



## MINISTRY OF WATER AND ENVIRONMENT

### INTERGRATED WATER MANAGEMENT AND DEVELOPMENT PROJECT

#### ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR WATER SUPPLY AND SANITATION PROJECT IN IGANGA & KALIRO DISTRICTS



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## CERTIFICATION

We the undersigned certify that this Environmental and Social Impact Assessment Report for the proposed Iganga-Kaliro Towns Water Supply and Sanitation Project in Iganga and Kaliro districts was conducted under our direction, supervision and based on the Terms of Reference provided to us by Ministry of Water and Environment. We hereby certify that the particulars given in this report are correct and true to the best of our knowledge.

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Signed:

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**Ministry of Water and Environment**

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## LIST OF ACRONYMS

BGG	Burial Ground and Grave
CAO	Chief Administrative Officer
CBD	Convention on Biological Diversity
CBOs	Community Based Organizations
CFU	Faecal Coli forms
CGV	Chief Government Valuer
CITES	Convention on International Trade in Endangered Species
CLO	Community Liaisons Officer appointed by the contractor
CSEAP	Construction Social and Environmental Action Plan
CSR	Corporate Social Responsibility
dB	Decibel
DEO	District Environment Officer
DISO	District Security Officer
DMM	Department of Museums and Monuments (Ministry of Tourism)
DN	Internal Diameter
DSOER	District State of Environment Report
DV	District Valuer
DMM	Department of Meseums and Monuments
DWD	Directorate of Water Development
DWRM	Directorate of Water Resources Management
EA	Environmental Audit
EC	Environmental Consultant
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMO	Environmental Management Officer (Contractor's)
EMP	Environmental Management Plan
EOHS	Environmental and Occupational Health and Safety
EOHS-MP	Environmental and Occupational Health and Safety Management Plan
EPA	Environmental Protection Agency
EPB	Environmental Project Brief
EPP	Emergency Preparedness Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework



GAC	Granular Activated Carbon
GIS	Geographical Information System
GPS	Global Positioning System
GRC	Grievance Redress Committee
GRM	Grievance Redress Management
HPDE	High Density Polyethylene
HRM	Human Resource Management
HSE	Health Safety and Environment
IBCC	International Bird Census Committee
ICT	Information Communication Technology
IDA	International Development Agency, member of the World Bank Group
IFC	International Finance Corporation
IUCN	International Union for the Conservation of Nature
IWMDP	Integrated Water Management and Development Project
LC	Local Council
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MDD	Maximum Day Demand
MoGLSD	Ministry of Gender Labour and Social Development
MWE	Ministry of Water and Environment
NDP	National Development Plan II
NEA	National Environment Act
NEAP	National Environment Action Plan
NEMA	National Environmental Management Authority (Uganda)
NFA	National Forestry Authority
NGO	Non-Governmental Organisation
NT	Near threatened
NWSC	National Water and Sewerage Corporation
O&M	Operation and Maintenance
OUA	Organisation of African Unity
OHS	Occupational Health and Safety
OHSD	Occupational Health and Safety Department
OM	Organic Matter
OP	Operational Policy
PAP	Person (People) Affected by Project/Project Affected Persons
PAPs	Project Affected Persons
PCR	Physical Cultural Resources

PFD	Personal Flotation Device
PIU	Project Implementation Unit
PPE	Personal Protective Equipment
QA	Quality Assurance
RAP	Resettlement Action Plan
RDC	Resident District Commissioner
RGC	Rural Growth Centre
SDC	Site Disciplinary Committees
SDG	Sustainable Development Goals
SEAP	Social and Environmental Action Plan
SIA	Social Impact Assessment
SPR	Environment Sector Performance Report
STDs	Sexually Transmitted Diseases
TDS	Total Dissolved Solids
ToR	Terms of Reference
TSC	Timed Species Counts
UBOS	Uganda Bureau of Statistics
UGX	Uganda Shilling
UNBS	Uganda National Bureau of Standards
UNESCO	United Nation Education and Scientific Cultural Organisation
UNRA	Uganda National Roads Authority
UTM	Universal Trans Mercator
UWA	Uganda Wildlife Authority
VAWG	Violence Against Women and Girls
VES	Visual Encounter Surveys
VIP	Ventilated Improved Pit Latrine
WB	World Bank
WCS	Wildlife Conservation Society
WHO	World Health Organisation
WTP	Water Treatment Plant

## EXECUTIVE SUMMARY

### Introduction

The Government of Uganda (GoU) through the Ministry of Water and Environment (MWE), with financial assistance from the World Bank, under the proposed Integrated Water Management and Development Project (IWMDP) is planning to undertake Water and Sanitation sub-projects in small towns and rural growth centres. The Project will focus on three strategic areas: (i) delivering necessary WSS infrastructure and catchment management measures in targeted areas; (ii) supporting water related institutions (MWE, local government, and service providers) establish and consolidate operational efficiency and service quality in small towns and rural areas; and (iii) strengthening national and regional capacity to improve Integrated Water Resource Management (IWRM). The Project comprises the four components: Component 1–WSS in Small Town & Rural Growth Centers which will cover Support to Small Town & Rural Growth Centers and Support to Refugee & Host Communities; Component 2–WSS in Urban Large Towns; Component 3–Water Resource Management and Component 4–Project Implementation & Sector Support. Sub-components 1.1-Support to Small Towns and Rural Growth Centers will be implemented by MWE team at central level through the Department of Urban WSS (UWSSD) and RWSSD, with close collaboration with staff in WSDFs as well as district local governments.

Iganga-Kaliro water and sanitation project will be financed under sub-component 1.1. The feasibility study, design review, and detailed engineering design of the improvement to the Water Supply and Sanitation for Iganga and Kaliro was carried out under the closed ‘Water Management and Development Project’, and this assessment has been carried out with the intention that the proposed project will be funded under the IWMDP.

### Project Description

Several activities will be undertaken during the implementation of the Iganga-Kaliro Towns Water Supply and Sanitation Project. In summary, the following activities are envisaged;

- Extension of water from the NWSC system at Iganga town to Kaliro town including all trading centres along the transmission route for a distance of 33.8km.
- Construction of a water distribution network in the project area worth 14,252meters in Kaliro town, and 10,858 meters in the trading centres along the transmission route.
- Establishment of 8 water storage reservoirs to meet the water demands of the various centres.
- Construction of an additional 10,000 m<sup>3</sup>/d capacity clarifier at NWSC treatment plant in Jinja.
- Construction of a booster station at Wairaka College in Jinja.
- Construction of various sanitation facilities in the project area to improve hygiene.

The current source of water for the project area is production boreholes. Hydrogeological investigations showed that borehole yield in the project area is between 5 and 15 m<sup>3</sup>/hr. For the ultimate year demand of 4,650m<sup>3</sup>/d this would require 20 boreholes of 15 m<sup>3</sup>/hr for 16 hours per day of pumping. This number of boreholes would make operation and maintenance of the water supply system complicated and with high operating costs and unreliability.

Potential surface water sources in the project area include, River Mpologoma, Lake Nakuwa and Kitumbezi Swamp. However, assessments showed that these surface water sources were not viable due to the distant location of more than 30km from the project area and the requirement of full treatment which makes the option costly. It was therefore established that Kaliro Town and the en-route RGCs could also be supplied from the NWSC Iganga Town water supply system. The source is the water supply system in Jinja Municipality where the water is transported to Iganga Town via a 37km long DN300 steel pipe transmission main. The Jinja WSS abstracts raw water from Lake Victoria in the Napoleon gulf and treats it at Masese Water Works, Walukuba Division.

Bukaye and Namunkesu RGCs are elevated above Iganga reservoir site. Namungalwe, Nasuti and Nambale are located at nearly the same elevation as Iganga reservoir site while Naibiri, Nabitende and Kaliro are located at a lower elevation than Iganga reservoir site. Therefore, when all these RGCs are connected to the transmission main, the flows into the reservoirs will be governed by the residual pressures at the junction of the transmission main leading to the reservoir. The residual pressures will depend on the relative elevation of the RGCs to Iganga reservoir site. All the reservoirs of the RGCs are elevated on 18m high towers to be able to provide enough pressures in the respective distribution networks.

Hydraulic analysis showed that it was not possible for the water to flow by gravity from Iganga reservoir site to the en-route RGCs and Kaliro town and therefore a booster station needs to be installed at Wairaka.

Considering the long distance from the Project area to the source of water, the scope of catchment protection was not included under this Project. Water source catchment protection is the responsibility of National Water and Sewerage Corporation that is managing the intake and water treatment plant that are located on the shores of Lake Victoria in Masese, Jinja. NWSC is already undertaking a number of source protection measures like regulating the quality of effluent being discharged into the Lake from nearby factories and the human activities taking place at the Lake shores. NWSC reports that from the raw water quality tests it regularly does, there is no significant impact on the raw water quality from the activities currently taking place on the Lake shore. National water conducts physical-chemical and bacteriological tests on a range of parameters such as alkalinity, chlorides,

nitrate, total dissolved solids, total suspended solids, calcium, turbidity, pH, faecal coliforms, Escherichia coli among others.

The growth rates are 3.95% for Kaliro town and 2.95% for the enroute RGCs. The maximum Day Demand for the Future Year (2039) is 4,147 m<sup>3</sup>/day. Table.0.1 below summarizes the total maximum day demand for the design period in the project area.

Table 0-1: Summary of total maximum day demand for the design period

Village	Water Demand (m <sup>3</sup> /day)					
	2014	2019	2024	2029	2034	2039
<b>Domestic demand</b>						
Kaliro Town	304	362	432	514	612	728
Nabitende RGC	127	147	170	197	228	263
Naibiri RGC	84	97	113	130	151	174
Nasuti RGC	131	152	175	203	234	271
Nambale RGC	63	72	84	97	112	130
Namugalwe RGC	159	184	212	246	284	328
Namunkesu RGC	72	84	97	112	130	150
Bukaye RGC	144	166	192	223	157	298
<b>Total Domestic Demand</b>	<b>1,085</b>	<b>1,265</b>	<b>1,475</b>	<b>1,721</b>	<b>2,007</b>	<b>2,342</b>
<b>Non-Domestic Demand</b>						
Commercial	39	42	46	49	53	57
Institutional	252	271	292	315	339	365
<b>Total Non-Domestic Demand</b>	<b>291</b>	<b>314</b>	<b>338</b>	<b>364</b>	<b>392</b>	<b>422</b>
<b>Total Domestic &amp; Non-Domestic Demand</b>	<b>1,376</b>	<b>1,579</b>	<b>1,813</b>	<b>2,085</b>	<b>2,400</b>	<b>2,765</b>

Add 20% Non-Revenue Water (NRW)	344	395	453	521	600	691
<b>Total Demand including NRW</b>	<b>1,720</b>	<b>1,973</b>	<b>2,266</b>	<b>2,606</b>	<b>3,000</b>	<b>3,456</b>
Apply Peak day factor of 1.2						
<b>Maximum Day Demand</b>	<b>2,064</b>	<b>2,368</b>	<b>2,720</b>	<b>3,127</b>	<b>3,599</b>	<b>4,147</b>

### **Water supply system components**

The source of water for the project will be the existing NWSC treatment plant. However, the project will augment this plant with the construction of a clarifier. A booster station will also be constructed at Wairaka. Transmission and distribution systems in Iganga and Kaliro districts will also be constructed under this project

### **Onsite sanitation management facilities**

On-site sanitation will be required in the project area. The following is foreseen:

- Septic tank system for the high-income group i.e. households with house connections,
- Improved pit latrines for the low-income groups i.e. households with yard taps and those who use public stand posts.

Although it is the responsibility of households to provide for their own sanitation facilities, this is often not possible for a variety of reasons. There is need for some intervention to improve the level of coverage, particularly the pit latrines for the low-income groups. Sixteen one stance Eco-San toilet types (i.e. 2 toilets per town/RGC) with Hand Washing facilities are to be constructed at domestic level. The households to be piloted are to be determined by the Local Authorities based on a needs assessment which will be conducted by the district and subcounty authorities in consultation with the LC 1 Chairpersons. The plan layout of this toilet is given in the feasibility study report.

From the baseline survey results, there is need to invest in a water borne public toilet facility in Kaliro to serve the residents in the busy areas such as the main park and market. Therefore, provision of an 8-stance gender disaggregated public toilet (as per WSDf-E design) has been included in the project. The same need was identified in all the enroute Towns including Nabitende, Nambale, Nasuti, Naibiri, Bukaye, Namungalwe and Namunkesu. Therefore, eight (8) Public toilets have been provided for in the project. The layout plan of this toilet is given in the feasibility study report.

### **Offsite sanitation management facility**

Since Kaliro is about 35 Km from Iganga Town, it could be served by the Sewage/FS treatment facility in Iganga Town managed by NWSC. Iganga Town also has a resident private cesspool service provider who offers services to the neighbouring small towns. In line with the clustering concept of the MWE, the feasibility recommended that sharing of both FS transportation and disposal facilities be taken up for Kaliro. An M.O.U between the different stakeholders in Kaliro Town Council, Private Cesspool Provider and NWSC) with regard to faecal sludge management is in place and this should facilitate service provision in the Town. However, in the long term, as the demand grows, Kaliro Town will require its own FS disposal facility. This could be in the form of FS drying beds and a constructed wetland for treatment of the effluent.

### **Requirement for Environmental and Social Assessment**

Development of water and sanitation infrastructure is listed in the Fifth Schedule of the National Environment Act No. 5 of 2019 as amended; among projects for which environmental impact assessment is mandatory. The ESMF of this project developed by MWE and approved by the World Bank classified it as Category B. This is in consideration of the nature of impacts of associated with the project.

Environmental assessment is a pre-requisite to the implementation of water and sanitation project under the Integrated Water Management and Development Project (IWMDP), and in line with national and lender requirements.

### **Objective of the Environmental and Social Impact Assessment**

The specific objectives of ESIA according to the EIA Guidelines which states that Environmental Assessment is accomplished to:

- Describe the likely environmental conditions if the proposed project were not implemented;
- Assess the impacts (positive and negative) of the proposed project that might be expected to occur;
- Specify and cost the environmental measures needed to improve the beneficial impacts and reduce or eliminate the adverse impacts;
- Allow the incorporation of appropriate mitigation measures into the project and ensure that these are included in an Environmental and Social Management Plan (ESMP) to guide all the project development stages;
- Enable the selection of optimal alternatives from the various relevant options available.



For purposes of comprehensiveness, the report – will refer to both national guidelines and World Bank Safeguards requirements in an effort to identify and address all risks and impacts associated with the project.

### **ESIA methodology and approach**

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

Literature review, Stakeholder consultations, Water quality assessment, Biodiversity studies on flora and fauna, Baseline noise assessment, Mapping and photography, Visual observations, Impact screening, Impact assessment, evaluation and analysis.

The ESIA study was partly undertaken by intensive literature review, using documents provided by the Developer and those from other sources such as, Feasibility study reports, Environmental and Social Management Framework (ESMF) for the Integrated Water Management and Development Project-P163782, World Bank Safeguards policies, IFC Environmental Health and Safety Guidelines for Water and Sanitation Projects, and other documents provided by district staffs on project location such as District Development Plans, district state of environment and health reports among others. Other documents reviewed include relevant National Household survey reports, policies, regulations, legal framework impacting on the water and sanitation sector. Consultations with stakeholders constituted a major part of the ESIA methodology in information gathering. Rational data collection instruments were designed and centered mainly on the proposed water and sanitation project and other associated systems. Data on the environmental (Ecological, water, etc) and social baseline and stakeholder perceptions, views and concerns were collected through ecological surveys, focus group discussions, meetings and personal interviews with the target audience including but not limited to all communities in all the benefiting trading centres and villages along Iganga-Kaliro road, Iganga Town Council Administration, Iganga District Administration, Kaliro Town Council Administration, Kaliro District Administration, National Water and Sewerage Corporation among others. Emphasis was laid on environmental concerns expected from laying of water transmission and distribution pipes within the rest of project area and construction of water storage facilities and sanitation facilities, obligations of the various parties in mitigating the various impacts anticipated and the procedure for operating the water and sanitation project among others. Concerns were analyzed, documented, and addressed in the environment management plan.

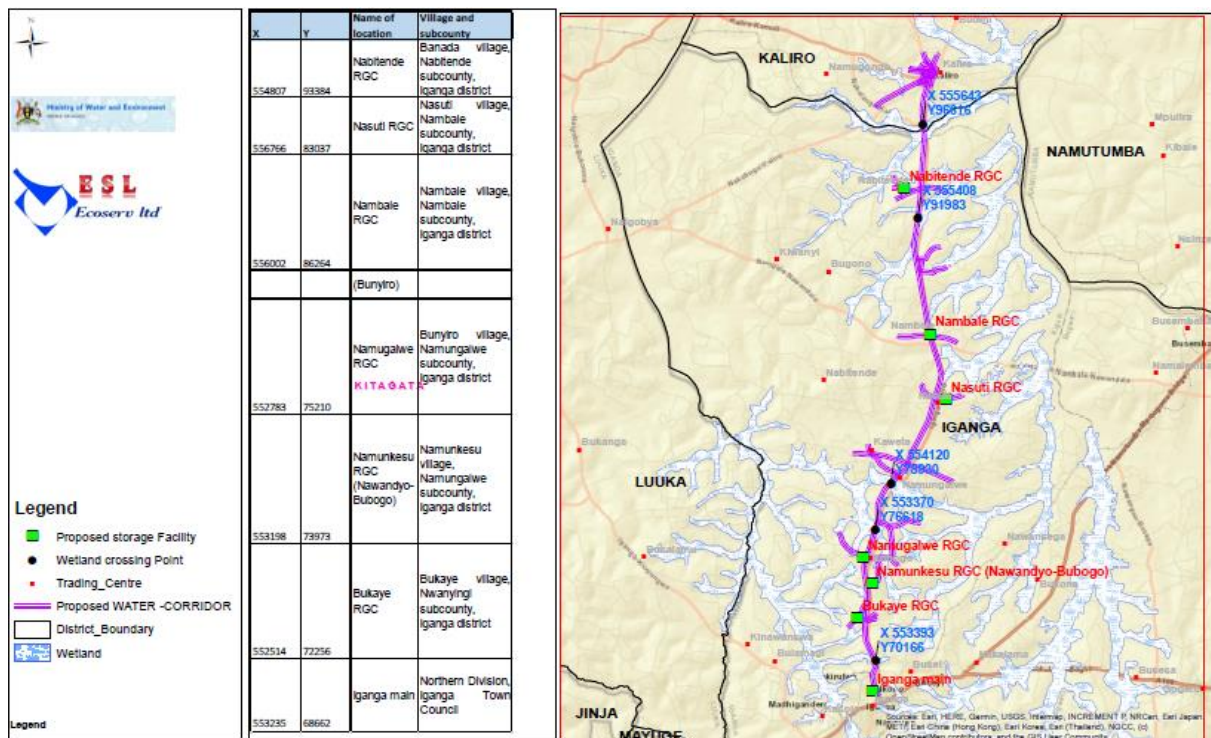
### **Policy, Legislation and Regulations**

Two frameworks in regard to policy, legislation and regulations have been reviewed i.e. World Bank Environmental and Social safeguard policies and Uganda national policy, legal and institutional framework.

