairman GMC

The chairman GMC welcomed all the members present. He noted that this consultation is timely because Olua community has experienced many issues on the present water facilities.

Min 4: Communication from JBN Consult & Planners Ltd

In her opening remarks, Pamela thanked the members present for coming to share their experiences. She pointed out that the Adjumani ESIA Water Supply and Sanitation Project is about rehabilitation and maintenance of the Water systems and facilities. Pamela informed the members present that the team from JBN Consult & Planners Ltd was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of road projects that have run into problems due to poor compliance to environmental and social issues such as child labor, spread of HIV/AIDS and contract workers impregnating of underage girls in the host communities. She pointed that the views from the community members in Olua village are crucial for the ESIA formulation and therefore highly appreciated. In her conclusion, she requested the community members to be forthright and point out the social and environmental issues that they would not want them to happen in the upcoming road project so that mitigation measures can be developed ahead of the project implementation.

Min 5: Challenges raised by the Camp Commandant

Mr. Julius the Camp Commandant stated that the borehole water is not good for drinking since it's stained with a brownish color. He further stated that the water is not sufficient throughout. He added by saying that the water is very dirty and some of the water sources have some small pathogens coming out of the outlets. He further added that some of the boreholes have smelly water coming out of the outlets.

Min 6: Recommendations by the Camp Commandant

Mr. Julius emphasized about the water tank supply saying that it's not always having sufficient water to accommodate all the settlers within the community and he added that piped water supply would be good enough for the community. He further stated that the borehole repairs usually delay and take long to accomplish yet the settlers need water. He also requested for the installation of security lights around the source because some people collect water at night.

Min 7: Reactions and Way Forward	
Comments	Responses
1. One of the community members observed that some of the borrow pits that were opened by the previous contractor were not restored. These have become a danger to human life.	Pamela from JBN Consult & Planners Ltd responded that the contractor will ensure to acquire borrow pits legally. This will include conducting studies and getting the requisite permits from NEMA.
2. The community members inquired where to take his application for the job with the contractor?	Pamela pointed that the contractor has offices in Adjumani town where applications can be dropped. However, there will also be recruitment through the district labor officer.
3. One of the community members also inquired if the drainage will be improved and made safe for pedestrians.	Pamela From JBN Consult & Planners Ltd affirmed that drainage will be improved as part of the rehabilitation works.
4. One of the community members inquired where to report incase his daughter is seduced into sexual activities by the contract workers.	Pamela from JBN Consult & Planners Ltd advised the meeting that cases of where the contractor seduces young girls into sexual activities should be reported to police.
5. One of the community members pointed that truck drivers are reckless.	Pamela from JBN Consult & Planners Ltd responded that drivers will be trained in health and safety. She also pointed that the contractor will ensure to recruit drivers that have the right qualification and experience in driving trucks.
7. One of the community members wondered if the contractor will compensate the victims of accidents at the work place during the water project implementation phase.	Pamela from JBN Consult & Planners Ltd affirmed that the contractor will operate within the confines of the laws of Uganda. For this reason, worker man's compensation
8. One of the community members inquired if women will be employed on the project.	Pamela from JBN Consult & Planners Ltd affirmed that women will be employed on the project.
9. The chairman GMC pointed that NWSC should provide them with identification tags.	Pamela pointed that this point has been noted.
10. Mr Stanley pointed that there is fear that the contract workers will spread HI/AIDS in the community.	Pamela from JBN Consult & Planners Ltd indicated that the contractor will have an HIV/AIDS management plan to ensure that the spread of HIV/AIDS is minimized. This will include; VCT, provision of ART and condoms.

Closing Remarks

In his closing remarks, the chairman GMC thanked the team from JBN Consult & Planners Ltd for consulting and informing the community about the proposed road rehabilitation and maintenance project.

CLOSURE: Meeting was closed at 6:00 pm

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT

PROJECT ACTIVITY NAME/PLACE:	ADJUMANI ESIA/meeting with community members in Pereci Ward Adjumani District
Consultant	JBN Consult & Planners Ltd
Minutes by:	Ainembabazi Joshua
Reviewed by:	Pamela Tashobya
Date of Meeting:	17 th /12/2021
Meeting Venue:	Trading Centre
Meeting Minutes Version number:	011
Meeting Start Time:	4:30 pm

ATTENDEES(See attendance register attached)

No	Name	Position	Email Address

AGENDA

1. Prayer
2. Self-Introductions
3. Remarks from the Chairman of the meeting
4. Communication from JBN about the project
5. Reactions and Answers
6. Way Forward

MEETING MINUTES and PROCEEDINGS

Min 1: Prayer

Prayer was led by the Community Development Officer

Min 2: Introductions and Remarks from the LC1 Chairman

Members from JBN team introduced themselves to the community members present.

Min 3: Welcome Remarks From the LC1 Chairman

The chairman LC1 welcomed all the members present. He noted that this consultation is timely because the community has experienced many accidents on the project road.

Min 4: Communication from JBN Consult & Planner

In her opening remarks, Pamela thanked the members present for coming to share their experiences. She pointed out that the North Eastern Road Corridor Asset Management project (NERAMP) is about rehabilitation and maintenance of the water facilities and Supply points. Pamela informed the members present that the team from JBN Consult & Planners Ltd was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of the water projects that have run into problems due to poor compliance to environmental and social issues such as child labor, spread of HIV/AIDS and contract workers impregnating of underage girls in the host communities. She pointed that the views from the community members in Pereci Ward are crucial for the ESIA formulation and therefore highly appreciated. In her conclusion, she requested the community members to be forthright and point out the social and environmental issues that they would not want them to happen in the upcoming road project so that mitigation measures can be developed ahead of the project implementation.

Min 5: Issues raised by the community members

The community members stated that the ward has had challenges with the Northern Umbrella which have negatively affected the livelihoods of the community members. They added that more sensitization should be done to equip and vanish the community members with knowledge about the water project.

Min 6: Reactions and Way Forward

Comments	Responses
1. One of the community members inquired whether the drainage in some places will be improved given that it is in poor state.	Pamela from JBN Consult & Planners Ltd acknowledged that the rehabilitation works will include improvement of the drainage.

	Improvement will consider things like installation of new culverts.
2. The respondent wanted to know when the project is going to start?	Pamela from JBN Consult & Planners Ltd pointed that the rehabilitation works will commence once the ESIA studies are concluded and the necessary permits acquired.
3. The community member was also concerned about compensation incase his land is acquired?	Pamela from JBN Consult & Planners Ltd clarified that the project does not intend to acquire any more land given that it will take place on the existing road profile.
4. Mr. Hussein pointed that there is a fear that people's property especially the one within the zone for the water project will be damaged by construction works.	Pamela indicted that in the event such property is destroyed/damaged during the water implementation phase, compensation will be given to the affected persons. The affected person should ensure that the log their grievances through the GMC set up by National Water and Sewerage Corporation (NWSC)
5. The Chairman LC3 pointed that there is need to install better culverts in some sections to avoid cases of accidents.	Pamela from JBN Consult & Planners Ltd noted that this will be done during the rehabilitation works.
6. The CDO also cautioned that the contract workers should not break up homes by eloping with married women.	This point was noted.
7. One of the community members inquired whether the water will only be distributed to areas where the Northern Umbrella already exists.	Pamela responded that there will be distribution of the water throughout the entire district while covering all the community settlements
8. The respondent inquired to know how the water will be extended from door to door.	
9. The respondent also inquired about what the payment terms will be like?	The ESIA team leader responded that there will be monthly charges which will be paid to cater for maintenance of the water facilities.
10. One of the community members further inquired about the period when the water project implementation phase will commence?	The project will commence after the ESIA study has been complete and the necessary clearance for the project are secured by the contractor. This could take some few months.