The following World Bank Environmental and Social safeguard policies are triggered by the project: Environmental Assessment OP/BP 4.01 because of the likely negative environmental and social impacts arising from the construction and operational activities of the proposed project; Natural Habitats OP/BP 4.04 because the project's water transmission line traverse wetlands; Physical Cultural Resources OP/BP 4.11 because construction excavations may unearth chance finds; and Involuntary Resettlement OP/BP 4.12 as a result of land take and likely impact on livelihoods and economic displacement and; OP/BP 4.36: Forests . However, there will be no physical displacement of Project Affected Persons under this specific sub-project. The main Ugandan national policies, laws and regulations that the project will guide project development and implementation are those that deal with water, environment, land, labour, child abuse and gender aspects. These include but not limited to: - the Water Act Cap 152; the National Environment Act No.5 of 2019; the Land Act Cap 227; the Land Acquisition Act Cap 226; the Occupational Safety and Health Act No. 9, 2006; Employment Act, 2006; Workers' Compensation Act 2000 and Child Act 2006.

### **Description of the Project Host Sites**

Kaliro town council is located in Kaliro district about 35 km from Iganga town. Kaliro District is bordered by the districts of Kamuli in the west, Iganga in the south, Namutumba to the southeast Pallisa in the north east, Serere in the north, Luuka District to the southwest and Buyende District to the northwest. The town has 15 villages and 5 Parishes. The project area is mainly under subsistence farming. The area has many wetlands that have been degraded with rice and sugarcane plantations. The project area and key sensitivities are presented in figure 0-2 below.



**Figure 0-2: Map of the project area showing key sensitivities (wetlands)**

### Raw water intake sites

The proposed water source for Kaliro Town and the en-route RGCs is the extension of the Iganga Town Water Supply system. The tap off will be on the DN 300mm Transmission pipeline just before the Iganga main Reservoir. As such no major intake works are required for the proposed system and therefore, the project will have no significant impact on the water source. The main water supply from Iganga is already treated and as such no further treatment will be required for the supply to Kaliro.

### Water Transmission and distribution system

The transmission main is 33.8 Km from the tap off point (main DN300 transmission line at the Iganga main reservoir in Iganga town) to Kaliro Town. It consists of 12.74 km of OD 280 uPVC PN 16 and 21.07 Km of OD 250 uPVC PN 16 pipes. The transmission main has been designed with a capacity of delivering 4,147 m<sup>3</sup>/day. This was based on the estimated Maximum Day Demand for the Kaliro water supply system (including en-route RGCs) is 1,954 m<sup>3</sup>/day in the initial year (2019) and 3,919 m<sup>3</sup>/day in the ultimate year 2039. The nature of the terrain favours gravitating water from Iganga to Kaliro however, a booster station will be constructed at Wairaka to enhance the flow.

## Storage reservoir

The planned storage capacity for the Kaliro water supply system has been considered as 30% of the expected maximum day demand. Based on a maximum day demand, the storage capacities for the ultimate years are shown in Table 0.2. The Reservoirs are the cold pressed steel type raised on a steel tower of 20 Metres. The tank capacities in the Table below were adopted on the basis of using steel plates of size 1.22m.

Table 0-2: Storage Capacity for Kaliro Town and enroute RGCs

System Particulars	MDD (m3/d)	Storage Capacity (m3)	Reservoir Tank Adopted (m <sup>3</sup> )
Kaliro Town	1,573.4	472 (Less 217.9)	272.4 (8.54x8.54x3.66)
Nabitende RGC	394.9	118	109.0(6.1x4.88x3.66)
Naibiri RGC	261.3	78	87.2(4.88x4.88x3.66)
Nasuti RGC	406.7	122	136.2(6.1x6.1x3.66)
Nambale RGC	194.4	58	65.4(4.88x3.66x3.66)
Namugalwe RGC	645.3	194	196.1(7.33x7.33x3.66)
Namunkesu RGC	224.9	67	65.4(4.88x3.66x3.66)
Bukaye RGC	446.5	134	136.2(6.1x6.1x3.66)

Source: Project Estimates

## Project Impacts

### Positive impacts

#### *Reduction in diseases*

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

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

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

### ***Easing of the water fetching burden***

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

This impact will be enhanced if the following are done:

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

### ***Improved livelihoods of the local people***

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

This impact will be enhanced through the following:

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

### ***Improved service delivery***

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

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

2. Ensuring that operations and maintenance are properly done to avoid issues of water contamination.
3. Ensuring that water is affordable and available all the time

### ***Reduction of child mortality***

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

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

### ***Improved maternal health***

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

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

### ***Promotion of gender equality and empowerment of women and the girl child***

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

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

### ***Increase in investment in the area***

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

- (i) Ensuring that the project uses locally produced materials where possible.
- (ii) The water distribution network connections should target SMEs

- (iii) The project should have an initiative of promoting productive use of water

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

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

***Increased Revenue to the government***

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



## Negative impacts

The major negative risks and impacts associated with the Iganga-Kaliro water and sanitation project are summarised in the Impact – Mitigation Matrix for the negative impacts below:

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures
General Provisions					
1.	All impacts	All activities in Project Site	All phases	All project sites	<ul style="list-style-type: none"> <li>a) Achieve full compliance with the the national and World Bank safeguards requirements, upon which this ESMP is based, through regularly monitoring and address on-site situations and through applying the relevant mitigation measures.</li> <li>b) The Environmental Officer can issue penalties, in consultation with relevant authorities, for incidents of non-compliance, and always in liaison with NEMA.</li> </ul>
2.	All impacts	All activities in Project Site	Construction	All project sites	<ul style="list-style-type: none"> <li>a) Sensitize all Contractors, including foremen, supervisors and labourers in the requirement for and full implementation of the ESMP.</li> <li>b) Employ an adequately qualified and experienced Environmental and Social Safeguards Officers to ensure environmental and social safeguards requirements are integrated in the design and construction phases of the project.</li> <li>c) Put in place simple Construction Method Statements for activities in sensitive areas, like wetland areas and densely populated areas.</li> </ul>
Specific provisions					
3.	Impacts on landuse and settlement patterns	Laying of pipes interfering with settlement patterns as well as land use	Design and Construction	All project sites	<ul style="list-style-type: none"> <li>a) The water transmission line routes should be as much as possible restricted within the road reserves;</li> <li>b) 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.</li> <li>c) Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the 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.</li> </ul>
4.	Impact on public Health	Interaction of workers with communities Dust generation Waste generation	Design and Construction	All project sites	<ul style="list-style-type: none"> <li>a) Workers and the community shall be sensitized on protective behaviour and practices during work by distributing appropriate education materials to workers and the surrounding community.</li> <li>b) The Contractor shall develop and implement an HIV prevention and management Plan.</li> <li>c) High risk groups such as the youths especially students shall be continuously sensitized on the dangers of casual sex, consequences of early marriages, teenage pregnancy and monitored to ensure that such groups are not at risk of falling victims.</li> <li>d) The Contractor shall provide surveillance and active screening and treatment of workers and the community where a communicable disease is discovered.</li> <li>e) Excessive alcohol abuse shall be discouraged as a policy among project construction workers.</li> <li>f) The contractor and subcontractors ought to have adequate sanitation facilities for the workers at both places of residences and at all work places.</li> <li>g) The contractor or subcontractors shall procure a secure and descent accommodation for all staff either through renting the existing structures in the project area or by constructing new houses in consultation with MWE and local authorities.</li> <li>h) All construction workers shall be orientated and sensitized about responsible sexual behaviour in project communities.</li> <li>i) The contractors will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).</li> </ul> <p>For prevention of Covid-19, the following measures shall be adhered to:</p> <ul style="list-style-type: none"> <li>j) Establish a daily screening protocol for staff and visitors, to ensure that potentially infected staff do not access worksites.</li> <li>k) Regularly clean and sanitize surfaces like desks, doors, printers, vehicles, toilets, and other shared equipment and spaces.</li> <li>l) Establish a hand washing station at the entrance to the worksite and the security MUST ensure that all people accessing the worksite wash their hands.</li> <li>m) Employees and visitors must at all times maintain the recommended social distancing and must not make unnecessary make direct contact with the staff and clients. The Ministry of Health proposal for working in shifts MUST be Complied with. In this regard, recommend that a rotational timetable for staff be prepared and communicated.</li> <li>n) The Developet/contractor should provide protection materials i.e. (i) face shields which must be put on all the time when the employees are on duty and (ii) Hand sanitizers to be on every work desk/station.</li> <li>o) The physical meetings must be minimized and virtual meetings encouraged.</li> </ul> <p>For prevention of dust, the following measures shall be adhered to:</p> <ul style="list-style-type: none"> <li>p) Construction sites (clarifier, storage tanks and booster station) shall be hoarded off to restrict dust to within site boundaries;</li> <li>q) Sprinkle water on vehicle pathways;</li> <li>r) PPE like dust masks shall be availed to workers whenever needed;</li> </ul>

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures
		Interaction of workers and communities during connections and maintenance activities	Operation	Water offices At all project infrastructure	<p>s) Loose materials like sand that are susceptible to dust generation during haulage be covered with tarpaulin;</p> <p>t) Limit vehicle speed to 30km/hr on murrum roads using speed bumps in trading centres.</p> <p>a) The public toilets should have an adequate water storage facility to ensure that water is available 24 hours even when the supply from the main is off.</p> <p>b) The project should provide for provision of adequate hand washing facilities at the public toilets</p> <p>c) The Operator should ensure that the public toilets are clean at all times</p> <p>d) The Contractor shall provide surveillance and active screening and treatment of workers and the community where a communicable disease is discovered.</p> <p>e) All workers shall be orientated and sensitized about responsible sexual behaviour in project communities.</p> <p>f) The Operator will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).</p> <p>For prevention of Covid-19, the following measures shall be adhered to:</p> <p>g) Establish a daily screening protocol for staff and visitors, to ensure that potentially infected staff do not access worksites.</p> <p>h) Regularly clean and sanitize surfaces like desks, doors, printers, vehicles, toilets, and other shared equipment and spaces.</p> <p>i) Establish a hand washing station at the entrance to the worksite and the security MUST ensure that all people accessing the worksite wash their hands.</p> <p>j) Employees and visitors must at all times maintain the recommended social distancing and must not make unnecessary make direct contact with the staff and clients. The Ministry of Health proposal for working in shifts MUST be Complied with. In this regard, recommend that a rotational timetable for staff be prepared and communicated.</p> <p>k) The Developet/contractor should provide protection materials i.e. (i) face shields which must be put on all the time when the employees are on duty and (ii) Hand sanitizers to be on every work desk/station.</p> <p>l) The physical meetings must be minimized and virtual meetings encouraged.</p>
5.	Impact on housing (Buildings, kiosks and other structures)	Laying of water pipes which may displace structures like kiosks.  Demolition of structures like houses	Construction	All project sites	<p>a) MWE shall work with local council committees, sub-county committees, Councillors, district land boards, CAOs, RDCs, Politicians and other local leaders to sensitize all people to be affected on the intentions of land acquisition.</p> <p>b) MWE shall conduct a Resettlement Action Plan (RAP) in accordance with the Land Act and World Bank environmental and social Safeguard Policies especially Involuntary Resettlement (OP 4.12).</p> <p>c) MWE shall send a valuation team to negotiate with land and structural owners in compliance with local market prices and government rates so as to establish rational figures for compensation and resettlement.</p> <p>d) All sorts of compensation and settlements must be done at least 6 months before structures are demolished.</p> <p>e) All physically or economically displaced people should be offered an option between either a full resettlement package, including the provision of replacement residential land and a house, or cash compensation.</p> <p>f) Any grievances in the course of project implementation shall be addressed in accordance with the grievance redress mechanism presented in section 9.3.</p> <p>g) The demolition wastes shall be disposed off in accordance with the National Environment (Waste Management) Regulations, 2020.</p>
6.	Impact on agriculture (crops and animals)	Clearance of corridor Movement of equipment	Construction	At all project sites	<p>a) Before valuation exercise for crops or any other affected property, adequate sensitization meetings shall be conducted among all the affected persons to prepare them psychologically and to address any concerns at hand.</p> <p>b) 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.</p> <p>c) The laying of pipework should be done concurrently with excavation and covering of trenches to avoid accidents.</p> <p>d) Prior to compensating the affected persons, adequate community sensitization meetings shall be carried out to ensure that the PAPs are aware of the entire program including visitation schedule per village, parish and or sub-county and how each PAP with be contacted and approached for payment.</p> <p>e) Prior to the compensation process, the Project Affected Persons (PAPs) shall be individually notified about the compensation amount to be paid. The PAPs may accept or refuse the compensation proposed depending on their expectations, market rates and damages incurred.</p> <p>f) The construction of the proposed water infrastructure shall only commence when all the affected farmers have been fully sensitized of the pending activities. Prior to the construction phase, farmers shall be sensitized on the pending project at least 6 months in advance such that cultivation under the line and within the water pipe corridor is stopped or reduced. This will give affected farmers ample time to plan in advance so as to avoid going into several negotiations with The Developer at later stage when the contractors have come in to implement the project.</p> <p>g) 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 crops.</p>

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures
7.	Impact on the local economy and associated dynamics	Employment of locals Influx of workers Sell of goods by locals to the contractor and workers Renting of houses	Construction	All project sites	<ul style="list-style-type: none"> <li>a) The contractor shall involve local (LC) leaders in labour recruitment to ensure that people hired have no criminal record.</li> <li>b) The local content provision shall be emphasised to minimize labour requirements needed from outside the community.</li> <li>c) Local governments and the contractor shall collaborate with police to contain criminal activities.</li> <li>d) The Developer together with the Contractor and the Iganga/Kaliro district local governments shall undertake comprehensive awareness to avoid/minimize risks related to drug use and prostitution</li> </ul>
		Water distribution	Operation	Entire project area	<ul style="list-style-type: none"> <li>a) MWE should sensitise 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.</li> <li>b) 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.</li> <li>c) Vendors would be encouraged to become scheme or kiosk operators; vendors would be encouraged to tender for public water points.</li> <li>d) Vendors could continue selling water to those who would wish to get water at their door steps.</li> </ul>
8.	Impact on Water and Sanitation	Excavations Waste and materials Management	Construction	All project sites	<ul style="list-style-type: none"> <li>a) The contractor to ensure disturbed sites, particularly the trenches are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion</li> <li>b) At the camp and material storage areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;</li> <li>c) If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites</li> <li>d) The movement of hazardous liquid chemicals like oils will be done on drip trays to avoid spillage to the ground;</li> <li>e) No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;</li> <li>f) All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line</li> <li>g) All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes.</li> <li>h) Mobile toilets for the construction crew shall be periodically emptied, and the contents shall be disposed off at Iganga Sewage Treatment Plant.</li> </ul>
		Emptying of septic tanks Run-off from the buildings	Operation	Public toilets and offices	<ul style="list-style-type: none"> <li>a) A Periodic maintenance regime including desludging will be put in place and implemented.</li> <li>b) Use of manifest system to ensure that the wastes are disposed off at the National Water and Sewerage sewage Treatment plant in Iganga.</li> <li>c) Proper drains will be constructed and all the water from the roof tops will be harvested for use at the facility for sanitation purposes. The car parking area will be paved and the green areas maintained to avoid erosion.</li> <li>d) A purpose designed drainage system will ensure adequate drainage of the site. The drainage network will be designed to carry storm water to the boundary of the site where it will then discharge into the existing storm water drainage system in the area. Maintenance of the drainage network will involve regular clearing of drains of sediment and other waste. Harvesting rain water from structure roofs (this is much water) into both overhead tanks. This water can be used for sanitation purposes among other uses.</li> <li>e) The Developer will also construct an oil interceptor within the storm water drainage system to trap any oily substances</li> </ul>
9.	Impact on gender	Employment Compensation Sexual relationships	Construction	All project sites	<ul style="list-style-type: none"> <li>a) Workers will be sensitized on their sexual rights. MWE shall Work with the contractor on establishing zero tolerance policies and codes of conduct related to violence against women and girls (VAWG).</li> <li>b) All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences.</li> <li>c) To the extent possible, there will be gender sensitivity in task allocation;</li> <li>d) The contractor shall conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others and;</li> <li>e) There will be a Specialist (Social Specialist) to oversee gender mainstreaming in the project.</li> <li>f) Workers will be informed about national laws and funder's policies that make sexual harassment and gender-based violence a punishable offence which is prosecuted;</li> <li>g) Worker Code of Conduct will be part of the employment contract, and including sanctions for non-compliance (for example, termination);</li> <li>h) The contractor, where a case arises, will cooperate with law enforcement agencies in investigating complaints about gender-based violence.</li> </ul>
			Operation	All project sites	<ul style="list-style-type: none"> <li>a) The Operator will develop and implement zero tolerance policies and codes of conduct related to violence against women and girls (VAWG).</li> <li>b) All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences.</li> </ul>

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures
					<ul style="list-style-type: none"> <li>c) To the extent possible, there will be gender sensitivity in task allocation;</li> <li>d) The Operator shall conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others and;</li> <li>e) Worker Code of Conduct will be part of the employment contract, and including sanctions for non-compliance (for example, termination);</li> </ul>
10.	Impact on transport (Interference with traffic and diminished road safety)	Excavations across roads	Construction	Road crossings	<ul style="list-style-type: none"> <li>a) The Contractor shall develop and Implement a traffic management plan</li> <li>b) To minimize interference with traffic, digging trenches and piping across roads and highways shall be conducted in hours with less traffic or on weekends.</li> <li>c) 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.</li> <li>d) The contractor will have to notify traffic police in advance and work with it during trenching across highways and other major roads.</li> <li>e) All company vehicles used in the transportation of construction workers, material and equipment to and away from the site shall be in sound mechanical conditions. Evidence shall always be provided by recording the status of the vehicle in the Daily Vehicle Inspection Form (Annex 4) before usage.</li> <li>f) All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits.</li> <li>g) 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 Municipality administration.</li> <li>h) 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 24 hours in advance.</li> <li>i) 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.</li> <li>j) The vehicle speed shall be limited to a maximum of 30km/hr areas near sensitive facilities.</li> <li>k) Works near sensitive facilities shall only be limited to day time (7am to 6pm).</li> </ul>
11.	Impact on Education (schools and learning process)	Excavations and pipe laying Construction of the booster station	Construction	Within or near schools	<ul style="list-style-type: none"> <li>a) Schools shall be sensitized on the need to keep off construction sites.</li> <li>b) Working schedule shall be consulted with the school administrator to avoid critical quiet hours. The working schedule shall be designed considering the school schedule and any potential adjustments needed to minimize any disturbances to student education and learning performance.</li> <li>c) Workers to be instructed to observe silence while working across sections of the project and transmission line which are considered nearby schools.</li> <li>d) The contractor shall not employ any person below 18 years and any pupil or student above 18 shall not be employed during school time. Students above 18 years can be employed only during holidays.</li> <li>e) Workers shall be required to strictly adhere to the code of conduct designed for the project</li> <li>f) For Wairaka College, the construction areas shall be hoarded off and a new gate created near the main gate to avoid construction activities from interfering with school activities.</li> <li>g) The workers shall not be allowed to interface with the students of the affected schools. The Code of conduct that shall be signed by all workers and will have a requirement of workers not interacting with school children.</li> </ul>
12.	Potential child abuse	Employment Interactions of workers with communities	Construction	At all project sites	<ul style="list-style-type: none"> <li>a) A child protection plan will be developed by MWE and provided to all the contractors and school management to discourage the contractors from using children as labourers. They will also be required to keep records that show the ages of their workers.</li> <li>b) Ensure that the community and local leadership have access to and know of and report abuse using the national child abuse hotline 611. The existence of the hotline can be displayed throughout near the construction site and in the community at large.</li> <li>c) The contractor shall ensure that mechanisms for close monitoring of worker's behaviour/conduct are in place e.g. contractor could discreetly engage the police to identify anonymous informers from among the workers to monitor and report any negative behaviour by the workers including child abuse related misconduct, display a call line or suggestion box where the community can provide feedback on workers behaviour.</li> <li>d) MWE and the contractor shall ensure that all local leaders and women/child representatives are fully oriented to the labour force related risks for children engaging in construction related activities.</li> <li>e) Talks with the contractor and his workforce by relevant guests (including the police) on child protection shall be encouraged and appropriately scheduled, including continuous popularization of the child help line 611. Parents/guardians shall be sensitized and held accountable for children leaving and arriving home</li> </ul>

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures
					before dark. f) Any person involved in child abuse shall be dealt with in accordance with the law. g) The contractor will ensure that children and minors are not employed directly or indirectly on the project.
13.	Impacts on Physical Cultural Resources	During excavations	Construction	At all project sites	a) Structures like shrines and graves if encountered (if any) will be relocated in accordance with the existing rituals and norms of the society. Loss of incomes shall also be compensated for since the owners may take some time without any income from them especially if it's deemed necessary to relocate them far from their original site due to cultural rituals involved. Details of compensation shall be contained in the RAP. b) On discovering evidence of possible scientific, Paleontological, historical, prehistoric, or archaeological remains, the contractor shall notify the Department of Museums and Monuments giving the location and nature of the finds. c) The Contractor shall cease work in the vicinity of the site and request the responsible officer from the Department of Museums and Monuments to inspect the site and make recommendation on possible salvage within 72 hours. d) The Contractor shall exercise care so as not to damage artefacts or fossils uncovered during excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings. e) The department of Museums and Monuments is located in Kampala, Kamwokya just before Uganda Wild Life Authority on the road to Ntinda (Kira road). The Commissioner Uganda Museum can be contacted on +256 772485624. A detailed chance find procedure has been presented in this report. f) To mitigate damage to archaeological resources, it is proposed that the construction foremen will inform construction crew to be aware of the possibility of discovering fossils or archaeological remains, what form these would take (bones, fossils in rock, shards or pottery, arrow heads etc.) and the procedure to be followed shall be as stated above. g) The contractor shall develop and implement avoidance procedures. In the event of human remains, there shall be no further excavations or disturbance of the site until the responsible police authorities have been informed.
14.	Impact on topography (Aesthetics pollution)	Excavations Heaping of excavated soils Erection of structures	Construction	At all the project sites	a) Excavated soil shall be heaped for a short time (1-5 days) and re-used for backfilling. In case the soil is not required for backfilling, it shall be ferried to designated waste disposal sites in the districts of Iganga, Kaliro and Jinja. b) The affected area shall be restored through landscaping and leaving it to undergo natural colonisation by plants. c) The materials shall be stored in a way that the height does not cause visual intrusion. Preferably the height should not be more than 2 metres.
15.	susceptibility to soil erosion	Excavations Storage of construction materials	Construction	All excavated areas  Materials storage areas	a) The construction sites for storage tanks, booster station and clarifier will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water. The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation. b) No spoil soil shall be temporarily placed in water ways. c) The top soil shall be kept separately so that it is used last in backfilling of the excavated areas. This is to ensure that the living soil (top soil) is available for plant growth in disturbed areas. d) MWE will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. Native vegetation must be used for re-seeding the excavated site. e) The excess soil shall be spread along the trench by the Contractor but in liaison with the local people; special attention would be made not to dispose of such construction wastes in swamps on any sensitive ecosystem. f) The excavated soil from the pit for the clarifier shall be removed from the site every end of the day and disposed off in accordance with the National Environment (Waste) Management Regulations, 2020.
16.	Impacts on Sources of Raw Materials	Sourcing and excavations	Construction	Sourcing sites	a) Raw material extraction be carried out at NEMA approved sites to be identified by the Contractor during project implementation; b) NEMA approved site management plan be prepared by contractors for each raw material extraction site; c) Cover extracted loose raw materials with tarpaulin during transportation; do not overload vehicles to avoid accidents. d) Active borrow pits shall be fenced off with clear markings to avoid accidents etc. e) Any new borrow pits established by the project and would not be used later, shall be restored to as close to pre-project conditions as possible immediately after use. Native vegetation must be used for re-seeding the excavated site. f) Materials will be preferentially sourced locally to minimize transport distances. For the existing material sources, the Contractor will be required to undertake due diligence to establish operational compliance status of these sites before procuring the material. g) In case the Contractor identifies a new site, S/he shall subject the site to environmental and social impact assessment and acquire all the necessary approvals as required by the National and World Bank requirements.
17.	Exposure to high noise levels	Excavations Machinery operations Vehicular movements	Construction	On all project sites	a) 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; b) Workers be provided with the necessary personal protective equipment (PPE) such as ear muffs as found



No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures
					<p>appropriate;</p> <p>c) The use of hearing protection by all the workers should be mandatory. The mandatory use of hearing protection equipment (earmuffs) should be enforced by the management of the Water Treatment Plant.</p> <p>d) Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.</p> <p>e) Periodic medical hearing checks should be performed on workers exposed to high noise levels.</p> <p>f) Sites must be hoarded to curb noise impacts to neighbouring communities.</p> <p>g) Works should be undertaken during day time i.e. from 8am to 6pm.</p> <p>h) Works near schools should be done in periods like weekends in order not to interfere with learning environment.</p> <p>i) For Wairaka College, the site should be hoarded off, materials should be brought it during non-learning hours i.e. during weekends, in the evening after classes or in the morning before classes to reduce on vehicular noise.</p>
18.	Impact on Flora (Vegetation and crops)	Clearance for the right and other project sites	Construction	All project sites	<p>a) Before carrying out valuation of the affected crops, adequate sensitization meetings shall be conducted among all the affected persons to prepare them psychologically and to address any concerns at hand.</p> <p>b) A RAP shall be developed and implemented by MWE to ensure that affected property is compensated.</p> <p>c) As part of the RAP, a comprehensive property impact survey shall be conducted which shall indicate all affected properties within the water transmission corridor/way leave, their owners and the replacement costs. Valuation of such property shall be conducted by experienced valuers in association with the district land board and local leaders.</p> <p>d) Prior to compensating the affected persons, adequate community sensitization meetings shall be carried out to ensure that the PAPs are aware of the entire program including visitation schedule per village, parish and or sub-county and how each PAP will be contacted and approached for payment.</p> <p>e) Prior to the compensation process, the Project Affected Persons (PAPs) shall be individually notified about the compensation amount to be paid. The PAPs may accept or refuse the compensation proposed depending on their expectations, market rates and damages incurred.</p> <p>f) The construction of the proposed water infrastructure shall only commence when all the affected farmers have been fully sensitized of the pending activities. Prior to the construction phase, farmers shall be sensitized on the pending project at least 6 months in advance such that cultivation under the line and within the water pipe corridor is stopped or reduced. This will give affected farmers ample time to plan in advance so as to avoid going into several negotiations with The Developer at later stage when the contractors have come in to implement the project.</p> <p>g) The Developer shall set aside funds to contribute towards local environmental programs like biodiversity offset programs if any. The Developer may remit funds towards district and sub-county afforestation projects to compensate for biomass lost during corridor clearing. The compensation shall be done after RAP and property and offset valuation studies done by the developer. The biodiversity off-set program is unlikely as the proposed project area is highly modified and no critical biodiversity was found in the area. In case the destruction is due to contractor's negligence, it will be the responsibility of the contractor to make compensation. MWE shall take the overall responsibility however, the contractor takes liability of those plants/trees destroyed either knowingly or unknowingly and which are outside the Corridor</p> <p>h) Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to vegetation.</p> <p>i) When invasive species are encountered, they will be removed and destroyed, for example, by burning. The equipment and cars shall be cleaned to ensure that the construction activities do not contribute to the spread of the invasive species.</p> <p>j) The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been removed before pitting the trenches for the pipeline should be put back to cover the trenches so that the crops can regrow in a natural environment. Excess soil, stones and boulders should be dumped in an area that has been approved by the District Environment Officer</p>
19.	Disturbance and degeneration of wetlands and aquatic ecosystems	Excavations and pipe laying	Construction	In wetland areas	<p>a) Construction works across wetlands will use existing road corridors for construction and operational access wherever possible.</p> <p>b) Where the route requires the suspension points for the water pipes to be located in the swamp and in areas which cannot easily be accessed from existing roads or causeways, temporary access ways built from Terramats or similar structures will be used and removed after.</p> <p>c) Obtain wetland user permits from NEMA before constructing across or along wetlands and follow all guidelines given.</p> <p>d) All project workers should be sensitized to minimize damage to flora and fauna.</p> <p>e) Close monitoring and supervision of the construction operations to ensure compliance to the NEMA permit conditions and avoid causing further damage to undesignated project areas.</p> <p>f) The water transmission pipes shall be built over the already degraded wetland and the artificial streams there into prevent abnormal flow during the rainy seasons.</p>
20.	Impacts on water quality	Excavations Waste management	Construction	Water sources	<p>a) The Contractor shall construct a drainage system with silt traps to reduce impacts of storm water from the construction site.</p> <p>b) The contractor shall implement waste management according to good practice to ensure waste does not pollute the surface water resources</p>

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures
					<p>c) 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.</p> <p>d) 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;</p> <p>e) 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.</p> <p>f) 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 centers (garages) away from the water transmission and distribution corridor.</p> <p>g) All other forms of hazardous waste regardless of their hazardous properties such as plastics, polythene and others shall be collected out of the project site and disposed in gazetted NEMA waste disposal sites.</p> <p>h) 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, 1999. 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.</p> <p>i) A Spill kit will be maintained onsite to clean-up any accidental spills.</p>
21.	Impacts on fauna	Excavations Clearance of the right of way Movement of equipment	Construction	Habitats areas	<p>a) Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to fauna.</p> <p>b) The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been removed before pitting the trenches for the pipeline should be put back to cover the trenches so that the mobile fauna is not affected.</p> <p>c) If wild animals are encountered, the Contractor shall notify UWA so that it is picked and taken to a secure place.</p> <p>d) Trenching, pipework laying as well as well as backfilling will be done concurrently. For pits like at the clarifier and the booster pump, the contractor shall ensure that every evening, the pits are covered with timber while being secured with a warning tape.</p>
22.	Solid waste generation	Laying of pipes Cooking Sanitary activities	Construction		<p>a) All sorts of waste generated during construction such as HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and delivered to recycling facilities. Other forms of waste which are inert or ceramic in nature (construction wastes - waste generated by demolition of the building to pave way for construction of a clarifier) must be collected by NEMA gazetted waste handlers and taken to a NEMA gazetted waste disposal facilities for disposal.</p> <p>b) All organic waste generated at eating places during construction such as food stuffs shall be collected and transported by the contractor to designated Municipal and/or Town Council landfills for disposal in Kaliro, Iganga and Jinja</p> <p>c) All plastic waste generated during construction, such as mineral water bottles, polythene bags, jerrycans and cups shall be collected and taken for recycling in plastic collectors in Iganga Kaliro and Jinja for onward transmission to Plastic Recycling Industries Ltd in Kampala and other plastic recycling facilities in Kampala and Jinja.</p> <p>d) Human excreta shall be managed using a mobile toilet and then disposed at the National Water and Sewerage Treatment Plants in Kaliro, Iganga and Jinja.</p> <p>e) The Contractor shall develop and implement a Waste Management Plan</p>
		Maintenance activities Office activities Sanitation activities at both the office and public toilets	Operation	Office/materials storage area  Public toilet	<p>a) Waste collection bins will be provided at strategic positions at the water offices/reservoirs for temporary waste storage. The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes.</p> <p>b) The facility operator will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA.</p> <p>c) Waste management plan will be developed and implemented</p>
23.	Impacts from damages of the distribution network	Excavation activities by third parties	Operation	Along the distribution and operation corridor	<p>a) 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;</p> <p>b) Design and implementing a leak detection and repair program;</p> <p>c) Prevent introduction of contamination from the distribution system itself, for example by:</p> <ul style="list-style-type: none"> <li>- Minimizing microbial growth and biofilm development (e.g. by ensuring adequate residual disinfection levels). 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;</li> <li>- Choosing residual disinfectant (e.g. chlorine or chloramines) to balance control of pathogens and formation of potentially hazardous disinfection by products;</li> <li>- Using construction materials that do not contribute to release undesirable metals and other substance or interact with residual disinfectants.</li> </ul>
24.	Wastewater and septage collection	Emptying and disposal	Operation	Public toilet	<p>a) Promotion of collection services, or ensuring that collection services are available, is of primary concern.</p> <p>b) Timely collection of sewage should be undertaken to prevent sewage over flows.</p>



No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures
					c) There should be a system among the communities, their leaders and the health workers to monitor, detect and alert the responsible authorities to call for emptying of any septic tank that poses danger to the community.
25.	Fire outbreak	Electrical shocks	Operation	Offices	<ul style="list-style-type: none"> <li>a) The project proponent and the contractor will put in place a comprehensive fire plan to guide the occupants and users of the offices in case of fire outbreak.</li> <li>b) The buildings shall be fitted with fire alarms to alert the occupants of any potential fire outbreak</li> <li>c) All electrical wiring will be carried out by certified electricians.</li> <li>d) There will be installation and proper maintenance of firefighting equipment (fire extinguishers and firefighting water horse pipes).</li> <li>e) Management will carry out annual drills to ensure evacuation plans are effective and are understood by all facility occupants.</li> <li>f) The premises should also have permanently stationed security guards and lighting to ensure security against arson-associated fires.</li> </ul>
26.	Decommissioning phase impacts (Noise and vibration, Solid waste generation and Dust )	Demolition of structures and levelling	Decommissioning	At sites where decommissioning is taking place	<ul style="list-style-type: none"> <li>a) Workers shall be provided with adequate protective wear (Ear muffs and dust masks)</li> <li>b) Solid waste shall be managed in accordance with the National laws. A licensed waste handler shall be contracted to transport and dispose wastes at a gazette waste disposal facility</li> <li>c) Communities shall be informed of the plan to decommission and shall be sensitized on potential impacts</li> </ul>
27.	Occupational health and safety of workers	Lifting, working at heights, transportation etc	Construction and Operation	All project sites	<ul style="list-style-type: none"> <li>a) The contractor should have in place a Health and Safety Policy and Action Plan, addressing workers' occupational health and safety issues, workers' welfare and working conditions in line with the Occupational Health and Safety Act of 2006, and World Bank Group EHS general Guidelines, and the EHS guidelines for water projects</li> <li>b) The Contractor should have HSE induction for all workers, and undertake daily tool box meetings prior to works, including work at heights</li> <li>c) Ensure adequate provision of PPEs (gloves, safety shoes, safety belts, overalls and goggles), as well as continuous awareness on the need for use of PPEs and enforcement of usage</li> <li>d) Ensure good housekeeping practices on site (have all equipment, materials, containers well stacked or stored) to avoid trips and falls on site</li> <li>e) The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground</li> <li>f) All workers on sites should be well trained on the risks and their tasks</li> <li>g) Workers should regularly be taken through safety drills and emergency preparedness training allowing for quick and efficient responses to accidents that could result in human injury or damage to the environment.</li> <li>h) First aid facilities should be provided on site and accessible to all personnel. It should among others contain rubber gloves, bandages, pain killers and cotton wool to cater for minor accident victim.</li> <li>i) Fence off equipment storage areas and camp sites to discourage idlers to the sites</li> <li>j) The contractor and Operator to have in place a traffic management plan, and guidelines for drivers to avoid accidents.</li> </ul>
28.	Labour issues and employee conduct	Employment Interactions among workers and communities	Construction and Operation	All project sites	<ul style="list-style-type: none"> <li>a) Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism</li> <li>b) All workers to have contracts</li> <li>c) Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</li> <li>d) To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly.</li> <li>e) Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.</li> <li>f) Contractor to have in place a workers' code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour.</li> </ul>
	<b>TOTAL</b>				



## **Conclusions**

In this study, the need for the project was examined, its compatibility with the surroundings and economic benefits evaluated and environmental impacts assessed and analysed. Impacts were identified, mitigation measures to avoid, reduce and minimise these impacts have been suggested, either as part of the design, or as measures to be implemented. The proponent has agreed to these mitigation measures and they are, therefore, expressed as commitments. Overall, the negative impacts of this project are rated by this study as largely moderate if no mitigation measures are implemented. Following the implementation of mitigation measures and environmental monitoring plans, the project would have minimal residual environmental and social risks. Hence the project can be implemented in a sustainable way with minimal or no threat to the environment and natural resources if the mitigation measures and monitoring plan are implemented effectively.