11. Another community member inquired if the communities will apply for water connection or NWSC will handle that?	
12. The community member pointed out that there is a great fear and tendency of worry about the girl child becoming pregnant. Therefore What plans does NWSC have to mitigate this issue?	Pamela responded that focus will be majored on establishing the GBV committees and groups to handle the different violence vices.
13. The community members cautioned that the CDO should be empowered to sensitize the local people about the project.	Pamela noted this.
Closing Remarks In his closing remarks, the chairman GMC thanked the team from JBN Consult & Planners Ltd for consulting and informing the community about the proposed water system and water facility rehabilitation and maintenance project. There being no other questions/fears from the community, the meeting was adjourned.	
CLOSURE: Meeting was closed at 6:00 pm	

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT			
PROJECT ACTIVITY NAME/PLACE:		ADJUMANI ESIA/ meeting with community members in Central Ward, Adjumani District	
Consultant		JBN Consult & Planners Ltd	
Minutes by:		Ainembabazi Joshua	
Reviewed by:		Pamela Tashobya	
Date of Meeting:		18 th /12/2021	
Meeting Venue:		Central Ward village	
Meeting Minutes Version number:		012	
Meeting Start Time:		10:00 am	
ATTENDEES(See attendance register attached)			
No	Name	Position	Email Address
AGENDA			

1. Prayer
2. Self-Introductions
3. Remarks from the Chairman of the meeting
4. Communication from JBN about the project
5. Reactions and Answers
6. Way Forward

MEETING MINUTES and PROCEEDINGS

Min 1: Prayer

Prayer was led by the LC 1 Chairperson.

Min 2: Introductions and remarks from the LC1 Chairperson

Members from JBN Consult & Planners Ltd introduced themselves to the community members present.

Min 3: Welcome Remarks From the SAS

The SAS welcomed all the members present. She noted that this consultation is timely because the community has experienced many social challenges with previous contractors. He pointed that increase in break of homes was the main social problem brought about by the influx of contract works into the community.

Min 4: Communication from JBN about the project

In her opening remarks, Pamela thanked the members present for coming to share their experiences. She pointed out that the Adjumani ESIA Water Supply and Sanitation Project is about rehabilitation and maintenance of the water project. Pamela informed the members present that the team from JBN Consult & Planners Ltd was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of water projects that have run into problems due to poor compliance to environmental and social issues such as child labor, spread of HIV/AIDS and contract workers impregnating of underage girls in the host communities. She pointed that the views from the community members in Central Ward Village are crucial for the ESIA formulation and therefore highly appreciated. In her conclusion, she requested the community members to be forthcoming and discuss the social and environmental issues that they would not want to happen in the upcoming road project so that mitigation measures can be developed ahead of the project implementation.

Min 5: Reactions and Way Forward

Comments

Responses

1. Mr. Ben observed that the open drainage has caused many accidents in the community.	Pamela from JBN Consult & Planners Ltd pointed that the rehabilitation works will include improvement of the drainage along the road.
2. Mr. Opolot there was no restoration of borrow pits. This has affected agriculture production in the community.	Pamela from JBN Consult & Planners Ltd pointed that the contractor will ensure to acquire all borrow pits in accordance with the law and NEMA guidelines.
3. One of the Community members inquired about how is recruitment of workers going to be done?	Pamela from JBN Consult & Planners Ltd pointed that jobs will be advertised through the Local leaders and the district labor officer. But also, the people who have the right academic qualifications can go to NWSC office and apply for jobs. She however cautioned the community members to be aware of middle men who promise to get those jobs and in turn ask for money.
4. Mrs. Acheng inquired if uneducated women will also be employed on the project.	Pamela from JBN Consult & Planners Ltd acknowledged that uneducated women will be employed on the project. Some of the roles they will perform include cooking for employees etc.
5. Miss Stella suggested that the contract workers been given identification tags for easy identification.	Pamela pointed that this is noted. However all NWSC workers always wear uniform at the work place.
Closing Remarks In his closing remarks, the Chairman LC3 noted that the issues of accidents should be given priority when rehabilitating the water systems and water facilities. He later thanked the team from JBN Consult & Planners Ltd for consulting and informing the community about the proposed road rehabilitation and maintenance project.	
CLOSURE: Meeting was closed at 12:00 pm	

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT

PROJECT ACTIVITY NAME/PLACE:

ADJUMANI ESIA/meeting with community members of Atabo A, Atabo B Atabo Central at Pakelle Central Ward Adjumani District

Consultant	JBN Consult & Planners Ltd		
Minutes by:	Ainembabazi Joshua		
Reviewed by:	Pamela Tashobya		
Date of Meeting:	22 nd /12/2021		
Meeting Venue:	Atabo A Village		
Meeting Minutes Version number:	013		
Meeting Start Time:	10:00 pm		
ATTENDEES(See attendance register attached)			
No	Name	Position	Email Address
AGENDA			
<ol style="list-style-type: none"> 1. Prayer 2. Self-Introductions 3. Remarks from the Chairman of the meeting 4. Communication from JBN about the project 5. Reactions and Answers 6. Way Forward 			
MEETING MINUTES and PROCEEDINGS			
<p>Min 1: Prayer</p> <p>Prayer was led by the LC1 Chairman.</p> <p>Min 2: Introductions and remarks from the chairman</p> <p>Members from JBN team introduced themselves to the community members present.</p> <p>Min 3: Welcome Remarks From the LC5 Chairman</p> <p>The LC5 Chairman welcomed all the members present. He noted that this ESIA stakeholder consultation is timely because the contractor is going to come to the community when social acceptance of road construction projects is at its lowest due to past negative experiences.</p> <p>Min 4: Communication from JBN Consult & Planners Ltd about the Project</p> <p>In her opening remarks, Pamela thanked the members present for coming to share their experiences. She pointed out that the Adjumani ESIA Water Supply is about rehabilitation and maintenance of the water systems and facilities. Pamela informed the members present that the team from JBN Consult</p>			

& Planners Ltd was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of road projects that have run into problems due to poor compliance to environmental and social issues such as child labor, spread of HIV/AIDS and contract workers impregnating of underage girls in the host communities. She pointed that the views from the community members in Atabo A village are crucial for the ESIA formulation and therefore highly appreciated. In her conclusion, she requested the community members to be forthright and point out the social and environmental issues that they would not want them to happen in the upcoming road project so that the contractor can formulate mitigation measures ahead of the project implementation.

Min 5:FGD'S and other views raised by Women

The ladies highlighted out by saying that there is a high rate of teenage pregnancies within the community because the girls travel far distances to fetch the water for domestic use.

The ladies further highlighted by saying that they miss the periods to be with their husbands thus failing to conceive because they leave their homes early in the morning to go to the gardens to cultivate.

The ladies stated that they are exposed to the risks for example the mosquito bites which contributes to malaria.

Some women are disabled and yet the water sources are far.

The women further pointed out saying that there are conflicting cases at water supply points because the water sources are limited in relation to the population size of the community.

The women emphasized about the user fee payments saying that some households take long to pay and if they delay to make the payments, they are denied access to water.

They further stated that the rate of malnutrition has increased because they leave the children hungry without any foods.

They also highlighted out saying that the scarcity of water has influenced poor hygiene and has caused related diseases in homes.

The women also said that they leave their homes very early in the morning to fetch the water because there is water shortage.

Min 6: Views from the KII'S leaders at Nyivura

The KII'S leaders stated that the water project will reduce on the risks of accidents to the children who participate in fetching the water from the water sources.

They also stated that the water project will reduce the risks and cases of GBV among parents and the children and further stated that the water project will greatly reduce the risks of early pregnancies among the girl child.

They proposed that the project contractors should consider employing 75% of the locally based community members and also went on to accept the project because most community members are vulnerable and find it difficult to access the water sources for example the disabled persons.

The KII leaders further recognized and appreciated the efforts and the input invested in by the government and the concerned stakeholders in extending the water project since one individual within the community had constructed the borehole which was in use by the community at large.

The KII'S leaders and the community at large welcomed the water project and are positive, and are willing to give land so that the pipes can be connected.

Min 7 : Concerns raised by the community members

They stated by saying that the village lacks water but they are grateful for the initiation of the water project by NWSC and further said that this is going to improve the insufficiency of water within the community.

They also inquired about the legitimacy of the water project because some organizations come to carry out project surveys and resort to telling lies to the respondents hence failing to show up to implement the initiated projects.

The local members emphasized about the issue of employment opportunities saying that they worried that the project contractor may bring their own workers yet they have locals willing to participate in the ongoing water project once it has commence.

They also suggested that the skilled labor force is also urgently required of which 75% of the workers should come from the local based population.

Min 8: Reactions and Way Forward

Comments	Responses
1. Mr.Nagwana inquired when the construction works will commence.	Pamela pointed that the construction works will commence once the ESIA is done and the necessary approvals have been acquired. However, the contractor is has already established a camp/office in Adjumani.
2. There is need to improve drainage that is leading to public facilities like schools.	Pamela pointed that rehabilitation works will include the improvement of drainage.
3. Mr. Massa Steven inquired if the local youth will be given jobs on the project?	Pamela from JBN Consult & Planners Ltd acknowledged that the contractor will employ local youth.
4. The community members inquired about the cost of water extension to someone's home?	