# 1 INTRODUCTION

## 1.1 The Integrated Water Management and Development Project

The Government of Uganda (GoU) through the Ministry of Water and Environment (MWE), with financial assistance from the World Bank, is implementing the Integrated Water Management and Development Project (IWMDP) in towns and rural growth centres. MWE is directly responsible for implementation of IWMDP in small towns and rural growth centres whereas the National Water and Sewerage Corporation (NWSC) is responsible for the same in large towns.

The proposed IWMDP Project will support the GoU's Vision 2040, which aims to transform Uganda into a modern and prosperous economy. The Second National Development Plan (NDP II), which is aligned with Vision 2040, focuses on promoting inclusive economic growth and achieving the United Nation's Sustainable Development Goals (SDGs), including SDG #6: Ensure availability and sustainable management of water and sanitation for all. The NDP II also identifies the following priority actions: (i) increasing the stock and quality of strategic infrastructure to accelerate the country's competitiveness; (ii) engaging human capital development; (iii) strengthening mechanisms for quality, effective and efficient service delivery; and (iv) improving refugee management and host community development. Water is at the center of the NDP II, which highlights interventions focused on: (i) improving WSS services in priority, northern urban large towns envisioned as economic regional hubs; (ii) expanding WSS access to the poor and vulnerable in underserved areas, including refugee hosting districts; and (iii) strengthening water sector institutions to improve IWRM and service delivery. The Project will focus on three strategic areas: (i) delivering necessary WSS infrastructure and catchment management measures in targeted areas; (ii) supporting water related institutions (MWE, local government, and service providers) establish and consolidate operational efficiency and service quality in small towns and rural areas; and (iii) strengthening national and regional capacity to improve IWRM. The four components as described below:

Component 1 –WSS in Small Town and Rural Growth Centers: This component will support small towns and rural growth centers that have met Project selection criteria and are located in various regions of the country and in refugee hosting districts located in the Northern Region (Yumbe, Arua, Adjumani, Moyo, Lamwo, and Kiryandongo).

Component 2 –WSS in Urban Large Towns: This component will finance Project activities designed to improve WSS services in the municipalities of Mbale (Eastern Region) and Gulu (Northern Region) as well as nearby small towns. The activities include: (i) construction and rehabilitation of WSS infrastructure investments in Mbale; (ii) construction of a new water supply scheme for Gulu;

(iii) construction supervision consultancies; and (iv) environmental and social management activities, including water source protection and community mobilization and sensitization.

**Component 3 – Water Resource Management:** This component will finance Project activities designed to support implementation of catchment management measures in select sub-catchments as well as national efforts to mainstream IWRM into Uganda’s water sector program. Specific activities include: (i) implementation of catchment management interventions, such as soil and water conservation measures, river bank protection and restoration, and alternative livelihood for affected communities; (ii) TA to prepare a Water Resources Strategy for the Albert WMZ, CMPs in identified “hotspot” sub-catchments, and a national groundwater management study; and (iii) provisions to strengthen water resource monitoring and information systems, including implementation of the Water Information System (WIS 2.0) at the national level, installation of hydrologic monitoring systems, and rehabilitation of the National Water Quality Reference Laboratory. Apart from the national support to IWRM, this component will mainly support activities in the Upper Nile and Kyoga WMZs (where most of the WSS investments financed under this Project and the WMDP are located). This component will contribute to national, regional, and local stakeholder’s capacity to apply an IWRM approach to infrastructure development.

**Component 4 – Project Implementation and Sector Support:** This component will finance activities designed to ensure effective and efficient Project implementation and coordination as well as institutional strengthening to support WSS service delivery reforms. Project management activities will include: (i) overall coordination of planning, monitoring and reporting, supervision, and oversight of all Project activities; (ii) training on Bank procedures related to procurement, environmental and social safeguards, and financial management (FM), and (iii) hiring a project support team (PST) comprised of key technical specialists (e.g. safeguards, monitoring and evaluation (M&E) and fiduciary specialists) to assist the Project implementing agencies (IAs). This component will ensure that the implementing agencies (IAs) have adequate inputs for Project oversight, reporting and implementation. The component will also support the financial and technical sustainability of the infrastructure investments by investing in the ongoing WSS service delivery reforms and regulatory framework.

*The proposed project falls under component 1, sub-component 1.1 - **Support to Small Towns and Rural Growth Centers** that is implemented by a MWE team at central level through the Department of Urban Water Supply and Sewerage (UWSSD) and RWSSD, with close collaboration with staff in WSDFs as well as district local governments. Existing MOU signed with Iganga and Kaliro Municipal Councils will be adopted to provide a framework for cooperation and the Municipalities fulfilling their roles of community mobilization, land acquisition and fecal sludge management*

including management and regulation of public sanitation facilities. Busia and Mbale cluster (Butaleja, Busolwe, Budaka, Kadama, Tirinyi, Kibuku) including Namungalwe-Kaliro, Kyegegwa-Mpara-Ruyonza and Namasale will be financed under subcomponent 1.1. The design review, feasibility study and detailed engineering design of Water Supply and Sanitation component for Iganga-Kaliro was carried out under Water Management and Development Project.

The proposed project will be located in Iganga & Kaliro district. The benefiting centers are actual district towns of Iganga and Kaliro and rural growth centers along Iganga-Kaliro road in Iganga Municipal Council, Nakalama, Namungalwe, Nambale and Nabitende sub-counties. The benefiting trading centres in Iganga district include Silver ward, Kigulu village, Bugumba, Nabikote, Namungalwe, Nasuti, Nambale, Naibiri and Nabitende. The main distribution area for Kaliro district will be Kaliro Town Council.

From the feasibility study, the recommended option for Kaliro water supply is the extension of the Iganga water system to serve both Kaliro and the 7 enroute RGCs between Iganga and Kaliro. It was established that Kaliro Town could also be supplied from the NWSC Iganga Town water supply system. The source of the water is the National water and Sewerage Corporation water supply system in Jinja Municipality. NWSC Jinja Area abstracts raw water from Lake Victoria and treats it at Masese Water Works, Walukuba.

The proposed project for which this ESIA is being done will be located in Iganga & Kaliro district. The benefiting centers are actual district towns of Iganga and Kaliro and rural growth centers along Iganga-Kaliro road in Iganga Municipal Council, Nakalama, Namungalwe, Nambale and Nabitende sub-counties. The benefiting trading centres in Iganga district include Silver ward, Kigulu village, Bugumba, Nabikote, Namungalwe, Nasuti, Nambale, Naibiri and Nabitende. The main distribution area for Kaliro district will be Kaliro Town Council.

The proposed interventions in the IWMDP will contribute to Uganda's achievement of the Sustainable Development Goals, SDG#3 - ensuring healthy lives and promote well-being for all at all ages, SDG#4 - ensuring availability and sustainable management of water and sanitation for all and SDG#10 - reducing inequalities within and among countries.

### **Current water supply and sanitation in Iganga-Kaliro**

#### **Status of urban water supply**

The Water and Sanitation sector defines urban areas as those with population of 5,000 people and above (MWE, 2007).

## Iganga

Currently the safe water coverage for the district stands at 67% as at the end of 2013/14 financial year. If the proposed water and sanitation project is implemented most of the water stressed areas in Iganga would be served and the coverage would shoot to over 80%. The project area was observed to be water stressed with long queues at bore holes that were reported to be the major sources. According to the National and Housing Census, 2014, the number of households who use piped water and boreholes is 13,198 (12.9%) and 72,810 (71.1%) respectively.



Plate 1-1: A crowded Nabitende borehole



Plate 1-2: A borehole in Nambale village

## Kaliro

Safe water coverage is 58% while Pit latrine coverage for Kaliro district is 81% compared to the national average of 67.5%. The National target is 100% (According to Kampala Declaration of sanitation 2006- 2007). The project area has access to piped water. However, during community consultations, it was reported that the supply is not sufficient and the proposed project would be an added advantage. The proposed project is expected to increase access to safe water which will further increase the percentage of the population that access safe water.

There is a piped water supply system in Kaliro Town Council currently under the Management of National Water and Sewerage Corporation. However, the existing system has exceeded its 10 years design horizon (from 2000 – 2010) and there are many dry zones. The system is composed of 1.5 km of transmission pipe DN 63mm; 5.5 km of pipe from DN 30 to DN 100; 2 production boreholes complete with submersible pumps and control panels with yields of 5m<sup>3</sup>/h and 8m<sup>3</sup>/h; 1 No. 3-phase generator set; Storage Reservoir of 100 m<sup>3</sup> capacity and a pump station.





Plate 1-3: Existing pump station in Kaliro town

For the current water system in Kaliro Town Council, the piped water supply is limited to the core areas of the town. The total connections are estimated at 601 in number. The breakdown of the connections is shown in Table below.

Table 1-1: Breakdown of existing Water Connections in Kaliro Town (NWSC, May 2015)

#	Water Connection Type	Number
1	Domestic	508
2	Commercial/industrial	18
3	Institutions	74
4	Public Stand Pipe	1
<b>Total</b>		<b>601</b>

Some of the town population is served by a total of 25 boreholes spread out in the town council. On the other hand, it is evident that, the rest of the population entirely depends on unsafe water sources like stream/swamps and shallow wells thus posing health hazards to the community in the project area.



## Namungalwe RGC

Access to safe and clean water in the entire sub county is very low from boreholes, springs and shallow wells as the major sources of water supply. The Sub County has a total of 57 boreholes spread out in the seven parishes that make up Namungalwe Sub-County. There are also 4 protected springs and 19 shallow wells.

Table 1-2: Distribution of water point sources by parish

Parish	Boreholes		Springs	Shallow wells	
	Functional	N/Functional		Total	
Bulumwaki	7	2	9	2	-
Mwendanfuko	7	0	7	-	1
Namunkanaga	7	1	8	2	2
Nawansega	6	-	6	-	-
Namunsala	3	-	3	-	1
Namungalwe	13	1	4	-	8
Namunkensu	9	1	10	-	7
<b>Total</b>	<b>32</b>	<b>9</b>	<b>57</b>	<b>4</b>	<b>19</b>

*Source: Namungalwe Sub County Five Year DP 2011/2012 -2015/2016*

The baseline survey established that 80.10% of the households use boreholes as the main source of water whereas 12.6% use ponds/streams, 5.8% use traditional wells and only 1.6% use springs. 63% of the respondents reported that they treat their drinking water mostly by boiling.

### Status of urban sanitation facilities

#### Iganga

According to NWSC, Iganga area has two sets of waste stabilization ponds located at Igamba and Nakavule in Iganga Municipality. They have the capacity to treat about 800m<sup>3</sup> and 400m<sup>3</sup> of wastewater daily, with total number of sewer connections of 154. This serves 4% of its sewerage needs. According to the Higher-Level Local Government Statistical Abstract, the latrine coverage in the

district is about 68% and those who do not have a toilet facility stand at 4.1%. The rest of the population uses toilets connected to isolated septic tanks.

### **Kaliro**

According to the feasibility study, the common sanitation facility in Kaliro Town is the pit latrine. From the survey, 91% of households have the traditional pit latrines. Only 1.4% of the households had flush toilets. About 0.8% reported that they don't have toilets and use the bush. Therefore, as part of the project, sensitization and promotion of improved sanitation facilities should be undertaken in a bid to improve prioritization of sanitation by households. The use of public toilets is also a common practice as 6.5% of respondents indicated that they use these facilities.

Most of the schools in Kaliro Town have lined pit latrines that require FS emptying service. With the improvement on the existing piped water system, more households and institutions will opt for water borne sanitation facilities that are emptiable in a bid to save on the need to always dig a new pit latrine once the ones in use fill up. This calls for the need of a FS disposal facility and FS emptying equipment. Also important to take note is since Kaliro is about 35 Km from Iganga Town, it could be served by the Sewage/FS treatment facility in Iganga Town managed by NWSC. Iganga Town also has a resident private cesspool service provider who offers services to the neighbouring small towns. An M.O.U between the different stakeholders in Kaliro Town Council, Private Cesspool Provider and NWSC, with regard to faecal sludge management is in place and this should facilitate service provision in the Town. However, in the long term, as the demand grows, Kaliro Town will require its own FS disposal facility. This could be in the form of FS drying beds and a constructed wetland for treatment of the effluent. Kaliro also has a Truck that Collects garbage in the Town. It is proposed that the other enroute Sub Counties (Namungalwe and Nambale) put in place systems for solid waste management. The system should involve the collection of solid waste at designated collection refuse bunkers which are emptied by Sub County workers or contracted private companies using shovels and forks, onto a collection vehicle. Transport of refuse to the bunkers is done by the community.

## **1.2 Geographic location**

The proposed areas for water transmission and distribution network towns and rural growth centres in the districts of Kamuli and Iganga. The construction of the booster station and augmentation of the existing water treatment plant with an additional clarifer shall be done in Jinja district. Below is a map showing the location of the different project components.

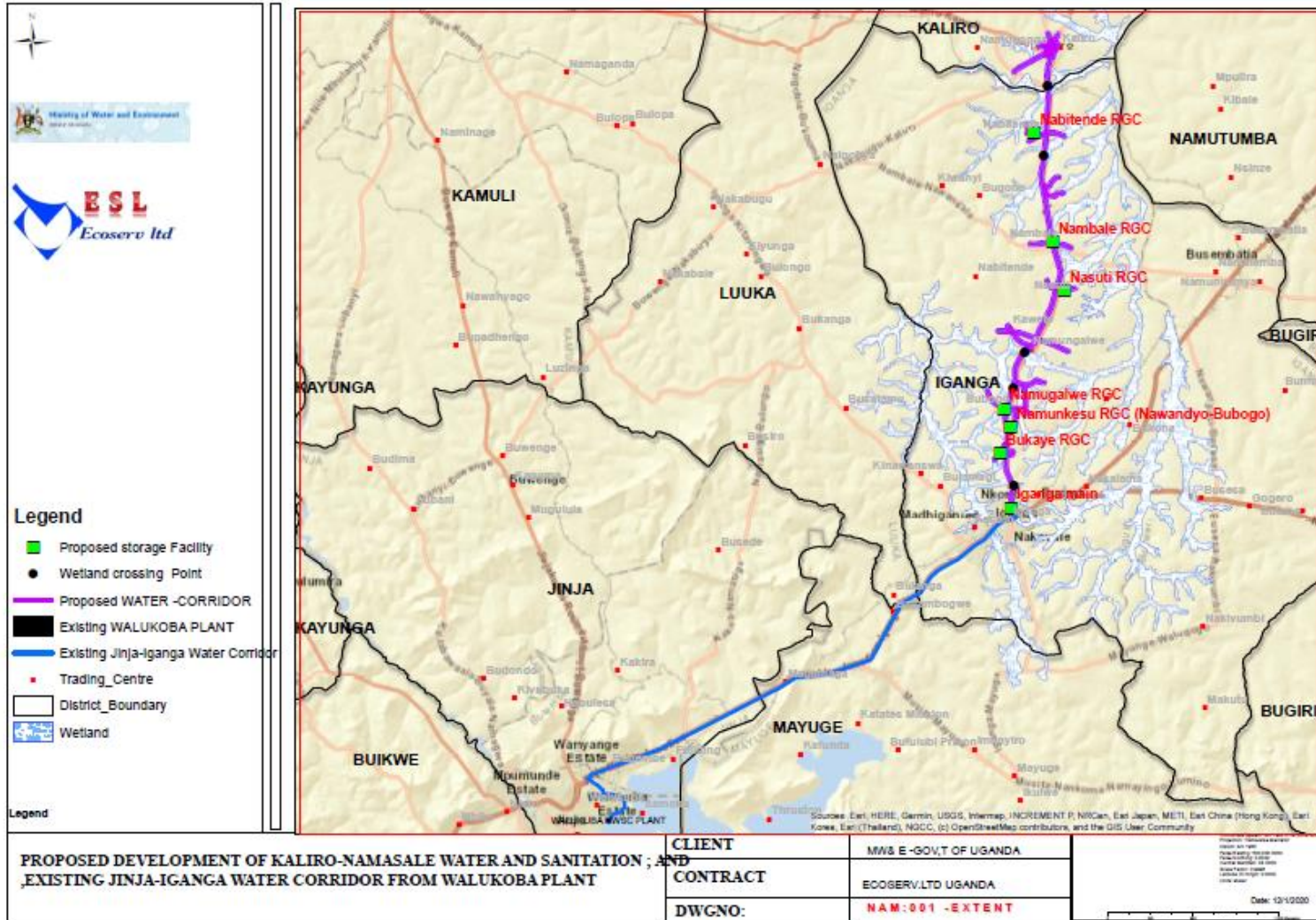


Figure 1-1: The map showing an overview of the project area and the proposed water supply system

### 1.2.1 Location of reservoirs

Table 1.3 below presents a summary of the location of all the water reservoirs (water storage facilities). Figure 1.2 below presents a map showing the locations of the water reservoirs.

Table 1-3 : Location of all water reservoirs along the project area (From Kaliro-Iganga town)

No	Name of location	GPS coordinates	Village and subcounty
1	Kaliro Town	E: 556313, N: 98895, H:1087	Kaliro Town Council, Kaliro district
2	Nabitende RGC	E: 554807, N: 93384, H:1090	Banada village, Nabitende subcounty, Iganga district
4	Nasuti RGC	E: 556766, N: 83037, H:1146	Nasuti village, Nambale subcounty, Iganga district
5	Nambale RGC	E: 556002, N: 86264, H:1116	Nambale village, Nambale subcounty, Naibiri village, Nambale subcounty, Iganga district
6	Namungalwe RGC (Bunyiro)	E: 552783, N: 75210, H:	Bunyiro village, Namungalwe subcounty, Iganga district
8	Bukaye RGC	E: 552514, N: 72256, H:1158	Bukaye village, Nwanyingi subcounty, Namunkesu village, Namungalwe subcounty, in Iganga district

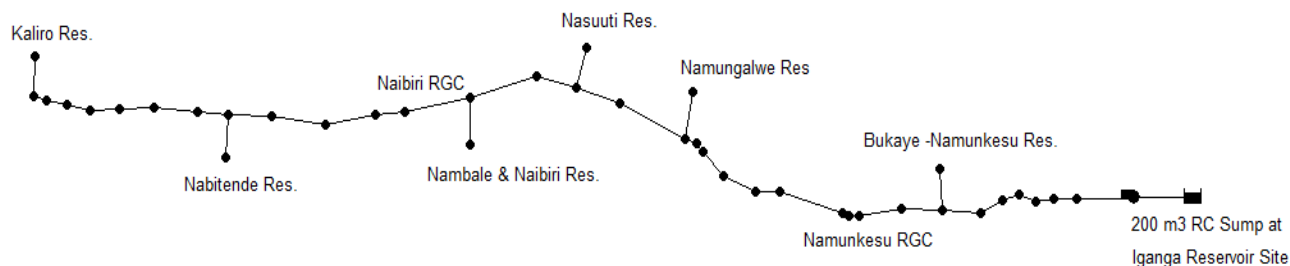


Figure 1-2: Schematic presentation of Reservoirs along the Iganga – Kaliro Transmission Main

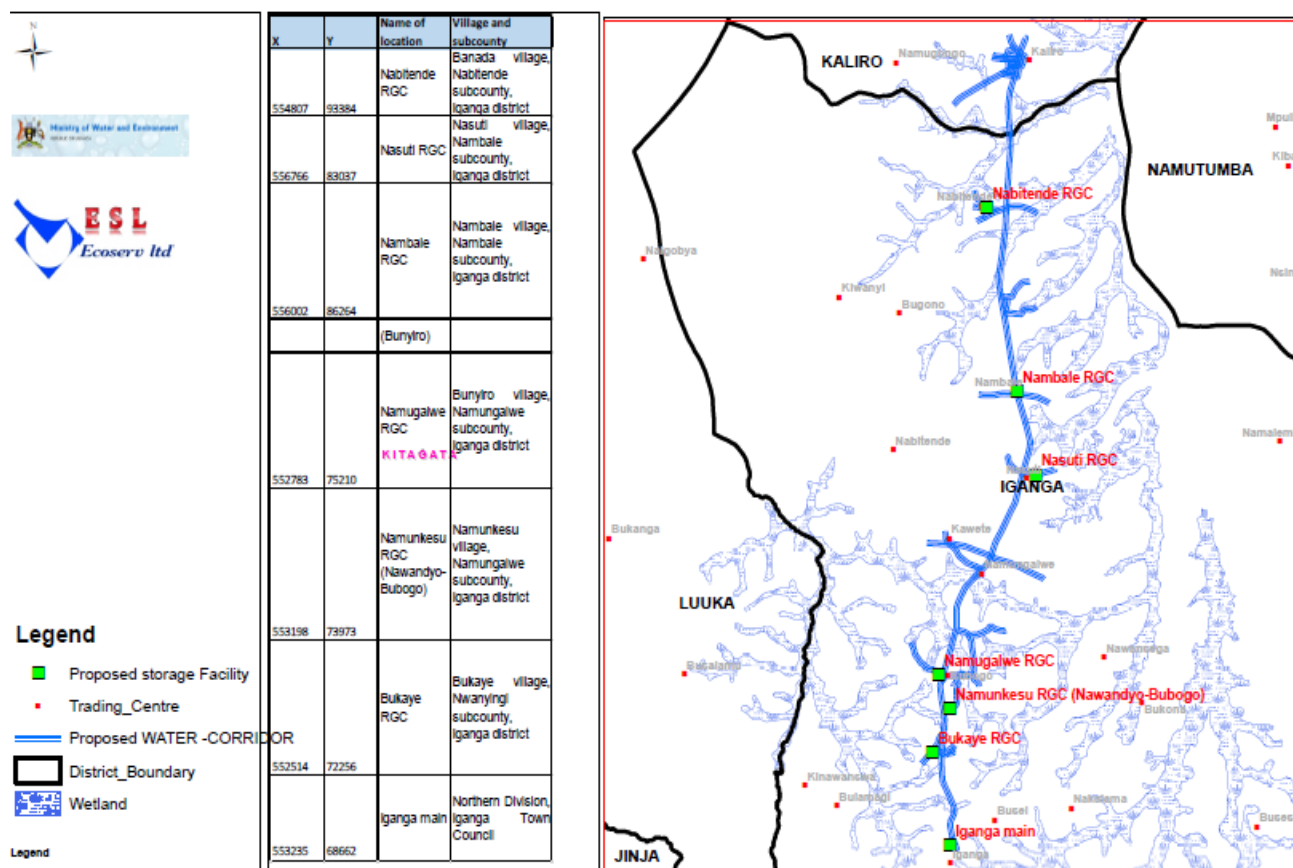


Figure 1-3: Map showing the location of the reservoirs

### 1.3 Project justification

The purpose of this project is to increase sustainable access to safe water and basic sanitation in Iganga & Kaliro towns and all the benefiting trading centres along the transmission route. The following benefits are expected to accrue from this project;

- i. Reduction in the prevalence rates of waterborne diseases, especially cholera, dysentery and diarrhea;
- ii. A significant reduction in health costs and time for collecting water which translate into substantial savings for rural households;

- iii. The easing of the burden of fetching water which is one of the most arduous tasks for women and young girls in the rural areas;
- iv. The development of income-generating activities for women given the free time accruing from the reduced burden of fetching water;
- v. An increase in the enrolment ratio, especially for girls, and in the female literacy rate;
- vi. The reduction in social conflicts related to water use;
- vii. The promotion of local governance and decentralization;
- viii. The efficient management and maintenance of water supply and sanitation facilities; and
- ix. Human capacity building and the creation of jobs in water management through the involvement of private operators in the construction, management, repair and maintenance of water supply facilities.

### **1.3.1 The need for Environmental Impact Assessment**

The implementation of the Iganga-Kaliro Towns Water Supply and Sanitation Project will result in a number of environmental impacts that require an Environmental and Social Impact Assessment (ESIA). Furthermore, the third schedule of the National Environment Act No. 5 of 2019 as amended, lists such projects (An activity out of character with its surrounding) among those to be considered for environmental impact assessment. The project falls under the Fifth schedule of the National Environment Act which lists projects to be considered for ESIA. It involves activities out of character with its surroundings and major changes in land use.

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

### **1.3.2 Purpose of the ESIA**

- To investigate the likely impacts of the proposed project on the biophysical and social-economic environment and propose appropriate mitigation measures to avert or reduce such impacts.



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

### 1.3.3 Approach and Methodology

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

#### **Literature Review**

The ESIA study was partly undertaken by intensive literature review, using documents provided by the Developer and those from other sources such as, Feasibility study reports, Environmental and Social Management Framework (ESMF) for the Integrated Water Management and Development Project-P163782, World Bank Safeguards policies, IFC Environmental Health and Safety Guidelines for Water and Sanitation Projects, and other documents provided by district staffs on project location such as District Development Plans, district state of environment and health reports among others. Other documents reviewed include relevant National Household survey reports, policies, regulations, legal framework impacting on the water and sanitation sector.

#### **Stakeholders' consultations**

Consultations with stakeholders constituted a major part of the ESIA methodology in information gathering. Rational data collection instruments were designed and centered mainly on the proposed water and sanitation project and other associated systems. Data on environmental impacts and stakeholder perceptions, views and concerns were collected through focus group discussions (Plate 1.1-1.2), meetings and personal interviews with the target audience including but not limited to all communities in all the benefiting trading centres and villages along Iganga-Kaliro road, Iganga Town Council Administration, Iganga District Administration, Kaliro Town Council Administration, Kaliro District Administration, National Water and Sewerage Corporation among others. Emphasis was laid on environmental concerns expected laying of water transmission and distribution pipes within the rest of project area, obligations of the various parties in mitigating the various impacts anticipated and

the procedure for operating the water and sanitation project among others. Concerns were analyzed, documented (Annex 1), and addressed in the environment management plan.

### **Physical measurement and assessment of environmental parameters**

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

#### **Baseline noise condition**

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

#### **Biodiversity inventories**

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

#### **Mapping and Photography**

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

#### **Visual Observation**

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

#### **Impact screening**

Checklists structured on the basis of environmental components in the case of the biophysical environment, and of socio-economic concerns in the case of activities, man-made structures, institutions or likely demographic-economic changes by the proposed project were used for the



preliminary screening of the major impacts. Both National (As presented by NEMA) and international EIA checklist were used. Major impacts were defined for the selected aspects of the biophysical and socio-economic environment.

### **Assessment, evaluation and analysis of potential adverse impacts**

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

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

## Report writing

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



Plate 1-4: ESIA team consults PAPs that will be affected by the Iganga-Kaliro project

## 2 PROJECT DESCRIPTION

Ministry of Water & Environment through the Urban Water & Sewerage Department intends to undertake construction of the Iganga-Kaliro Towns Water Supply and Sanitation Project. This is a sub-component under the Integrated Water Management and Development Project (IWMDP) which aims at contributing to Uganda’s achievement of the Sustainable Development Goals, SDG#3 - ensuring healthy lives and promote well-being for all at all ages, SDG#4 - ensuring availability and sustainable management of water and sanitation for all and SDG#10 - reducing inequalities within and among countries. This sub-component will also ensure the long-term availability and improved quality of water supply through enhanced source protection (e.g. supporting water resources management activities and other measures to protect catchment areas), including coordination mechanisms between DWRM and DWD. This project will be supported by the World Bank.

### 2.1 Water supply system demand

A design period of 20 years starting from the “initial year” has been used in the design. The Initial Year for the commissioning of the water supply system has been taken as 2019 with an Ultimate Year of 2039. The population growth rates are 3.95% for Kaliro town and 2.95% for the enroute Rural Growth Centres (RGC).

Table 2.1 below summarizes the total maximum day demand for the design period in the project area.

Village	Water Demand (m <sup>3</sup> /day)					
	2014	2019	2024	2029	2034	2039
<b>Domestic demand</b>						
Kaliro Town	304	362	432	514	612	728
Nabitende RGC	127	147	170	197	228	263
Naibiri RGC	84	97	113	130	151	174
Nasuti RGC	131	152	175	203	234	271
Nambale RGC	63	72	84	97	112	130
Namugalwe RGC	159	184	212	246	284	328
Namunkesu RGC	72	84	97	112	130	150
Bukaye RGC	144	166	192	223	257	298
<b>Total Domestic Demand</b>	<b>1,085</b>	<b>1,265</b>	<b>1,475</b>	<b>1,721</b>	<b>2,007</b>	<b>2,342</b>

Non-Domestic Demand						
Commercial	39	42	46	49	53	57
Institutional	252	271	292	315	339	365
<b>Total Non-Domestic Demand</b>	<b>291</b>	<b>314</b>	<b>338</b>	<b>364</b>	<b>392</b>	<b>422</b>
<b>Total Domestic &amp; Non-Domestic Demand</b>	<b>1,376</b>	<b>1,579</b>	<b>1,813</b>	<b>2,085</b>	<b>2,400</b>	<b>2,765</b>
Add 20% Non-Revenue Water (NRW)	344	395	453	521	600	691
<b>Total Demand including NRW</b>	<b>1,720</b>	<b>1,973</b>	<b>2,266</b>	<b>2,606</b>	<b>3,000</b>	<b>3,456</b>
Apply Peak day factor of 1.2						
<b>Maximum Day Demand</b>	<b>2,064</b>	<b>2,368</b>	<b>2,720</b>	<b>3,127</b>	<b>3,599</b>	<b>4,147</b>

## 2.2 Main components of the Water Supply and Sanitation Project

The Iganga-Kaliro Water Supply and Sanitation Project will majorly comprises of the following;

1. A new horizontal flow clarifier at Masese water treatment plant in Jinja with capacity of 12,792 m<sup>3</sup>/d and sludge drying beds with sludge volume capacity of 51m<sup>3</sup>.
2. A booster pump station at Wairaka with capacity of 336m<sup>3</sup>/hr and 148m head in 2023; 377m<sup>3</sup>/hr and 210m head in 2033.
3. A new transmission main along the Iganga- Kaliro Highway consisting of OD 250 uPVC PN16 – 16.57 km and OD225 uPVC PN20 – 16.61 km.
4. Tee-offs for the en-route population at Bukaye, Namungalwe, Nasuti, Nambale and Nabitende trading centers along the Iganga-Kaliro road.
5. A Cold Pressed Steel reservoir of 200 m<sup>3</sup> on an 18m elevated steel tower for Kaliro town.
6. A Cold Pressed Steel reservoir of 100 m<sup>3</sup> on an 18m elevated steel tower for Nabitende RGC.
7. A Cold Pressed Steel reservoir of 100 m<sup>3</sup> on an 18m elevated steel tower at Nambale for Nambale and Naibiri RGCs.

8. A Cold Pressed Steel reservoir of 100 m<sup>3</sup> on an 18m elevated steel tower for Nasuti RGC.
9. A Cold Pressed Steel reservoir of 170 m<sup>3</sup> on an 18m elevated steel tower for Namungalwe RGC.
10. A Cold Pressed Steel reservoir of 170 m<sup>3</sup> on an 18m elevated steel tower at Bukaye for Bukaye and Namunkesu RGCs.
11. A new distribution pipe network of total length 89.79 km of HDPE and uPVC pipes ranging in size from OD200 - OD50 mm PN10 for the entire Project area.
12. 2,000 consumer connections (Kaliro and the 7 enroute RGCs)
13. Water office- 1 No.
14. Public Toilets – 2 No.

### **2.2.1 Water source**

The proposed water source for Kaliro Town and the en-route RGCs is the extension of the Iganga Town Water Supply System. The tap off will be from the Iganga 900m<sup>3</sup> reservoir elevated on a 10m tower into a reinforced concrete sump on the ground from where the water will be boosted to Kaliro and the en-route RGCs by surface pumps.

The main water supply from Iganga is already treated at the Masese Water Treatment Plant in Jinja and as such no further treatment will be required for the supply to Kaliro.

### **2.2.2 Water treatment plant infrastructure**

The Masese Water Treatment Plant in Jinja is comprised of the following components:

- (i) An intake on Lake Victoria rated at 36,000 m<sup>3</sup>/day with 6no submersible raw water pumps of capacity 410m<sup>3</sup>/h each.
- (ii) Clarifiers: Stream 1 comprising 8no vertical flow clarifiers rated at 11,700m<sup>3</sup>/day and Stream 2 comprising 1no horizontal flow clarifier rated at 10,000m<sup>3</sup>/d.
- (iii) Rapid gravity filters with total rated capacity of 30,610 m<sup>3</sup>/d: Filter house 1 with 6no. tanks of 7m<sup>2</sup> each and Filter house No. 2 with 6no. tanks of 40m<sup>2</sup> each.
- (iv) High lift pumping: High level to Rubaga reservoir through 3 mains using a mix of 180, 200 and 238m<sup>3</sup>/h pumps (2 duty + 1 standby) for each main and Low level to Walukuba reservoir at 342m<sup>3</sup>/h (duty + standby) as shown below.