5. The community members inquired if the community members will be employed when the project commences?	Pamela pointed that the construction works will commence once the ESIA is done and the necessary approvals have been acquired. However, the contractor is has already established a camp/office in Adjumani?
6. The community members inquired whether the NWSC is a permanent organization which is going to supply water to Adjumani.	The ESIA team leader affirmed that NWSC will supply the water throughout the entire district of Adjumani.
7. The community members also inquired if the public toilets will be provided for or there will be a charge for using the toilet facilities?	The interventions will also focus on the improvement of public sanitation, through construction of public toilet facilities and a faecal sludge treatment facility.
8. The community members expressed the fear of not being compensated incase the water pipes pass through some's land?	The ESIA team leader informed community members that persons whose land is affected by the water projected will be identified by the Survey and valuation team and details of their affected property will be documented and will be compensated
9. The community members inquired whether plumbers within the area will be given job opportunities regarding the water pipe connections.	The ESIA team leader positively affirmed and added that there will be job application points and offices within Adjumani town
10. The community members of Pakele further inquired whether NWSC will disconnect the other water sources which are already existing.	Pamela responded that the water project contractors will rehabilitate the existing water systems and facilities.
11. The community members also expressed that they worry that some neighbors might refuse to connect from their lines.	Mrs. Pamela responded that NWSC will first talk to the concerned stakeholders before any recommendations.
15. The community members cautioned that there is a tendency of recommending the workers to participate in the activities of the water project for example the scenario of Strabag company.	Mrs. Pamela pointed out that recommendations will be given to NWSC and the contractors to give priority to the locals for jobs.
16. The community members inquired whether there will be sub-offices for NWSC or only in Adjumani.	Mrs. Pamela pointed out saying that there will be considerations of constructing a sub-office for NWSC.
Closing Remarks In his closing remarks, the Chairman LC1 requested that the issues of damaged boreholes, open septic tanks and damaged sewerage pipes in the trading center should be given priority when rehabilitating	

the water systems and facilities. He later thanked the team from JBN Consult & Planners Ltd for consulting and informing the community about the proposed road rehabilitation and maintenance project.

CLOSURE: Meeting was closed at 12:30 pm

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT

PROJECT ACTIVITY NAME/PLACE:	ADJUMANI ESIA meeting with community members at Marindi Parish-Adjumani District
Consultant	JBN Consult & Planners Ltd
Minutes by:	Ainembabazi Joshua
Reviewed by:	Pamela Tashobya
Date of Meeting:	19 th /12/2021
Meeting Venue:	
Meeting Minutes Version number:	014
Meeting Start Time:	2:00 pm

ATTENDEES(See attendance register attached)

No	Name	Position	Email Address

AGENDA

1. Prayer
2. Self-Introductions
3. Remarks from the Chairman of the meeting
4. Communication from JBN about the project
5. Reactions and Answers
6. Way Forward

MEETING MINUTES and PROCEEDINGS

Min 1: Prayer

Prayer was led by the LC1 Chairman.

Min 2: Introductions and remarks from the chairman

Members from JBN team introduced themselves to the community members present.

Min 3: Welcome Remarks From the Chairman

The chairman LC 1 welcomed all the members present. He noted that this consultation is timely because the community has experienced many social challenges with previous contractors.

Min 3: Communication from JBN Consult & Planner about the Project

In her opening remarks, Pamela thanked the members present for coming to share their experiences. She pointed out that the Adjumani ESIA Water Supply and Sanitation Project is about rehabilitation and maintenance of the water systems and facilities. Pamela informed the members present that the team from JBN Consult & Planners Ltd was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of water projects that have run into problems due to poor compliance to environmental and social issues such as child labor, spread of HIV/AIDS and contract workers impregnating of underage girls in the host communities. She pointed that the views from the community members in Marindi village are crucial for the ESIA formulation and therefore highly appreciated. In her conclusion, she requested the community members to be forthright and point out the social and environmental issues that they would not want them to happen in the upcoming road project so that the contractor can formulate mitigation measures ahead of the project implementation.

Min 4: Reactions and Way Forward

j) Comments	i) Responses
2. One of the community members inquired if the crops/trees/flowers/structures are affected by the water project, will they be compensated?	ii) The ESIA team leader pointed that there will be an evaluation and assessment team to value the extent of the destroyed property
3. One of the community members inquired if the water will be charged or be free?) The ESIA team leader responded that there will be some monthly charges paid by each household for purposes of maintenance and rehabilitation of the water systems and the water facilities.
5. One of the community members inquired if there will be consideration for those with only qualification merits such as qualification documents and required skills that are in line with the purpose of the water project?	Pamela responded that there will be consideration for both the skilled and unskilled workers that suite the water project work activities.

6. One of the community members further inquired about the accidents saying in case the casual laborers are involved in any form accident, how will the project handle such unprecedented occurrences?) Pamela responded that there will be involvement of the VHTs, senior health officers to corporate with the undertakings of the project to be in a better position to handle and mitigate such incident occurrences
7. One of the community members proposed that at least 70% of the indigenous local based community members need to be employed because usually, the contractors come with their own labour.	i) Pamela noted this.
8. One of the community members inquired if the contractor will employ local people?	Pamela from JBN Consult & Planners Ltd acknowledged that the contractor will employ local people. This will include both female and male.
9. One of the community members pointed that contract workers are found of taking away people's wives and this breaks up homes.	Pamela responded that this concern is noted. She further pointed that the contract workers will be sensitized about the dangers of indulging in sexual relations with the married women.
10. One of the community members was concerned that the contractor's trucks that ferry water materials like the pipes and deploying workers will knock the children in the community.	Pamela informed the meeting that the contractor will train drivers in road safety measures.
11. One of the community pointed that contractors have a habit of using people's facilities like renting houses and they go without payment.	Pamela noted that it is unfortunate that the community members were cheated by the previous contract workers. She cautioned the service providers to be keen and demand for cash upon service delivery.
11. One of the respondents inquired if the company has a mechanism to punish the bad manned workers especially those who engage in sexual relationships with underage girls and married women?	Pamela affirmed that NWSC has a code of conduct that guides all the employees.
Closing Remarks In his closing remarks, The Parish Chief requested the members present to be vigilant and report any misconduct of the contract workers. He pointed that the community is struggling with many 'fatherless' children and broken home due to the contract workers who seduce the village vulnerable women in sexual activities. He later thanked the team from JBN Consult & Planners Ltd for consulting	

and informing the community about their roles in the proposed water system rehabilitation and maintenance project.

CLOSURE: Meeting was closed at 4:00 pm

ESIA FOR ADJUMANI WATER SUPPLY AND SANITATION PROJECT

PROJECT ACTIVITY NAME/PLACE:	ADJUMANI ESIA meeting with the Community members at Omi Parish-Araa West village
Consultant	JBN Consult & Planners Ltd
Minutes by:	Ainembabazi Joshua
Reviewed by:	Pamela Tashobya
Date of Meeting:	21 st /12/2021
Meeting Venue:	Araa West Village
Meeting Minutes Version number:	015
Meeting Start Time:	11:00 am

ATTENDEES(See attendance register attached)

No	Name	Position	Email Address

AGENDA

1. Prayer
2. Self-Introductions
3. Remarks from the Chairman of the meeting
4. Communication from JBN about the project
5. Reactions and Answers
6. Way Forward

MEETING MINUTES and PROCEEDINGS

Min 1: Prayer

Prayer was led by LC1 Chairman.

Min 2: Introductions

Members from JBN Consult & Planners Ltd team introduced themselves and this was followed by the police members present.

Min 3: Welcome Remarks from District Police Commander (DPC)

The DPC welcomed all the members present. He noted that this ESIA stakeholder's consultation comes at a time when Adjumani District is grappling with many social challenges among which include; increased prostitution, increased gender based violence, child neglect, alcoholism etc.

Min 4: Communication from JBN about the project

In her opening remarks, Pamela thanked the members present for coming to share their experiences. She pointed out that the Adjumani ESIA Water Supply and Sanitation Project is about rehabilitation and maintenance of the water systems and facilities. Pamela informed the members present that the team from JBN Consult & Planners Ltd was contracted by NWSC (The Contractor) to do an environmental and social impact assessment as one of the requirements of the World Bank who are the project financing partner. She noted that this comes against a backdrop of road projects that have run into problems due to poor compliance to environmental and social issues such as child labor, spread of HIV/AIDS and contract workers impregnating of underage girls in the host communities. She pointed that the views from the community members in Araa West Village are crucial for the ESIA formulation and therefore highly appreciated. In her conclusion, she requested the police officer present to be candid and point out the social and environmental issues that they would not want to happen in the upcoming road project so that the contractor can formulate robust mitigation measures ahead of the project implementation.