Table 2-1. Lift pumping levels

		Name, Model and Rated Capacity of Pumps
High Level to Rubaga Hill	Main 1	<ul style="list-style-type: none"> <li>• KSB WKLN 125/5: 238m<sup>3</sup>/h at 129m</li> <li>• Ritz E-4415/5/3: 180m<sup>3</sup>/h at 158m</li> </ul>
		<ul style="list-style-type: none"> <li>• Standart SKM 125/4: 200m<sup>3</sup>/h at 145m as standby for either Main 1 or Main 2</li> </ul>
	Main 2	<ul style="list-style-type: none"> <li>• Caprari PML/50H/MU/6B: 200m<sup>3</sup>/h at 145m</li> <li>• KSB WKLN 125/5: 238m<sup>3</sup>/h at 129m</li> </ul>
	Main 3	<ul style="list-style-type: none"> <li>• Ritz E-4415/5/3: 220m<sup>3</sup>/h at 142m</li> <li>• KSB WKLN 125/5: 238m<sup>3</sup>/h at 129m</li> <li>• KSB MTC-C125/06: 200m<sup>3</sup>/h at 145m</li> </ul>
Low Level to Walukuba	Main 4	<ul style="list-style-type: none"> <li>• Flow Serve ME 150-500: 342m<sup>3</sup>/h at 74m</li> <li>• Flow Serve ME 150 -500: 342m<sup>3</sup>/h at 74m</li> </ul>

Source: Detailed Engineering Design Report 2020

- (v) Pumping to Rubaga high level reservoir is through three independent DN300 PN16 DI pipelines of 4km length with an elevation difference of 95m. Each pipeline is connected to three pumps with two duty and one standby. Pumping to Walukuba is through DN300 PN10 DI pipeline of 400m length and 45m static head on single duty and standby pumps.
- (vi) Sludge drying tank of external dimensions 16.2m x 7.7m x 1.5m and internal dimensions 15.6m x 7.3m x 1.0m sludge depth giving sludge volume of 114m<sup>3</sup>.
- (vii) Storage reservoirs of reinforced concrete at Walukuba of 4,000m<sup>3</sup> and at Rubaga of 28,000m<sup>3</sup> plus 22,950m<sup>3</sup> for the old and new reservoirs respectively.

According to the designed report the treatment plant units are **mismatched**; the intake and filters are rated at about 30,000m<sup>3</sup>/d but the total rated capacity of the clarifiers is only 21,700m<sup>3</sup>/d. Therefore, in order to meet the projected design water demand of 30,397m<sup>3</sup>/d in 2043 for the Project area of Jinja, Mayuge, Iganga and Kaliro-Namung'alwe, the Masese Water Treatment Plant shall be uprated to full capacity of 30,000m<sup>3</sup>/d by construction of an additional horizontal flow clarifier of 10,000 m<sup>3</sup>/d capacity

### 2.2.3 Treated water transmission main

The transmission main has two segments; i.e., Jinja – Iganga main which is 37km long with DN300 steel pipe with no works expected to be executed and the proposed main 33.18 Km Iganga to Kaliro Town (Refer to figure 1.1 for the location of the network infrastructure). It consists of 12.74 km of OD 280 uPVC PN 16 and 21.07 Km of OD 250 uPVC PN 16 pipes. The transmission main has been designed with a capacity of delivering 4,147m<sup>3</sup>/day. The levels used in the design of the

transmission main are shown in Table below. The transmission main was sized using Hazen-Williams Formula and Epanet software was used to design the main requirements in the ultimate design year 2039. The summary of the design details for the sizing of the transmission main are given in Table below.

Table 2-2: Transmission main design components

Pipe Section	Length (m)	Flow (m <sup>3</sup> /h)	Pumping Head (m)	Pipe Type	Remarks
Iganga to Bukaye	3,800	172.8	Gravity	OD 280 uPVC PN16	Has 100% of the project demand
Bukaye to Namunkesu	2,700	154.2	Gravity	OD 280 uPVC PN16	Has 89 % of the project demand
Namunkesu to Namungalwe	5,160	144.8	Gravity	OD 280 uPVC PN16	Has 84 % of the project demand
Namungalwe to Nasuuti	3,520	117.9	Gravity	OD 280 uPVC PN16	Has 68 % of the project demand
Nasuuti to Nambale	3,280	101	Gravity	OD 250 uPVC PN16	Has 58 % of the project demand
Nambale to Naibiri	3,230	92.9	Gravity	OD 250 uPVC PN16	Has 54 % of the project demand
Naibiri to Nabitende	4,090	82.1	Gravity	OD 250 uPVC PN16	Has 47 % of the project demand
Nabitende to Kaliro Town	5,930	65.6	Gravity	OD 250 uPVC PN16	Has 38 % of the project demand
<b>Source:</b> Project estimates					

#### 2.2.4 Booster station

The project shall finance the construction of a booster pump station at Wairaka college school. According to the detailed engineering design report, the booster station shall have capacity of 336m<sup>3</sup>/hr and 148m head in 2023; 377m<sup>3</sup>/hr and 210m head in 2033, Figure 2-1 provides the proposed location of the booster station.



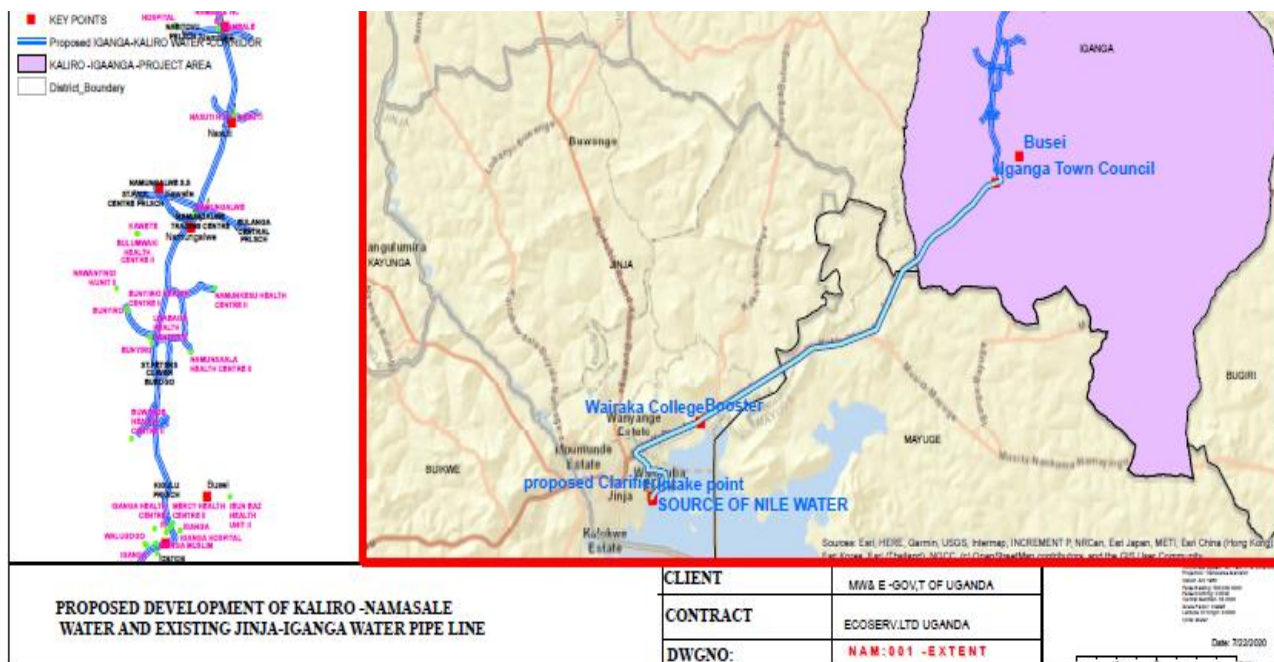


Figure 2-1 Location of the proposed booster station at Wairaka college

### 2.2.5 Storage reservoirs

The project shall support construction of six (6) storage reservoirs with respective capacities and locations indicated in table 2-4 below and figure 1-2 respectively.

Table 2-3: Storage Capacity for Kaliro Town and enroute RGCs

Towns and RGCs	MDD (m <sup>3</sup> /d) 2033	Required Storage Capacity (30% of MDD) (m <sup>3</sup> )	Existing storage capacity (m <sup>3</sup> )	Proposed storage (m <sup>3</sup> )	Combined and Standardized Storage
Kaliro Town	1327.4	398.2	200	198.2	200
Nabitende RGC	331.7	99.5	-	99.5	100
Naibiri RGC	219.5	65.8	-	65.8	100
Nambale RGC	163.3	49.0	-	49.0	
Nasuti RGC	341.6	102.5	-	102.5	100
Namugalwe RGC	553.8	166.1	-	166.1	170
Namunkesu RGC	188.9	56.7	-	56.7	170
Bukaye RGC	375.0	112.5	-	112.5	

Source: Detailed Engineering Design Report 2020

**NOTE: Naibiri and Nambale** are served by one reservoir at Nambale of capacity **100m<sup>3</sup>** while **Namunkesu and Bukaye** are served by one reservoir at Bukaye of capacity **170m<sup>3</sup>**.



## 2.2.6 Distribution network

The project shall support construction of distribution network of 89.792km in Kiliro Town and six rural growth centers along the transmission line as summarized in the table 2-4 below as per the detailed engineering design report.

Table 2-4; Summary of the Distribution Network for the Project

Pipe Details	Town and Pipe Length (m)							Total (m)
	Kaliro	Namungalwe	Bukaye	Namunkesu	Nasuuti	Nambale/Naibiri	Nabitende	
HDPE OD 50 PN 10	3,994	-	6,680	12,792	-	8,498	2,456	<b>34,420</b>
HDPE OD 63 PN 10	4,294	2,000	1,793	3,440	2,395	1,638	7,225	<b>22,785</b>
HDPE OD 75 PN 10	380	2,591	-	1,420	2,772	1,100	600	<b>8,863</b>
HDPE OD 90 PN 10	2,690	4,040	720	-	-	3,200	-	<b>10,650</b>
uPVC OD 110 PN 10	1,529	1,310	320	3,140	-	3,100	-	<b>9,399</b>
uPVC OD 160 PN 10	580	400	120	-	500	1,020	950	<b>3,570</b>
uPVC OD 200 PN 10	105	-	-	-	-	-	-	<b>105</b>
<b>Total</b>	<b>13,572</b>	<b>10,341</b>	<b>9,633</b>	<b>20,792</b>	<b>5,667</b>	<b>18,556</b>	<b>11,231</b>	<b>89,792</b>

Figure 2-2 provides the major distribution main for the proposed water supply for Iganga - Kiliro Water Supply System.

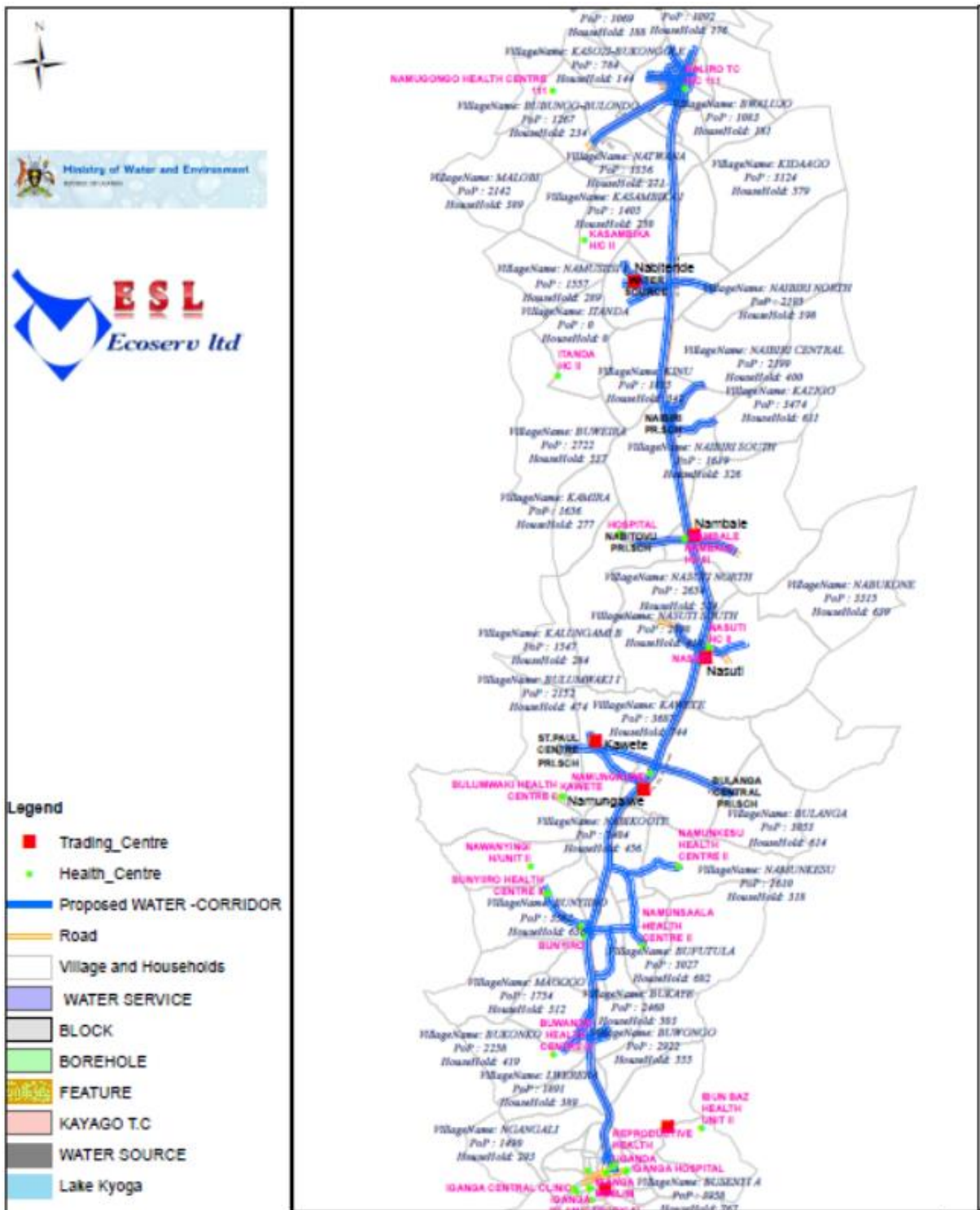


Figure 2-2: Water Spplly Distribution main for Kaliro WSS

### 2.2.7 Valves and Fittings

In general, valves and fittings facilitate the operation of the water supply system. A careful design of the routing of the pipeline was done to minimize their number and related costs. The following valves and fittings shall be installed within the piped water supply network;

- i. **Section Valves** - Section valves are provided to facilitate maintenance of the pipes by isolating one section from the others as shown on the profile drawings.
- ii. **Air Valves** – 32 Air valves shall be installed to release air from the pipeline, during normal operation (degassing due to changes in pressure) and during the pipe filling process. The air valves shall be installed at peaks/crests within the pipe network.
- iii. **Wash outs** – 27 Washouts are to be installed on pipelines to drain the pipe section especially during cleaning out of sediments in the pipe. They are provided at pronounced low points or valleys in the pipeline.

### **2.2.8 Network intensification and Consumer Connections**

As a measure to increase the densification of the distribution networks and to increase the customer base, and allow a neater layout of the service connection pipes, some pipe work intensification will be required. The intensification lines, which are HDPE OD32 to HDPE OD40 are not included in the hydraulic calculations but determined on the basis of the site conditions. They will be demand-driven, and installed where there are adequate applications for connections. Estimated quantities for this item have thus been included in the Bills of Quantities to cater for this. The location of the service pipes will not be known until applications for new connections are received. Only an estimate of the sizes, quantities and costs has been provided at this stage. A consumer connection includes the connection to the distribution system (pipe saddle), the pipeline, the section valve, the stopcock, the mono-directional water meter, the strainer, and all necessary fittings.

#### **House Connections**

House connections have been provided for residencies that may have internal house plumbing. A total of 164 house connections have been provided for implementation in Kaliro and Namungalwe phase. All house connections shall be metered in order to account for the water supplied.

#### **Yard Tap Connections**

Yard taps shall be provided to middle-income earners and to all health, education and government institutions in the project area. A total of 1,836-yard connections have been determined. The yard taps shall be constructed during the implementation phase of the project. All yard taps shall be metered.

#### **Public Stand Posts**

Stand posts shall be constructed to supply water to the low-income earners who are the majority. A total of 14 Public stand posts have been provided. Each tap is expected to serve a maximum of 300 persons and is expected to have 4 faucets/taps. All public stand posts shall be metered. The stand posts shall be constructed during the implementation phase of the project. The public stand posts

should be sited in such a way that the furthest household from the stand post should have a maximum walking distance of 500m.

### Service Connections

The location of the service pipes will not be known until applications for new connections are received. Only an estimate of the sizes, quantities and costs has been provided at this stage. The expected number of new connections is estimated at 2,000 as shown in Table 2-6. This is in addition to the 701 Connections already existing in Kaliro and Nambale towns. The operator of the Water Supply System NWSC will undertake all the required connections on takeover of the WSS. The connection materials will be supplied by the project upon payment by the consumers of the connection fees required by the Project. In addition, 30 new Public water kiosks/stand posts have been provided under this design as shown in table 2-6 below.

Table 2-5: Computation of Service Connections and Public Stand Posts

	Population 2023	Average Household Size	Number of Households	Number of House Connections (HC)	Number of Yard Taps (YT)	Total connections HC& YT	Number of Public Stand Posts (PSP)
<b>Kaliro Town</b>	22,646	4.2	5,392	54	1,402	1,456	18
Existings Connections						690	8
Required Connections						766	10
Design Provision						<b>420</b>	<b>5</b>
<b>Nabitende RGC</b>	8,851	4.7	1,883	87	384	471	5
Existings Connections						0	0
Required Connections						471	5
Design Provision						<b>260</b>	<b>5</b>
<b>Naibiri RGC</b>	5,856	4.7	1,246	57	254	312	4
Existings Connections						0	0
Required Connections						312	4
Design Provision						<b>170</b>	<b>4</b>
<b>Nasuti RGC</b>	9,116	4.7	1,940	89	396	485	6
Existings Connections						0	0
Required Connections						485	6

	Population 2023	Average Household Size	Number of Households	Number of House Connections (HC)	Number of Yard Taps (YT)	Total connections HC & YT	Number of Public Stand Posts (PSP)
Design Provision						<b>270</b>	<b>5</b>
<b>Nambale RGC</b>	4,357	4.7	927	43	189	232	3
Existings Connections						11	2
Required Connections						221	1
Design Provision						<b>120</b>	<b>1</b>
<b>Namugalwe RGC</b>	11,042	4.7	2,349	108	479	587	7
Existings Connections						0	4
Required Connections						587	3
Design Provision						<b>320</b>	<b>3</b>
<b>Namunkesu RGC</b>	5,040	4.7	1,072	49	219	268	3
Existings Connections						0	0
Required Connections						268	3
Design Provision						<b>150</b>	<b>3</b>
<b>Bukaye RGC</b>	10,008	4.7	2,129	98	434	532	6
Existings Connections						0	0
Required Connections						532	6
Design Provision						<b>290</b>	<b>4</b>
<b>Total Required</b>						<b>3,642</b>	<b>38</b>
<b>Total Design Provision</b>	<b>76,916</b>		<b>16,939</b>			<b>2,000</b>	<b>30</b>

Source: Detailed Engineering Design Report 2020

### **2.2.9 Office Block**

Currently, the NWSC offices and Kaliro Town Council offices are housed in the same NWSC building, but the available space is quite limited. An office block to house the management team after construction has been completed was therefore proposed. This will be the standard size of water office adopted by the MWE. The enroute towns will be served by these two offices, one in Kaliro and another in Iganga. The final location of the office will be agreed upon during construction.

### **2.2.10 On site sanitation management facilities**

The project will support two 8 stance water borne gender disaggregated public toilet (as per the MWE design) in Kaliro to serve the residents in the busy areas such as the main park and market. Therefore, provision of a public toilet has been included in the project. The same need was identified in all the enroute Towns including Nabitende, Nambale, Nasuti, Naibiri, Bukaye, Namungalwe and Namunkesu but these have not been provided under the design due to budget constraints apart from Namungalwe. The emerging offsite sanitation requirements will be managed by the local governments as part of operation and maintenance activities.

### **2.2.11 Auxilliary Facilities**

#### **Access roads**

Access to the transmission and distribution corridor will be gained by use of existing public highways and roads since the pipes will be buried in the road reserves. Clearance from housing and other buildings will be maintained by local adjustment of the route.

#### **Camp Sites**

It will be necessary for the contractor to establish workers camp to provide accommodations for experts that might come outside the project area as well as project offices for the contractor and supervising consultants. Other facilities with the camp shall includes, parking yard, material storage yard, kitchen, sanitary facilities, site clinic etc. The identification, selection, construction and operation shall be in line with the WB safeguards policies and the provisions in NEA 2019 and other relevant statutory requirements. All the auxiliary facilities shall be subjected to independent and comprehensive Environmental and social impact assessment and approvals shall be secured.

#### **Materials Sources.**

Where there is need for local materials such as water, sand, aggregates and gravels, the contractor shall be required to get from legally existing and authorized sources

#### **Waste handling and disposal**

During the operation 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 Governemnt Act (Ammended) 1997.

### **2.3 Labour Force**

For the proposed Iganga-Kaliro Towns Water Supply and Sanitation Project, the number of staff required during construction could include; project managers, supervisors, and other technical categories and unskilled workers who can be recruited locally. Semi-skilled and unskilled workers will be trained by supervisors prior to the commencement of construction. Local people will be recruited as unskilled labourers from the villages traversed by the water transmission and distribution line, where possible. On average, an estimated 100-150 people are anticipated to constitute the workforce on the project. While in many cases the workers will arrive at the site on foot, some pool transport can be provided as necessary to bring workers to the project sites. The entire recruitment process for the workers will be managed by the contractors in accordance with Uganda labour laws and World Bank safeguard policies & EHS requirements/guidelines.

### **2.4 Management Strategy for the Water Supply system**

The proposed management option for Kaliro and en route RGCs is to handover the system to NWSC for management after construction is completed. The justifications for this choice are as follows:

- NWSC already has a strong presence in the neighbouring towns of Iganga and Kaliro. The RGCs are all located in between these two major towns and for;
- Purposes of optimizing operation costs, annexing these to the NWSC Iganga/Kaliro area make business sense.
- The main source of water supply to the Kaliro and the RGCs is from NWSC. Having one entity manage both the water source and customer services will ensure prioritization, availability and reliability of the water supply to the respective towns and RGCs.
- NWSC has better internal resources and opportunities for cross-subsidization for purposes of making water extensions to the areas surrounding the RGCs even after project completion.



## 3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This Chapter provides analysis of the policy, legal and institutional framework within which the proposed Iganga-Kaliro Towns Water Supply and Sanitation Project is expected to operate. This Chapter covers relevant Ugandan and Development Partner policies, legislations and guidelines as well as relevant institutions. 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.

### 3.1 Overview of the National Policies and Laws on Environmental and Social Impact Assessment

There are several environmental and social policies and laws that will apply to the proposed Iganga-Kaliro WSSP. A list below provides applicable policies, laws and guidelines include: -

#### 3.1.1 Policies

- a. Vision Uganda 2040
- b. Draft National Environment Management Policy, 2014
- c. National Water Policy, 1999
- d. National Policy for the Conservation and Management of Wetland Resources, 1995
- e. Uganda National Land Policy, 2013
- f. National Health Policy, 2010
- g. Uganda Forestry Policy, 2001
- h. National Gender Policy, 1997
- i. HIV/AIDS Policy, 1992
- j. Occupational Health and Safety (OHS) Policy

#### 3.1.2 Guidelines

- a. EIA Guidelines, 1997
- b. Environmental Impact Assessment Guidelines for water resources related projects, 2011
- c. The Environmental Audit Guidelines for Uganda, 1999
- d. The Guidelines for Occupational Safety and Health, Including HIV in the Health Services sector 2008

#### 3.1.3 Overviews of Laws

- a. The 1995 Constitution of Uganda (as amended)
- b. The National Environment Act No. 5 of 2019 as amended
- c. The Water Act, Cap 152

- d. The Land Act, Cap 227
- e. The Land Acquisition Act, Cap 226
- f. The National Forestry and Tree Planting Act, 2003
- g. The Uganda Wildlife Act Cap 200
- h. The Public Health Act Cap 281
- i. The Occupational Safety and Health Act No. 9, 2006
- j. The Physical Planning Act, 2010
- k. The Local Governments Act, Cap 243
- l. The Employment Act, 2006
- m. The Workers' Compensation Act 2000
- n. The Children Act Cap 59
- o. The Prevention of Trafficking in Persons Act, 2009
- p. The Penal Code Act Cap 120
- q. Historical Monuments Act, 1967
- r. The Mining Act, Cap 148 2003

#### **3.1.4 Regulations**

- a. The Water Resources Regulations, 1998
- b. Water (Waste Discharge) Regulations, 1998
- c. The Water Supply Regulations, 1999
- d. The Sewerage Regulations, 1999
- e. The Environment Impact Assessment Regulations, 1998
- f. The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000
- g. Environment (Waste Management) Regulations, 1999
- h. The National Environment (Delegation of Waste Water Discharge Functions) Instrument, 1999
- i. The National Environment (Standards for Discharge of Effluents into Water or on Land)
- j. Regulations, 1999
- k. The National Environment (Noise Standards and Control) Control of Noise Regulations, 2003
- l. The Employment (Employment of Children) Regulations of 2012
- m. National Environment (Audit) Regulations, 2006
- n. Uganda National Roads Authority (General) Regulations, 2017

## 3.2 Key provisions of the environmental policies and laws

The source of the water is the National water and Sewerage Corporation water supply system in Jinja City. NWSC- Jinja Area abstracts raw water from Lake Victoria at . The following policies and laws will apply and guide project construction and operation phases.

### 3.2.1 Policies

Uganda policies	Key provisions and Relevancy
The National Environmental Management Policy, 1994	<p>The framework points out cross-sectoral guiding principles and strategies to achieve sustainable socio-economic development. The policy sets a guiding principle that Environmental Impact Assessment should be required for any activities, which cause significant impact on the environment.</p> <p>The National Environment Management Policy 1994 supports and promotes the proposed water and sanitation project under key principle 1 which provides for a clean, safe and productive environment.</p>
National Gender Policy (1997)	<p>The overall goal of this policy 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 of Uganda, particularly women. Thus, in the context of the water sector, this policy aims to redress imbalances which arise from existing gender inequalities and promotes participation of both women and men in all stages of water and sanitation project cycle, equal access to, and control over significant economic resources and benefits.</p>
Wetlands Management Policy, 1995	<p>The national policy on conservation and management of wetlands aims at curtailing loss of these resources and ensuring that their benefits are equitably distributed to all people of Uganda. The wetlands policy calls for:</p> <p>Sustainable use to ensure that benefits of wetlands are maintained for the foreseeable future;</p> <p>Environmentally sound management of wetlands to ensure that other aspects of the environment are not adversely affected;</p> <p>Equitable distribution of wetland benefits;</p> <p>Application of environmental impact assessment procedures on all activities to be carried out in a wetland to ensure that wetland development is well planned and managed.</p>
Land Policy	<p>The Policy has two major objectives: (1) to re-orient the land sector in national</p>

2012	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.
The National Children Policy	The Ministry of Gender labour and Social Development is in the process of developing the National Children Policy to replace the existing National Policy on Orphans and Other Vulnerable Children in Uganda. Once this policy is in place, actions that support the realization of its overarching objectives need to be developed and implemented to ensure that children are protected from all forms of abuse and that the project complements the improvement of the quality of lives of children in a comprehensive manner
National Climate Change Policy, 2012	The goal of the policy is to ensure a harmonized and coordinated approach towards a climate-resilient and low-carbon development path for sustainable development in Uganda. The overarching objective of the policy is to ensure that all stakeholders address climate change impacts and their causes through appropriate measures, while promoting sustainable development and a green economy
National water policy 1999	The goal of this policy is to provide guidance on development and management of the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs, with full participation of all stakeholders and mindful of the needs of future generations
National Health Policy, 2010	The policy aims at promoting people's health to enhance socio-economic Development. The national policy on health is guided by; primary health care, decentralization, evidence-based and forward looking strategy, Gender-sensitive and responsive health care, Pro-poor and sustainability and Partnerships.
Uganda Forestry Policy, 2001	The policy aims at maintaining a sufficiently forested, ecologically stable and economically prosperous Uganda. Maintaining forest cover will help to conserve biodiversity and provide vital ecological services, such as soil and water protection. The government is fostering a common interest in all its developments and a sense of inclusion across all groups and localities by addressing the ways that forestry can benefit people throughout Uganda,
HIV/AIDS Policy, 1992	The goal of the national HIV policy is to provide a framework for prevention of further spread of HIV and mitigation of the socio-economic impact of HIV/AIDS within the world of work in Uganda. It sets out 6 guiding principles that are aimed at achieving this goal and these are; non-discrimination, confidentiality, HIV testing, involvement of people living with the disease, Promotion of Prevention, Treatment, Care and Support

and the gender concerns in the world of work

### 3.2.2 Laws and guidelines

Law/Regulation/Guideline	Key provisions and Relevancy
The Constitution of the Republic of Uganda, 1995.	<p>The implementation of the project will take into consideration of the Constitution that provides for, <i>inter alia</i>, matters pertaining to land, natural resources (such as swamps, rivers and lakes) and clean environment.</p> <p>Principle XXVII of the Constitution declares that:</p> <p>a) Utilization of natural resources shall be managed in such a way as to meet the development and environmental needs of the present and future generations of Uganda, particularly taking all measures to prevent or minimize damage and destruction to land, air, and water resources resulting from pollution or any other kind of natural resource degradation.</p> <p>b) The state shall promote sustainable development and public awareness of the need to manage natural resources and to ensure that the utilization of the natural resources of Uganda shall be managed in such a way as to meet the needs of present and future generations.</p>
The Land Act Cap 227	<p>The Act requires a person who owns or occupies land to manage and utilize the land in accordance with the environmental laws and other laws listed in Section 43 including the Water Act and National Environment Act.</p>
The National Environment Act No. 5 of 2019	<p>This act provides for the management of the environment for sustainable development, provides for emerging environmental issues including climate change, management of hazardous chemicals and biodiversity, and provides for strategic environmental assessment to address environmental concerns for any developments of such magnitude.</p> <p>Schedule 5, part 4 of the National environment Act lists projects for Utilization of water resources and water supply under those for which environmental and social impact assessments are mandatory.</p>
The Environment Impact Assessment Regulations, 1998	<p>Regulation 2 (2) provides that no developer shall implement a project for which environmental impact assessment is required under the Act and under these Regulations unless the environmental impact assessment has been</p>

	<p>concluded in accordance with these Regulations.</p> <p>The project Developer will apply for the license from NEMA so as to comply with standards provided under the Regulations.</p>
The EIA guidelines of 1997	The guidelines establish three major phases through which the EIA should be conducted namely; the Screening phase, the environmental impact study phase and thirdly, the decision-making phase.
The Environmental Impact Assessment Guidelines for water resources related projects, 2011	<p>The guidelines under Section 3.4.1 requires that in order to avoid excessive abstraction or pollution of the available ground water resources, an assessment be carried out for all those water use projects that are likely to impact on such groundwater resources in rural and small towns' water supply projects.</p> <p>ESIA for this project has been conducted based on the above provisions of the Act, the EIA regulations and the guidelines followed. NEMA will issue an amended EIA certificate for the Iganga-Kaliro WSSP after reviewing and approving the updated ESIA.</p>
The Physical Planning Act, 2010	<p>The Act regulates the approval of physical development plans and applications for development permission. Section 37 requires an applicant of a development permit to acquire environmental impact assessment certificate in accordance with the National Environment Act before he/She can be granted full approval to develop.</p> <p>Therefore, the development of the Iganga-Kaliro WSSP is subject To the control of Physical Planning Authority of the respective Municipal Councils as mandated under S.12 of the Act.</p>
The Water (Waste Discharge) Regulations (1998)	Regulation 4 (1) require a person who wishes to discharge effluent or waste on land or into aquatic environment to apply for a waste discharge permit.
The Waste Management Regulations of 1999	<p>The Regulations require waste disposal in a way that would not contaminate water, soil, and air or impact public health.</p> <p>Regulation 5 requires a person who owns or controls a facility or premises, which generate waste to minimize the Waste generated by adopting the cleaner production methods. These provisions apply to the proposed Iganga-Kaliro Towns Water Supply and Sanitation Project in respect of the construction process, domestic waste and construction waste. The contractor and other institutions responsible for the generation of this</p>

	waste shall comply with provisions of this regulatory standard.
The Local Government Act Cap 243	<p>Under Part 4 of the second schedule of the Act, the local government is mandated to ensure the protection of</p> <p>Wetlands, the protection and maintenance of local water resources inter alia.</p> <p>The Iganga and Kaliro District Natural Resources/Environmental Officers shall in this respect monitor the project implementation to ensure that the project meets the environmental standards.</p>
The Wildlife Act Cap 200	<p>The Act provides for sustainable management of wildlife.</p> <p>S.15 of the Act states that any Developer desiring to undertake any project, which may have a significant effect</p> <p>on any wildlife species, or community, shall undertake an environmental impact assessment in accordance with the</p> <p>National Environmental Act. This ESIA is carried out in line with this provision.</p> <p>Uganda Wildlife Authority (UWA) is the institutional body whose principal function is to ensure sustainable management of wildlife resources in Uganda. It shall</p> <p>Monitor the implementation of conservational measures of the wildlife by the water project in Iganga and Kaliro.</p> <p>Considering that much of the water pipe will go through remote section of the countryside involving clearing of vegetation, and excavation of land to create holes etc, this Act is quite relevant, and relevant provisions should be complied with.</p>
The Public Health Act Cap 281	<p>Regulation 6 established permissible noise levels for a facility. Regulation 12 requires that any owner or occupier of premises whose works or activities are likely to emit</p> <p>Noise in excess of the permissible noise levels shall apply to the Executive Director of NEMA for a license to emit noise in excess of the permissible levels.</p>