Min 5: Issues raised by Focus Discussion Groups of the women

The community ladies stated that they mainly depend on the water from the river source when the boreholes within the community breakdown and they further stated that the water from the river source should be boiled before use because is contaminated with many pathogens and other harmful components which will endanger human life. They proceeded by saying that children and the adults also encounter stomach related ailments when they consume the water from the river.

The ladies said that the water supply points are far and encounter the problem of walking for long distances, they added that the existing boreholes are few in number.

These ladies stated that they use firewood for cooking food and boiling the drinking water but they encounter walking long distances while collecting the firewood.

The community ladies highlighted that usually women who experience antenatal conditions find it difficult to access the health services and hospital facilities because the distance to these health facilities is long for example Adjumani Hospital which is about 10 miles from Omi Parish.

Min 6:Activities/work done by the women

The community women stated that they engage themselves in fish mongering, digging and cultivation for both home consumption and selling, local brewing of local brews, stone quarrying and selling of firewood.

These women highlighted out saying that they can also participate in poultry farming and rearing of goats.

They further expressed that they can also be involved in cooking services by providing food and breakfast to the contractors and the other project workers in case the water project commences.

They also said that they can participate in water project activities by involving themselves in digging trenches where the water pipes will be laid once connected for example these ladies were involved in the DRIP project when it was implemented in the area.

Min 7: Views about the GBV by the women

The community ladies said that the rate of GBV is high and further that this is mainly attributed to lack of money/financial resources.

The ladies also pointed out the violence is accelerated by constant abuse and misuse of alcohol which inducts drunkenness behavior in men thus ending up forcefully grabbing the money from the women. They further added that such behaviors and violent tendencies are reported to the elders and the LC1 leaders.

Min 8:Views about Covid-19 by women

The community ladies highlighted saying that many girls have been married off at an early age which has contributed to high rates of early pregnancies among the girl child due to the negative impact paused by the Covid-19 lockdown and this has strongly encouraged many cases of the girl child drop out.

Min 9: Reactions and Way Forward

ii) Comments	v) Responses
1. The DPC Adjumani District pointed that local employees should be provided with legal appointment letters	Pamela from JBN Consult & Planners Ltd responded that it will be recommended to the contractor to provide legal appointment letters for those people that will be employed on the project.
2. One of the community members who is a fisherman inquired about what plans and arrangements does NWSC have for people	The fishermen will be relocated to a different site and their details will be covered in the RAP study and also associated Livelihood restoration

whose livelihoods will be affected by the project?	strategy /Plan will be prepared to inform the processes thereafter.
3. One of the community members suggested that grievance committees should be established to resolve the issues related to the water project for example cases of early pregnancies and rape through sexual harassment of the girl child, GBV.	The project will have a GRM at community and contractor level with clear referral pathways and attendant community liaison persons who will be in charge of recording and escalating the grievances through the various redress structures.
4. One of the community leaders suggested that the local based people are considered for employment opportunities are given priority such as the drivers and plumbers?	The project team considers the locals as priority for employment at all levels. All potential employees shall be required to produce recommendation letters from the LC chairpersons.
5. One of the community members expressed his happiness by thanking the tremendous efforts invested in by World Bank who are the funding the water project and positively welcomed the initiation of the project since water has been a challenge.	This was noted.
6. One of the local respondents cautioned that high rates of prostitution would emerge.	This was noted and there will be distribution of condoms to be in a better position to prevent the high risks of spreading HIV/AIDS.
9. One of the community members inquired in case one wants to connect and extend piped water to his compound yard space, will the responsibility be individual or it will be by NWSC?	They will apply and NWSC will connect them at a fee
11. One of the community members requested that the water should be given free of charge for the community at different supply points?	Water will be post-paid where customers will be paying a nominal fee after receiving the bill from NWSC
12. The DPC Adjumani District observed that domestic violence will increase when the contract workers come to the community. This is because local women are attracted to contract workers because they are perceived to be richer than their ordinary men.	Pamela responded that the contract workers will be sensitized about the dangers of engaging in sexual relations with other people's wives.
13. The DPC Adjumani District observed that the contractor should be strict with local workers that will be employed on the project because majority	Pamela pointed that this observation has been noted.

of them are found of over drinking when they get money.	
14. The DPC Adjumani District noted that given the rampant tribalism in the community, the contractor should employ some local people on the project as it will increase social acceptance of the project.	Pamela pointed that even if the contractor does not have specific jobs quotas that will that will be given to local people in Adjumani District; he will ensure that some of the youth from the local community are employed on the project.
15. The DPC Adjumani District there are many cases of child neglect in the community due to heavy drinking among the men in Adjumani District. Women are left with the burden of family support	Pamela pointed that the contractor will ensure that some job and business opportunities are given to women. The contractor will ensure the sources of income for women are not disrupted.
16. The DPC Adjumani District pointed that there is a rise in HIV/AIDS infections in Adjumani. This is attributed to the influx of cheap commercial sex workers	Pamela noted the contractor will work in association with other HIV/AIDS service providers to sensitize the workers on the dangers of HIV/AIDS. There will also be VCT services, ART and provision of condoms for the workers
17. The DPC informed the meeting that the customary land ownership in Adjumani is riddled with disputes which will constrain the acquisition of private borrow and dump pits.	Pamela pointed that this observation has been noted.
18. The DPC Adjumani District pointed contract workers should avoid indulging in sexual relationships with young girls however old they may seem physically.	Pamela pointed that this observation has been noted.
Closing Remarks In his closing remarks, the District Police Commander Adjumani District thanked the ESIA team from JBN Consult & Planners Ltd for the fruitful stakeholder engagement. He pledged to support the project when it commences	
CLOSURE: Meeting was closed at 12:00 pm	


Summary of Key Informant Interviews

No	Date	Name of key Informant, Title and Views
1	16 th /12/2021	DCID Adjumani District <ul style="list-style-type: none"> There is high domestic violence and women are on the receiving end.

		<ul style="list-style-type: none"> There are many cases of poisoning therefore, the contract workers should be careful about what they eat and who they annoy in the community. Commercial sex workers are on the increase in Adjumani Town. They have formed groups like which include; 'Team- No- Sleep' Team- No- Condom' Team-No-Fear' etc. These groups will disrupt contract workers by offering cheap sex. The rate of HIV/AIDS infections is high among the commercial sex workers. The contract workers need to be sensitized to use condoms consistently when they get involved with sex workers.
2	16 th /12/2021	<p>GBV Officer Adjumani Central Police Station</p> <ul style="list-style-type: none"> There have been reported cases of sexual harassment of women at the work place by foreign contract workers on some road projects in Adjumani District. Teenage prostitution is rampant in the central district and this is likely to increase with the influx of contract workers who have disposable income. Most contractors on water projects overwork their employees. Thus, women who are employed on the project are left with limited or no time to perform household chores hence, domestic violence as the mean feel that they are not being respected or even suspect their spouses to be cheating on them with male contractors.
3	16 th /12/2021	<p>Senior Probation and Labour Officer Adjumani District</p> <ul style="list-style-type: none"> Child labour is high in the district because of the increasing poverty in many households. It is also fuelled by the local business community who prefer cheap labour. To avoid cases of child labour on the project, the contractor will have to display posters at the project site that disallow children working on site. There should also be routine monitoring of the project by the Labour Officer to check if the contractor is employing children. Gender Based Domestic Violence is also common due to the cultural stereotypes about women's gender roles. Therefore, for the contractor to reduce cases GBDV, he should not over work women who will be employed on the project given that they are expected to also perform household chores.
4	18 th /12/2021	<p>DCID Ajumani Police Station</p> <ul style="list-style-type: none"> There are many fake defilement cases so as to extract money from new people in the area (Commercialised defilement). Therefore, the contractor should be warned not to engage with young girls in Adjumani otherwise, they fall into traps of 'bush lawyers' that are waiting to cheat them.

		<ul style="list-style-type: none"> ▪ The cases of teenage pregnancy normally increase during the school holidays. ▪ The number of street children in Adjumani is alarming. The contractor should not be tempted to use them as labour because they are cheap.
5	20 th /12/2021	<p>MTI Adjumani District</p> <ul style="list-style-type: none"> ▪ The overall water distribution is about 17.4% per capita i.e. 1.20 liter jerry can per day. ▪ The settlements have low water supply. ▪ There is flooding in Adjumani which ended up affecting some settlements (Brolali and Pagrinya) and this led to the destruction of the water sources which were being used by the community members. ▪ At the different health facilities, they use tap water which is run by a motorized mechanism. ▪ The prevalence rates of the common wash and sanitation diseases according the UNHCR report in 2021 in the settlement as acute watery diarrhea, skin diseases at 6% and added that they have got 2% of the OPDS, eye conditions diseases related to hygiene and water at 2%, intestinal worms at 2%. ▪ Malaria is the highest burden with a percentage between 30%-50% which is always at a peak during the month of September and the respiratory diseases at 14%. ▪ In Adjumani district, the overall prevalence rate of HIV/AIDS is at 2.9% with the positivity rate of HIV/AIDS at 0.9% in the last financial year and added that positivity is higher and common in nationals at 1.8% while for the refugees, the positivity rate stands to be at 0.8%. ▪ The MTI provide preventative services to the community members such as the distribution of condoms to the different settlements and they have different distribution points for the condoms. ▪ They get condoms from UNHCR and IDI which is the main supplier and leading partner within the region. ▪ There is existence of awareness by the community members through various forms such as using different structures with the adolescent groups, peer leaders and educators to sensitize the community members about the diseases and other health related issues.


Key informant meeting			
DATE		17 th May 2022	
MEETING		START	10:21am

		END	11:30am
	MINUTES BY	Pascal G Bithum	
Venue of meeting	MoGLSD		
Subject of the Meeting	Stakeholder consultations on piped water supply and sanitation facilities in Adjumani		
Agenda: <ol style="list-style-type: none">1. Opening prayer2. Self-Introductions3. Introduction of the project4. Views and concerns from the key informants5. Consultants’ response6. Closure			
A. Self-Introductions <p>Introductions were made by JBN team and technical team from the ministry</p> <p>The Consultant informed the technical team about project, the ESIA preparations and the level of progress.</p> <p>The technical team also explained the mandate of the ministry and OSH department to conduct environmental social safeguard issues, and one of them is to direct on how social, safety and health risks can be mitigated, done during the design, planning up to implementation stages of the project.</p>			
B. General concerns <ul style="list-style-type: none">• Consent forms from local leaders and other concerned authorities on land ownership should be availed to address the issues of land ownership.• The contractor should construct sanitation facilities to cater for labour force to be employed different from public toilets planned for the communities.• Site layout plans and architectural designs for piped water system and all that is entailed therein, should be submitted to the ministry• Geotechnical survey/ study reports on bearing ratio to hold the pipes should be submitted• During digging of ditches, the sites should be hoarded off with clear signage.• Traffic management plans, excavation methods (machines), dust pollution and emanating noise should be addressed• Driver competency, vehicle maintenance schedules should at all times be assessed and safe operating distances from the road addressed (50m for borrow pits and 15-20m for transmission mains)			

- All certification from concerned ministries and authorities i.e.; Directorate of water resources etc., should be acquired.
- Geological studies should be done in relation to water and sanitation facilities in order to prevent contamination of the underground aquifer
- The design lifespan of the sanitary facilities should be based on the size of the septic tank and the target population.
- The issue of environment pollution related to odour from faecal sludge treatment plant and waste management upon disposal of sludge, should be addressed. A site layout plan submitted.
- Safety (occupation & community) during construction should be observed. Risk assessment should be done, mitigation measures addressed and protection explained for preparedness.
- Welfare provision based on gender ranging from accommodation and sanitation facilities. All employees should have written documentation of their contracts (explaining their salary/ wage, time-off duty etc.)
- The employees should be pre-medically examined to determine mental capabilities before they are engaged or assigned with different tasks.
- HIV/AIDs services should be extended to the employees through provision of contraceptives and allowing them to optionally share among themselves.
- Emergency preparedness should be in place, emergency contacts displayed to know whom to contact e.g., Red cross has Ambulances to attend to emergencies on road accidents. There should be internal preparedness in case of emergencies.
- Firefighting mechanisms especially in camps e.g., Assembly points, fire extinguishers and smoking places should be designated.
- Personal Protective equipment should be provided based on the risk assessed.
- Water treatment plan should guard against waste contamination of the environment, facility pollution to underground waters.
- Traffic control through signage / flagmen and diversions should be done with the aid of Police and other concerned stakeholders.
- The vulnerable groups should be planned for especially during the design of sanitary facilities
- The redress mechanism plans should be in place to address challenges among workers, workers to community. A committee should be formed therein having natives of the area especially LC chairperson to bridge the gap between workers and community.
- The employment policy of the country should be followed; contracts, payment mechanisms, appointment letters should be in place. Children should not be employed
- The contractor should be gender sensitive during employment for gender equality. And when employing, some percentage should be from the local people as part of ownership and sustainability of the project.
- Restore the site to a more likely pristine nature, revegetate and encourage tree planting along the mains and more should be planted around the sludge treatment plant to curb the odour.

D. Meeting closure.


The meeting ended at 11:30 am

	Key informant interview		
	DATE	05 th February 2022	
	MEETING	START	11:30 am
		END	14:30 pm
	MINUTES BY		
Venue of meeting	MWE – Directorate of Water Resources Management		
Subject of the Meeting	Stakeholder consultations on ESIA for Adjumani Water Supply and Sanitation Project in Adjumani District.		
A. Agenda <ul style="list-style-type: none">• Opening prayer• Self-Introduction• Remarks from the Chairperson• Remarks from the Developer• Discussion• Way forward• Closure of meeting			
B. Self-Introductions <p>Introductions were made by the technical team at the Ministry and JBN team</p> <p>The Consultant informed the Ministry technical team about project, the ESIA preparations and the level of progress.</p>			
C. General concerns and views <ul style="list-style-type: none">• The technical team wanted more clarity on whether the abstraction points are inside the refugee settlement camps. This was attributed to concerns from the local communities as focus on service delivery is put on refugees leaving out the refugee hosting communities.• As service delivery is focused on refugees, the meeting also informed that there is going to be continued friction or hostility on the refugees because the refugee hosting communities have been bypassed by the distribution mains. Therefore, the design team should consider incorporating the hosting communities in the water supply.• The meeting also informed that the component of sanitation facility coverage in the hosting communities is at 30%-20%, an implication on open defecation in the area. Therefore, more sanitary facilities should be considered.• A question was raised on whether there are other downstream water users on R. Nile and what could be the amount of water going to be abstracted from the Nile.• What are the possible solutions to flooding around the boreholes incase flooding re-occurs? This was in line with the surface water abstraction sources at the Intake in Arra West.			

- What are the possible solutions for water contamination given the proximity of latrines and open defecation around the water sources?
- Develop Water Source Protection Plans and ensure that they are implemented during the commencement period of the project such that the implementation activity takes place alongside the project so as everything is finalized at the same time and this will reduce on the man power required.
- Ensure to develop sanitation/ solid waste management plans and clearly indicate the dumping so as to prevent

D. Meeting closure.

The meeting ended at 11:30 am

	Key informant meeting		
	DATE	17 th May 2022	
	MEETING	START	10:21am
		END	11:30am
	MINUTES BY	Pascal G Bithum	
Venue of meeting	MoGLSD		
Subject of the Meeting	Stakeholder consultations on piped water supply and sanitation facilities in Adjumani		
Agenda: 7. Opening prayer 8. Self-Introductions 9. Introduction of the project 10. Views and concerns from the key informants 11. Consultants’ response 12. Closure			
C. Self-Introductions Introductions were made by JBN team and technical team from the ministry The Consultant informed the technical team about project, the ESIA preparations and the level of progress. The technical team also explained the mandate of the ministry and OSH department to conduct environmental social safeguard issues, and one of them is to direct on how social, safety and health risks can be mitigated, done during the design, planning up to implementation stages of the project.			


D. General concerns

- Consent forms from local leaders and other concerned authorities on land ownership should be availed to address the issues of land ownership.
- The contractor should construct sanitation facilities to cater for labour force to be employed different from public toilets planned for the communities.
- Site layout plans and architectural designs for piped water system and all that is entailed therein, should be submitted to the ministry
- Geotechnical survey/ study reports on bearing ratio to hold the pipes should be submitted
- During digging of ditches, the sites should be hoarded off with clear signage.
- Traffic management plans, excavation methods (machines), dust pollution and emanating noise should be addressed
- Driver competency, vehicle maintenance schedules should at all times be assessed and safe operating distances from the road addressed (50m for borrow pits and 15-20m for transmission mains)
- All certification from concerned ministries and authorities i.e.; Directorate of water resources etc., should be acquired.
- Geological studies should be done in relation to water and sanitation facilities in order to prevent contamination of the underground aquifer
- The design lifespan of the sanitary facilities should be based on the size of the septic tank and the target population.
- The issue of environment pollution related to odour from faecal sludge treatment plant and waste management upon disposal of sludge, should be addressed. A site layout plan submitted.
- Safety (occupation & community) during construction should be observed. Risk assessment should be done, mitigation measures addressed and protection explained for preparedness.
- Welfare provision based on gender ranging from accommodation and sanitation facilities. All employees should have written documentation of their contracts (explaining their salary/ wage, time-off duty etc.)
- The employees should be pre-medically examined to determine mental capabilities before they are engaged or assigned with different tasks.
- HIV/AIDs services should be extended to the employees through provision of contraceptives and allowing them to optionally share among themselves.
- Emergency preparedness should be in place, emergency contacts displayed to know whom to contact e.g., Red cross has Ambulances to attend to emergencies on road accidents. There should be internal preparedness in case of emergencies.
- Firefighting mechanisms especially in camps e.g., Assembly points, fire extinguishers and smoking places should be designated.
- Personal Protective equipment should be provided based on the risk assessed.
- Water treatment plan should guard against waste contamination of the environment, facility pollution to underground waters.
- Traffic control through signage / flagmen and diversions should be done with the aid of Police and other concerned stakeholders.
- The vulnerable groups should be planned for especially during the design of sanitary facilities

- The redress mechanism plans should be in place to address challenges among workers, workers to community. A committee should be formed therein having natives of the area especially LC chairperson to bridge the gap between workers and community.
- The employment policy of the country should be followed; contracts, payment mechanisms, appointment letters should be in place. Children should not be employed
- The contractor should be gender sensitive during employment for gender equality. And when employing, some percentage should be from the local people as part of ownership and sustainability of the project.
- Restore the site to a more likely pristine nature, revegetate and encourage tree planting along the mains and more should be planted around the sludge treatment plant to curb the odour.

E. Meeting closure.

The meeting ended at 11:30 am

	Key informant meeting		
	DATE	24 th March 2022	
	MEETING	START	03:01 pm
		END	04:30 pm
	MINUTES BY	Pascal G Bithum	
Venue of meeting	UNRA HQ -KAMPALA		
Subject of the Meeting	Stakeholder consultations on piped water supply and sanitation facilities in Adjumani		
Agenda: 13. Opening prayer 14. Self-Introductions 15. Introduction of the project 16. Views and concerns from the key informants 17. Consultants’ response 18. Closure			
E. Self-Introductions Introductions were made by JBN team and technical team from the UNRA The Consultant informed the technical team about project, the ESIA preparations and the level of progress.			
F. General concerns • The design team should provide definite crossing points especially at town junctions called service ducts • There is lack of consultations with UNRA as decisions are made to cross roads without notification and inputs to UNRA			

- There is no interface from NWSC to update UNRA on their master plan for water networks or other specific requirements for decisions to be made collectively
- There is extortion of money from UNRA due to co-existence of right of way as UNRA is required to pay money for relocation. There should be agreements of funds required to better implementation of projects
- If there is need to be in UNRA's right of way, considerations should be established for issues to be discussed before implementation as described in UNRA's new regulations
- In case there is need of implementing water works with crossing points on UNRA proposed road constructions, consultations should be made so as to harmonise works and prevent cutting of pipes during the initial road works.
- The design team should submit their typical road crossings and typical valves so as they can be synchronised with UNRA's class of concrete and also to know the size of ducts required especially in big towns.
- Liaise with UNRA to know future road constructions especially bridges / right of way are not in close proximity with water abstraction points so as not to contaminate the quality of water sources
- Swamp crossings of hankers should not block the incoming flow on roads to avoid flooding of debris and water.

G. Site Specific comments

H. Atiak - Road has been designed and implementation on going. If there is going to be any crossings on Moyo 4G, earlier notifications are to be made with UNRA to harmonise the design.

F. Meeting closure.

The meeting ended at 04:30 pm

Annex 16: Water Source Protection and Catchment Management Plan

The water catchment area and the water point source for the project are degraded. The main drivers of this degradation are population growth, poor agricultural practices, rapid urbanization, climate change, anthropogenic activities like pollution from factories, open defecation and deforestation caused by land convention for agriculture and energy needs from fuelwood. Source protection and catchment management is provided for in the project but under a separate component "Investment in Integrated Water Resources Development and Management Component". The threats caused by anthropogenic activities, the hazards they are likely to cause and control measures are herewith outlined in table below.

Water source protection measures at water source

Water Source protection	Underlying Cause	Proposed Protection and Management Plan
Sustaining water quality at	Loss/degradation of wetland (due to agricultural encroachment) thus undermining capacity to filter	<ul style="list-style-type: none"> • Enforce Wetland policy to protect or regulate wetland

abstraction point	sedimentation and or stabilize the lake shore bank	<ul style="list-style-type: none"> Enforce environmental regulations (lake shore and wetlands) Demarcate and protect wetland/lake shore protection Zone
	Use agro-pesticides that find their way into water at abstract point	<ul style="list-style-type: none"> Improved capacity for safe handling and disposal of agro- pesticides Promote soils erosion control measures so as to reduce surface runoff
	Soil erosion/ surface erosion from gardens and along the access road resulting in sedimentation	<ul style="list-style-type: none"> Promote soils erosion control measures to reduce surface runoff
	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 Ensure safe disposal of human waste (e.g. use of pit latrines)
	Sand mining/ extraction within upstream wetlands	<ul style="list-style-type: none"> Halt/stop rock/ sand mining or extraction activities.
Sustaining water quantity	Poor agricultural land uses in the catchment affect hydrological system (underground water) e.g. through increased surface	<ul style="list-style-type: none"> Promote sustainable land management/agricultural practices in the catchment Regulate wetland use upstream (agriculture + sand mining)
Declining tree/vegetation cover that affect hydrological system (underground water)	<ul style="list-style-type: none"> Increase tree cover through appropriate afforestation or agroforestry practices with appropriate tree species. Maintain vegetation around the abstraction point. 	<ul style="list-style-type: none"> Declining tree/vegetation cover that affect hydrological system (underground water)
Maintenance of water supply infrastructure	Insecurity water supply infrastructure due to vandalism and thefts	<ul style="list-style-type: none"> Fence/provide protection of supply 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 Conflicts related to access to piped water among current and potential water users	<ul style="list-style-type: none"> Promote alternative water supply/water harvesting/ water storage technologies. Engage stakeholders in designing and monitoring the water supply Develop and apply conflict mitigation/management strategies.
Sustaining livelihoods	Declining Soil fertility and over-all 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.)
	Conflicting or competing land (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, lake and infrastructure Empowering stakeholders to plan for and manage their waste sources (provision of incentives for protecting water source e.g., fishing gear that enables fishing activity in deep waters) Increase awareness on the relationship between land/ water use and water quality and water availability

Annex 17: Aquatics (Fisheries)

The ecological and conservation status of Madi Region Upper Nile River fish species

Common name	Scientific name	Ecological status in Madi Region	Conservation status in Uganda	Source
Nile tilapia	<i>Oreochromis niloticus</i>	Dominant	Least Concern	Mwanja et al. 2013
African butter fish	<i>Shilbe mystus</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
African sharp tooth catfish	<i>Clarias gariepinus</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Marble Lungfish	<i>Protopterus aethiopicus</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Vundu catfish	<i>Heterobranchus longifilis</i>	Rare	Least Concern	IUCN Red List Status (Ref. 125652)
Redbelly tilapia	<i>Coptodon zilli</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Albert tilapia	<i>Oreochromis leucostictus</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
St. Peter's tilapia (Mango tilapia)	<i>Sarotherodon galilaeus</i>	Rare	Least Concern	IUCN Red List Status (Ref. 125652)
Black Nile catfishes	<i>Bagrus bayad</i>	Rare	Least Concern	IUCN Red List Status (Ref. 125652)
	<i>Bagrus docmac</i>	Rare	Least Concern	IUCN Red List Status (Ref. 125652)
Nile perch	<i>Lates niloticus niloticus</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Giraffe catfish (Bubu)	<i>Auchenoglanis occidentalis</i>	Rare	Least Concern	IUCN Red List Status (Ref. 125652)
Electric catfish	<i>Malapterus electricus</i>	Rare	Least Concern	IUCN Red List – 3.1
Cornish jackfish	<i>Mormyrops anguilloides</i>	Common	Least Concern	J. Afrotrop. Zool. Special Issue:87-96. 2007
Elephant snout fish	<i>Mormyrus kannume</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Bichir	<i>Polypterus Senegalus</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
	<i>P. birchir</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)

	<i>P. endicheri</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Elephant fish	<i>Petrocephalus bane</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Nile puffer	<i>Tetraodon fahak</i>	Rare	Least Concern	IUCN Red List Status (Ref. 125652)
African obscure snakehead fish	<i>Ophiocephalus obscurus</i>	Rare	Least Concern	J. Afrotrop. Zool. Special Issue:87-96
Climbing perch	<i>Anabas petherici</i>	Rare	Unknown	J. Afrotrop. Zool. Special Issue:87-96
	<i>A. muriei</i>	Rare	Unknown	J. Afrotrop. Zool. Special Issue:87-96
	<i>A. testudineus</i>	Rare	Unknown	J. Afrotrop. Zool. Special Issue:87-96
Kamuduli in Alur	<i>Synodontis schall</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652).
Nile labeo	<i>Labeo niloticus</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Assuan labeo	<i>Labeo niloticus</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Niger barb	<i>Barbus bynni</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Ngasia	<i>Hydrocyon forskalii</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Nile distichodus	<i>Distichodus niloticus</i>	Rare	Least Concern	IUCN Red List Status (Ref. 125652)
Aporo in Alur	<i>Citharinus citharus</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)
Angara in Alur	<i>Alestes baremoze</i>	Common	Least Concern	IUCN Red List Status (Ref. 125652)

Rapid Aquatic Environmental Assessment Checklist at Planned Intake Point (2 - 4km) either side of the intake point)

QUESTIONS	Yes	No	Notes
A. Project site			
Project area			
Fast flowing river?	X		
Visibly turbid or murky waters?		X	Water was apparently clear and moving.
Characteristic odour from River?		X	Water was not smelly at all but brown in colour
River bottom substrate a mixture of gravel, slit and mud with organic matter or debris at the bottom in some areas?	X		
River bottom substrate predominantly gravel and slit with no organic substrate at the bottom?			
Visibly heritage resources at intake?		X	
Buffer zone of encroached upon?	X	X	The river seems to have naturally kept away human settlement activities with regular inundation.
River edges vegetated?	X		A predominantly papyrus vegetated shores, and in some places with standing pools (lagoons) of water dominated by water hyacinth and thickets of shrubs and grasses
Visible adjoining swamp area /wetland	X		Limited to the buffer zone due to rising edges of the river
Significantly visible plants and pieces of floating water hyacinth passing the proposed intake	X		
Use of River at proposed intake for local and bulk domestic / industrial supply	X		River intake was observed as source of water for domestic purposes.
Use of River water at the proposed intake for direct human consumption (drinking)?	X		A number of locals were seen drinking water from the river

Dumping of domestic and industrial waste in the river close to the proposed intake?	X		Domestic waster was being dumped by the river edge, and was seen falling directly into the river about 8 km upstream from the intake point
Any industries by river edge upstream of the intake point.	X		There is a tin mining facility ~ 3 km upstream of the proposed river intake; and a hydropower dam ~ 6 km upstream
Visible active fishing and fishing traps	X		Minimal fishing activity at the proposed project site and mainly done using local basket traps – no fish was landed at this point for the three days consecutive days of observation
Nile crocodiles reported by locals but not seen during the survey.	X		Crocodiles or monitor lizards reported by locals but not seen.
Buffer zone of encroached upon?	X		Largely intake and a number of inundated.
Special zone to protect biodiversity		X	No visible or known published evidence to that effect.
Lagoons	X		Numbers of these lagoons or constellation of “Nile lakes” as they are known, exist.
B. Potential Environmental Impacts Will this project cause impacts...?			
Interference or damage to historical/cultural monuments/areas/ practices at or close to the intake?		X	No such activities or sites were observed or reported.
Constraint to other planned developments, enterprises and access to buildings; noise, bad smell related disturbance to neighbouring areas and flow of rodents, insects etc.?		X	No, as the site is generally away from any formal settlements.
Resettlement or necessary relocation of local people		X	The water intake and treatment facility will NOT displacement of persons or loss of economic livelihoods.

Damage to quality of downstream water in case of discharge of improperly treated or untreated wastewater?		X	This development is limited at intake and treating water for on-ward supply. No wastes apart from the settled organic material, silt and gravel are expected. The resultant settled material will not be re-introduced into the river. .
Flooding of private properties with untreated wastewater		X	No major release of water back into the natural water course or area is anticipated..
Environmental pollution due to improper sludge operation or discharge of industrial wastewater into public sewage system?		X	Sludge produced by wastewater treatment will be processed properly. Sludge processing shall ensure full liquidation of its pollutant and harmful compositions. If sludge will be used for agricultural purposes, the proper processing will be included in the wastewater treatment process and respond to relevant sanitary-hygiene norms. If sludge will not be used in agriculture, it will be processed accordingly, stored in sludge fields and buried in the areas agreed with NEMA. The body responsible for the maintenance of the treatment plant and sanitary-hygiene department will control discharge of inadmissible harmful substances, wastes and materials into the sewage collector.
Noise and vibration due to explosions and other construction works?	X		Construction works will be carried out in accordance with bidding process. It will be implemented with due compliance with specifications, ecological and sanitary norms and regulations. The quality and scope of works will be supervised by PIU and selected consultants. The constructor will take necessary measures in due time, with a view not to exceed allowable level of noise and vibration.
Discharge of toxic substance into sewage system which may damage the system and harm workers health?		X	Inadequacy of contractor's project related activities may cause damage to environment, staff health, and health security of local people, including discharge of toxic chemical substances to sewage collectors which may lead

			to bad consequences. The organization of works in accordance with the best practices and implementation of trainings for the local staff are the key components to eliminate or mitigate adverse environmental impacts and risk to human health.
Buffer zone to mitigate noise or other potential damages to surrounding locations and supply structures with protection zones?		X	The project/development will not have to as naturally the project site is vegetated.
Conflicts between project staff from other areas and local workers?		X	Social studies implemented in the project zone show the sufficiency of local labour force with different disciplines. One of the project outcomes is the creation of new temporary and permanent employments. Thus, local expertise must be favoured in the process of employment. Any conflicts resulted on any grounds will be resolved under procedures of Management of Social Impacts.
Traffic closures and temporary flooding of roads due to earth excavation works and during rainfall seasons?		X	It is expected that during construction of water supply and sanitation system implies a fair amount of earth excavation works will take place. The contractor will plan the work phases, provide temporary roads for local population, protect surrounding areas from flooding due to excavation works and take proper actions to handle excavated material.
Noise and dust caused by construction works?		X	Noise and dust caused by construction works will be mitigated by the application of best ecological practices. These measures may include implementation of works during ordinary working hours and application of noise silencers. Noise production rate cannot exceed 65 dB in the daytime and 45 dB in the dark hours in accordance with Uganda standards and norms. The dust distribution must be eliminated by minimum application of machines and mechanisms producing disturbing noise, watering of the

			construction site, provision of coatings over dusty materials and temporary fences and other methods.
Traffic constraints due to transportation of construction materials and wastes?		X	Construction works must be organized in such a way that they don't cause constraints to normal traffic and extra noise. In order to avoid pollution of central urban areas excavated materials will be transported through alternative secondary roads rather than main highways. (to be agreed with NEMA).
Excavation of temporary silt?		X	One of the environmental impacts is the silt and other earth materials generated due to construction works. Such materials will be handled in accordance with the EMP, surrounded to ensure flow to other areas, covered (if necessary) and discharge to areas as agreed with the NWSC.
Health risks due to flooding and groundwater pollution due to sewage line deterioration?		X	Treatment structures will be operated in compliance with the relevant guidelines and standard documents. These structures will be provided with emergency outlets in cases of breakages and other damages. Emergency outlets will be used with the prior awareness of the adequate local bodies. The emergency plan of the operator of the treatment structure will include early warning of unexpected emergency situations.
Damage to water quality due to bad sludge treatment or discharge of wastewater without treatment?		X	The plant should include internal laboratory to ensure operation of treatment structures in compliance with the relevant ecological and sanitary norms and adherence to permissible pollution level of the treated water content. The operation of these structures will also be followed by the local sanitary agencies and NEMA.
Pollution of surface and groundwater sources due to water intake and treatment activities?		X	There is no anticipated pollutant that will be involved in the water intake process neither in the treatment of water to be supplied.

Risks to health of operation staff resulting from treatment of water prior to supply?		X	No observable contaminants or substances that would lead to emissions.
Visible risks to water quality by socioeconomic activities close to the intake?		X	Activities undertaken did not seem to have negative impact on water quality.
Supply of unreliable raw water (including extra pathogens and mineral compositions)?		X	Water sources meeting potable water norms and having required flow rates approved by the government, including necessary technical, economical, financial, and ecological requirements are seen as reliable alternative sources. The project excludes investigation of sources irrelevant to the above indicators.
Delivery of irrelevant water flows into the distribution system?		X	The NWSC must ensure adherence to the set and agreed to treatment operation procedures and exclude any delivery of irrelevant and water in quality and quantity as per agreed to water quality and water flow standards into the distribution system.
Irrelevant protection of intake structures or wells resulting in pollution of water supply?		X	A sanitary-protection zone is envisaged for water supply source to be selected through comparison of different alternatives meeting technical, ecological, financial and ecological conditions and adequate structures to be built on this source. This zone will ensure that no discharge of wastes, pollutants or unwanted substances and illegal access to the selected water supply facilities is allowed.
Oversupply of groundwater flows resulting in soil salinization and ground setting?		X	This project is best on intake of surface water. Noe use of groundwater is envisaged.
Overgrowth of water-plants in the water reservoir?		X	Growth of water plants on the walls and bed of water reservoirs although likely, it shall be handled as part of the water for supply treatment process.

Risks resulting from inadequate design of structures envisaged for purchase, storage and application of materials (chemicals) for water treatment and other toxic chemicals?		X	Use of any chemicals in process of treatment of the water supplied shall follow strict guidelines for treating of potable water in Uganda by NWSC.
Health risks due to application of chlorine and other substances to disinfect water?		X	Chlorine and other reagents to be used for disinfection of potable water is unlikely to cause any health risks because the staff working with such substances will have necessary knowledge of behaviour with such substances and follow adequate guidelines and instructions.

In addition to the findings on fisheries, for comparison, also a semi-quantitative analysis was undertaken to further evaluate potential environmental impacts. Accordingly, “Valued environmental components” (VEC’s) in regards to aquatic environment were determined and ranked according to whether they are “high”, “medium” or “low” (Table below). Each of the environmental components identified in the Table was identified during the consultations or as a result of technical survey and review of the feasibility study report for the project. VECs that are valued as “high” are those that are broadly important across ecosystem and both attendant other effected communities. VEC’s that are ranked as “medium” are those that are important to the attendant communities at the intake, but are of limited significance at a wider level. VEC’s that are ranked as “low” are significant at a localised level

The table evaluates the significance of potential impacts with respect to each VEC. The “significance of potential environmental effects” is ranked based on the intrinsic potential of the identified potential effects to impact the VEC’s. As identified in the Table, the potential significance of possible project effects is ranked as “high” for most of the VEC’s that are highly valued. However, the significance of project impacts on land use is considered to be “medium” since the amount of land in question is limited, some future land uses would be enhanced (and development costs lowered) by facility development and specific alternate land uses have not been proposed.

The table also identifies the availability of mitigation measures to address all potential negative effects identified during the period of the preparation of this document. Mitigation measures may be at the level of facility siting, design, construction and operation, and may include physical, financial, institutional or other measures. An environmental monitoring plan will ensure that all measures are appropriately undertaken and that required environmental standards are maintained. This will document the nature and frequency of the monitoring required. For the intake site, environmental monitoring will include a schedule for regular monitoring for key indicators of contamination

Valued Environmental Components (VECs) and Potential Negative Effects

Valued Environmental Components		Significance of Potential Negative Effects		Availability of Mitigation
Priority	Environmental Component	Potential Negative Project Effects	Potential Significance of Effect*	Measures
Construction Phase				
High	Aquatic living resources	Loss of ecologically sensitive areas, loss of critical habitats, loss and or displacement of species due to vibrations, noise, effluent discharges, introduction of physical facilities for water abstraction, and reduction in river water levels due to water intake	Low	Measures available
	Ground and surface water	Pollution of ground and surface water	Low	Measures available
	Land Use	Long term reduction of choices for land development at the area	Moderate	Measures available
	Natural habitat	Disturbance of the natural habitat due to construction related noise, dust, non-seasonal works, unprocessed residues and etc. Loss of natural areas due to construction works.	Moderate Low	Measures available Measures not available
	Aquatic flora and fauna	Earthworks, operation of machines, noise and etc.; Losses or degradations during and after construction works, non-seasonal works, change of ecological situation etc.	Moderate	Measures available
	Drinking water quality	Pollution of drinking water sources	None	Measures available
	Cultural heritage	Loss of cultural heritage	None	Measures available

Valued Environmental Components		Significance of Potential Negative Effects			Availability of Mitigation Measures
Priority	Environmental Component	Potential Negative Project Effects	Potential Effect*	Significance	
	Public health	Injury from use of harmful substances in construction (paints with heavy metal, lead compositions), asbestos- cement slabs, inflammable and toxic materials etc.)	None		Measures available
	Air quality				
	Soil				
	Traffic/construction vehicle impacts	Increased level of truck/construction vehicle traffic in communities	Low		Measures available
	Odour, dust and noise impacts from construction activities	Odour, dust and noise impact at staff and off-site receptors	Low		Measures available
Medium	Environmental pollution from WTP	Environmental pollution due to improper handling, treatment and or discharge of wastewater into sludge	Low		Measures available
	Socio-economic stability				
	Public health	Health risks from unprocessed wastes; open reservoirs Use of harmful substances at the WTP (paints with heavy metal, lead compositions, toxic materials etc.)	Low		Measures available
	Soil	Contamination of soil from land disposal of sludge; Possibility of erosion related to wastewater discharge;	Low		Measures available

Valued Environmental Components		Significance of Potential Negative Effects		Availability of Mitigation Measures
Priority	Environmental Component	Potential Negative Project Effects	Potential Significance of Effect*	
	Odour impacts from wastewater treatment plant site activities	Odour impacts on nearby properties	Low	Measures available
	Reduction of land in productive agricultural use	Reduced land availability for grazing and crops	Low	Measures available
	Limitations on future development	Reduction of development options (reservoirs, WTP area)	High	Measures available
	Environmental pollution from WTP during both construction and operation phases	Soil, air and/or water pollution from improper storage of construction materials, improper handling, treatment and discharge of effluents and solid waste	Low	Measures available
Operational Phase				
High	Socio-economic stability	Loss of access to river crossing and point for drawing water	Moderate	Measures available
		Reduction in property values	Low	Measures available
	Public health	Health risks from sludge disposed as waste	Low	Landfill to protect public health from health risks related to waste not available
	Soil	Contamination of soil from land disposal of sludge	Low	Landfill to protect soil quality from contamination related to waste not available

Valued Environmental Components		Significance of Potential Negative Effects		Availability of Mitigation Measures
Priority	Environmental Component	Potential Negative Project Effects	Potential Significance of Effect*	
		Possibility of soil erosion related to wastewater discharge;	Moderate	Measures available
	Aquatic living resources	Loss of ecologically sensitive areas, loss of critical habitats, loss and or displacement of species due to vibrations, noise, effluent discharges, introduction of physical facilities for water abstraction, and reduction in river water levels due to water intake	Low	Measures available
	Odour impacts from WTP activities	Odour impacts on nearby properties	Low	Measures available
	Reduction of land in productive agricultural use	Reduced land availability for grazing and crops	None	Measures available
	Reduction in local property values.	Loss of investment value by residents	Low	Measures available
Medium	Limitations on future development	Reduction of development options (reservoirs, WTP area)	High	Measures available
	Visual impact	Unsightliness of treatment facilities	Low/medium	Measures available
	Employment/livelihood	Loss of traditional employment/livelihood	Low	Measures available
Low	Amenity value	Loss of amenity value adjacent to treatment facilities	Low	Measures available