Historical Monuments Act, cap 46 1968	This act provides for the preservation and protection of historical monuments and objects of archaeological, paleontological, ethnographical and traditional interest and for other matters connected therewith.
National Environment (Audit) Regulations, 2006	<p>These regulations apply to:</p> <p>A developer of a project listed in Schedule 5 and 10 of the NEA 5 of 2019</p> <p>The enforcement of the schedule 126 of part XII of the National Environment Act 5 of 2019 making a requirement for Environmental Audits to any project that has or may have adverse impacts on human health or the environment;</p> <p>Environmental Audit requirements by the National Environment (Environmental Impact Assessment) Regulations in section 31 where annual environmental audits of projects are mandatory;</p> <p>Voluntary Environmental Audits; and</p> <p>An environmental Audit report shall be carried out by persons certified and registered in accordance with the National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003.</p>
Uganda National Roads Authority (General) Regulations, 2017	<p>The Uganda National Roads Authority (General) Regulations, 2017 fall under section 37 of the Uganda National Roads Authority Act, 2006, Act No. 15 of 2006 and these give a clear and transparent framework for the use of national roads, road reserves and ferry landing facilities. An application for an approval to excavate and lay a transmission pipeline shall be made to the authority.</p> <p>This regulation is triggered since the biggest part of the transmission line is going to traverse the reserves of the Iganga – Kaliro road</p>
Vision 2040	Uganda’s Vision is to have “A transformed Ugandan society from a peasant to a modern and prosperous Country within 30 years”, from 2010. This involves changing from a predominantly low income to a competitive upper middle-income country within 30 years. It is envisaged that the country will graduate to the middle-income segment by 2017 and reach a per capita of USD 9,500 by 2040. For the country to achieve its Vision 2040, it is necessary to increase access to appropriate and adequate sanitation as well

	clean and safe water.
National Cultural Policy, 2006	The policy is put in place to protect Ugandan heritage and culture, as well as recognise specific heritage sites of national and global importance. This policy protects and conserves cultural heritage in Uganda, both tangible and intangible heritage.
National Land Use Policy, 2006	This policy aims to achieve coordination, sustainability and optimal land utilisation for socio-economic development.
National Employment Policy 2011,	The policy will stimulate Government objectives and processes for generating jobs and ensuring a better employment environment for all workers. The Employment Policy also makes mention of vulnerable groups and recognises the importance of and need for special considerations towards enhancing their employability. These groups include persons with disability and this aspect is important because of the number of young people who are disabled and continue to face numerous challenges when it comes to accessing employment opportunities.
National Gender Policy, 1997	This primary policy is in the current debates at a national level, and aims to guide and direct the planning, resource allocation and implementation of development programmes with a gender perspective in all sectors of the economy.
National HIV/AIDS Policy, 2004	This essential health policy aims to provide a framework for a multi-sectoral response to HIV/AIDS in Ugandan's world of work and applies to all current and prospective employees and workers in the public and private sectors.
Occupational Health and Safety (OHS) Policy	<p>This policy seeks to:</p> <ul style="list-style-type: none"> <li>Provide and maintain a healthy working environment;</li> <li>Institutionalize OHS in the power-sector policies, programs and plans;</li> <li>Contribute towards safeguarding the physical environment; and</li> </ul> <p>The OHS Policy Statement is guided by the Constitution of the Republic of Uganda and other global, national and sectoral regulations and policies. The OHS Policy also takes into recognition the Water Policy and the Health Sector Strategic Plan, all of which aim to improve the quality of life for all Ugandans in their living and working environment.</p>
Uganda Resettlement/Land Acquisition Policy Framework (2002)	<p>Regarding compensation and resettlement issues, the leading legislation is the Constitution of Republic of Uganda and the Land Act, both of which require that:</p> <p>Compensation should be aimed at minimising social disruption and assist</p>

	<p>those who have lost assets as a result of the project, in order to maintain their livelihoods; and</p> <p>Community infrastructure must be replaced and ideally be improved in situations where it was deficient.</p>
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### 3.3 Key provisions of social policies laws and guidelines

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

#### 3.3.1 Policies

Law/Regulation	Key provisions and Relevancy
The Employment Act No 6, 2006	<p>The Act makes provisions for governing legal statutory instrument for the recruitment, contracting, deployment, remuneration,</p> <p>Management and compensation of workers.</p> <p>It mandates Labour Officers to regularly inspect the working conditions of workers to ascertain that the rights of workers and basic provisions are provided and workers' welfare is attended to. Further, it has provisions prohibiting forced labour, discrimination and sexual harassment at workplaces (Part II; Part IV), Providing for labour inspection by the relevant Ministry (Part III) and stipulating rights and duties in employment (weekly rest, working hours, annual leave, maternity and paternity leaves, sick pay, etc.(Part VI). The Developer shall be required to treat workers with fairness and</p> <p>Without discrimination and in addition, Iganga and Kaliro District Labour officers shall regularly monitor the Contractor's compliance.</p>
The Occupational Safety and Health Act, 2006	The Occupational Safety and Health Act, 2006 provides for, general duties, obligations and responsibilities of employers,

	<p>Rights and responsibilities of workers and general safety requirements.</p> <p>Section 13 (1) stipulates that it's the responsibility of the employer to take, as far as is reasonably practical all measures for</p> <p>the protection of his or her workers and the general public from the dangerous aspects of the employer's undertaking at his or her</p> <p>Own cost. The employer should ensure, as far as is reasonably practical, that the working environment is kept free from any</p> <p>Hazard due to pollution. Section 19 requires an employer to provide adequate and suitable protective clothing and protective equipment to the workers of his or her undertaking. The Iganga-Kaliro WSSP should adhere to occupational safety and health</p> <p>rules according to the mitigation measures suggested in this report such as workers be trained in health safety, given the PPEs</p> <p>And given access to a first aid kit.</p>
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The project area has a number of both out of school and school going children. The project may have risk of using child labour at construction sites and therefore the underlying provisions have to be complied with. The following laws relating to protection from child labour will be applicable.

<b>Law/Regulation</b>	<b>Key provisions and Relevancy</b>
The 1995 Constitution of Uganda (as amended)	<p>Article 257 defines a child as any person below the age of 18 years.</p> <p><i>(Also, Section 2 of the Children Act Cap 59 and the Prevention of</i></p> <p><i>Trafficking in Persons Act 2009)</i></p> <p>Article 34 (4) of the Constitution provides that</p>

	<p>Children are entitled to be protected from social and economic exploitation</p> <p>and shall not be employed in or required to perform work that is likely to be hazardous or to interfere with their education, to be</p> <p>Harmful to their health or physical, mental, spiritual, moral and or social development.</p>
<p>The Employment Act 2006</p>	<p>Section 32 prohibits employment of a child under the age of twelve years to be employed in any business, undertaking or work place.</p> <p>The Act permits a child of under the age of fourteen years to be employed on condition that work is light work and carried out</p> <p>under supervision of an adult aged over eighteen years and does not affect the child’s education. It also requires that the child is not employed in any employment</p> <p>or work which is injurious to his or her health, dangerous or hazardous or otherwise unsuitable and that a child does not work</p> <p>Between the hours of 7 p.m. and 7 a.m.</p> <p>The person who employs such a child has to notify a labour officer in writing that the employment or work complies with the above conditions.</p>
<p>The Employment of Children Regulations of 2012</p>	<p>The Regulations also emphasize that a child employed under the age of fourteen years shall not be employed in any business</p> <p>undertaking or workplace, except for light work carried out under the supervision of an adult and where the work does not exceed</p> <p>Fourteen hours per week. They prohibit employment of a child to do work which is injurious, dangerous, and hazardous or in the worst forms of child labour.</p>

	<p>Overtime work is prohibited for a child aged between fifteen to seventeen years and a child shall not be employed at night</p> <p>Between the hours of 7.00 p.m. and 7.00 a.m. The Ministry of Water and Environment will work with the Ministry of Gender, Labour and Social Development to ensure prohibition of child labour by the contractors of the project.</p>
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Women and child sexual abuse by contractors' workers is a risk that needs to be managed especially at construction sites. Protection ought to be given to Children and women against sexual abuse and therefore the laws below will be applicable.

Law/Regulation	Key provisions and Relevancy
The Penal Code Act Cap 120	<p>Section 129 stipulates that any person who has sexual intercourse with a girl under the age of 18 is guilty of an offence and is liable</p> <p>To suffer death and also stipulates that any person who unlawfully and indecently assaults a boy under the age of 18 is guilty of felony. Section 131 prohibits procurement or attempting to procure a girl for the purpose of commercial sexual exploitation. <i>(Also, Regulation 5 of the Employment of Children Regulations 2012)</i></p> <p>Section 123 makes it an offence to have sexual intercourse with a woman without her consent and Section 132 prohibits procuring defilement of women and girls by threats or intimidation or false pretences or false representations or administration of drug, matter or thing with intent to stupefy or overpower.</p>
The Prevention of Trafficking in Persons Act 2009	<p>Section 8 prohibits recruiting a person below 16 years in any form of employment for the purposes of exploitation or introducing or</p> <p>Matching any person to another for purposes of</p>

	sexual exploitation. In Implementation of the project, the Ministry of Water and Environment will work with the Ministry of Gender, Labour, and Social Development to make sure that the women and children are not sexually exploited by the contractors. Iganga and Kaliro District Labour officers have a key role in monitoring compliance of the contractors.
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### 3.4 Legal, policy and regulatory framework for resettlement in Uganda

The project involves construction of sanitation facilities and transmission lines that required acquisition of land. This implied that the Central Government and Local Government had the responsibility to acquire land for the construction of the different project facilities which means compensation of Project Affected Persons (PAPs) in line with the World Bank OP 4.12 and GoU compensation requirements. The different types of land tenure and the acquisition processes, under Uganda laws are given below.

#### 3.4.1 Customary land

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

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



	chairpersons to verify ownership and women and the youths' due their vulnerability.
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### 3.4.2 Freehold land

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

### 3.4.3 Public land

The water transmission pipes will be laid mainly along the road reserve. This is public land, which shall require public use by the water project. It requires the involvement and discussions with the MWE and the Iganga and Kamuli District Local Governments as well as Uganda National Roads Authority. Other components shall be installed on private land.

## 3.5 Key international environmental and social laws

### 3.5.1 International protocols and conventions

The relevant international protocols and conventions for which Uganda is a signatory to as presented below.

No.	Name	Purpose
	African Convention on the	Encourages individual and joint action for the conservation,

No.	Name	Purpose
	Conservation of Nature, 1968	utilisation and development of soil, water, flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.
	United Nations Framework Convention on Climate Change (UNFCCC), 1992	The Convention requires parties to avoid adverse effects on the environment and adopt measures and policies to control carbon dioxide emissions in technologies, taking into account their common, yet differentiated responsibilities, as well as their specific national and regional development priorities, objectives and circumstances. They are required to take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimising adverse effects on the economy, on public health and on the quality of the environment of projects or measures undertaken by them to mitigate or adapt to climate change.
	United Nations Convention to Combat Desertification (UNCCD), 1994	Binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. In the 10-Year Strategy of the UNCCD (2008-2018) that was adopted in 2007 with a view to <i>forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas to support poverty reduction and environmental sustainability.</i>
	Montreal Protocol for the Protection of the Ozone Layer, 1987	The protocol was designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. All of the ozone depleting substances controlled by the Montreal Protocol contain either chlorine or bromine (substances containing only fluorine do not harm the ozone layer). The provisions of the Protocol include the requirement that the Parties to the Protocol base their future decisions on the current scientific, environmental, technical, and economic information that is assessed through panels drawn from

No.	Name	Purpose
		the worldwide expert communities.
	Stockholm Convention on Persistent Organic Pollutants, 2001	Protects human health and environment from Persistent Organic Pollutants that remain intact in the environment for long periods and can become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife, which can lead to serious health effects.
	Strategic Approach to International Chemicals Management, 2006	Fosters sound management of chemicals and to ensure that by the year 2020, chemicals are produced and used in ways that minimise significant adverse impacts on the environment and human health.
	International Labour Organisation Convention, 1998	Sets out basic principles and labour rights at work, based on international best practise.

### 3.5.2 World Bank Safeguard Policies

The Iganga-Kaliro WSS Project will be funded by the World Bank, which has Environmental and Social Safeguard policies that are designed to avoid, mitigate, or minimize adverse environmental and social impacts of projects supported by the bank. The operational policies triggered in this project are summarized in below:

Safeguard Policies Triggered	Reason
<b>Environmental Assessment OP/BP 4.01</b>	OP 4.01 is triggered as the project may have adverse environmental and social impacts through its infrastructure activities, particularly civil works for water supply and sanitation, the Iganga-Kaliro Towns Water Supply and Sanitation Project falls under category B since its impact on the human populations and other important areas including wetlands, forests and other natural habitats is less adverse than those of category A. <i>This is in line with the categorisation by the ESMF of the project that classified as category B.</i> For example, 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

Safeguard Policies Triggered	Reason
	<p>or sensitive sites will be affected except slight disturbance of the seasonal wetland that are already degraded at the border of Iganga and Kaliro district which is currently used for rice cultivation. 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 in trading centres like Namungalwe, Nabitende, Nambale and Kaliro 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. In addition, the water corridor will not be used to open up fresh forest land it will be constructed mostly in the road reserves of the existing public roads. Additionally, the World Bank Environment Health and Safety Guidelines (EHSGs), with specific reference to the EHSGs for water and sanitation projects, applies to the project.</p>
<b>Natural Habitats OP/BP 4.04</b>	<p>OP 4.04 is triggered due to potential loss or degradation of natural habitats including, riparian and wetland habitats, through project planning, physical activities or use of water resources. The conservation of natural habitats is essential for long term sustainable development. Sections of the project infrastructure will traverse natural habitats such as wetlands, and grasslands. Impacts of the project on such habitats will be mitigated through measures outlined in this ESIA and in its ESMP.</p>
<b>Pest Management OP 4.09</b>	<p>This is not triggered by this project.</p>
<b>Indigenous Peoples OP 4.10</b>	<p>This is not triggered by this project.</p>
<b>Physical Cultural Resources OP/BP 4.11</b>	<p>This Operational Policy has been triggered by this project because from the project involves excavations and there are chances of accidentally finding PCRs. Chance Finds Procedure have been developed to assist in managing of PCRs should they be found along the</p>

Safeguard Policies Triggered	Reason
	<p>proposed water transmission route. The impact assessment study only identified one physical cultural resource along the proposed water transmission route i.e. Mr Hassan Waswa's cultural tree/shrine located at E: 557051, N: 85711 in Nambale village. It is located 867 meters from the main road on the Nambale trading centre T-off to St Mulumba Primary school. It is historically known to be a source of blessing to the community and has been preserved for many generations.</p>
<p><b>Involuntary Resettlement OP/BP 4.12</b></p>	<p>OP/BP is triggered. <i>During the ESIA study, about 85% of all PAPs were consulted and all their concerns have been documented. All PAPs are interested in being compensated promptly and correctly.</i> Compliance will be ensured through the RPF and RAP which are prepared separately. OP 4.12 requires compensation at replacement cost as minimum. WB OP 4.12 Para (6 b &amp; c) state that in case of physical relocation, displaced persons are provided with;</p> <p>Assistance (such as moving allowances) during relocation. <i>This project will not result in physical relocation of PAPs except for the destruction of crops under the water transmission corridor.</i> WB OP 4.12 Para 13 (a) requires that appropriate and accessible grievance mechanisms are established to sort out any issues arising. <i>All communities have been sensitized and have been advised to form a tentative committee that will work with local leaders, RAP implementation consultant, NGOs and MWE to constitute a Grievance Redress Committee (GRC).</i></p>
<p><b>Forests OP 4.36</b></p>	<p>This is not triggered by this project.</p>
<p><b>Safety of Dams OP. 4.37</b></p>	<p>This is not triggered by this project.</p>
<p><b>Project on International waterways OP 7.0</b></p>	<p>This is not triggered by this project.</p>
<p><b>World Bank Policy on Access to</b></p>	<p>This policy is triggered since there is need for disclosure</p>

Safeguard Policies Triggered	Reason
<b>Information (July 1, 2010)</b>	of information to all the stakeholders. Compliance shall be ensured by disclosing the information to all the stakeholders such as district technocrats, Municipal and Local council leaders, and communities among others during the consultation process and the information is accessible.

### 3.5.3 The World Bank Group Environmental, Health and Safety Guidelines for Water and Sanitation Project

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

The 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.

## 3.6 Institutional framework

### 3.6.1 Ministry of Water and Environment

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

### 3.6.2 National Environment Management Authority

National Environment Management Authority (NEMA) was established under the National Environment Act No.5 of 2019 as the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management in Uganda. In this context, NEMA will be responsible for review and approval of this environmental impact assessment,

ensuring proposed mitigation measures are implemented, monitoring compliance with approval conditions, and ensuring any other impacts that may arise are mitigated.

### **3.6.3 National Forestry Authority**

The National Forestry Authority (NFA) is a Government statutory entity responsible for the management of Central Forest Reserves (CFRs) on a sustainable basis, as well as, to supply high quality forestry-related products and services in Uganda. NFA will be interested in ensuring tree clearance is minimised in case the project traverses a forest reserve. NFA has a number of regional NFA offices that have Forest Rangers to inspect and report any impacts on the forests.

### **3.6.4 Uganda Wildlife Authority**

UWA is mandated to ensure sustainable management of wildlife resources and supervise wildlife activities in Uganda both within and outside the protected areas.

### **3.6.5 Wetlands Management Department**

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

### **3.6.6 Directorate of Water Resources Management**

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

### **3.6.7 Ministry of Lands, Housing and Urban Development**

The **Mandate** is “To ensure a rational: sustainable and effective use and management of land and orderly development of urban and rural areas as well as safe, planned and adequate housing for socio-economic development”. The MoLHUD, through the Office of the Chief Government Value, and the District Land Boards, will provide guidance on land acquisition and property valuation, where required.

### **3.6.8 Uganda National Roads Authority**

The mandate of UNRA is to develop and maintain the national roads network, advise Government on general roads policy and contribute to addressing of transport concerns, among others. Some of UNRA responsibilities include: management of the National Roads Network; maintenance and development of the national roads network; and establishing and maintaining road reserves among



others. UNRA is a key stakeholder under the project because the distribution lines components largely run along the road reserves.

### **3.6.9 Ministry of Local Government**

The 1997 Local Government Act provides for decentralization and devolution of government functions, powers and services from the central to Local Governments and sets up the political and administrative functions of local governments. The Local Governments are responsible for the protection of the environment in their respective areas of jurisdiction. Local Governments shall be consulted on projects to be located within their jurisdiction and on matters that affect their environment. At the District Level, the District Environmental Officers, District Engineer and Community Development Officers in the respective areas of project implementation will participate in monitoring the projects to ensure that mitigation measures are adequate and advice or point out additional compliance requirements following their inspections. The District Land Boards and Lands Officers will provide guidance on issues of compensation or land acquisition.

### **3.6.10 The Ministry of Finance, Planning and Economic Development**

The mandate of the Ministry is to:

- ii. To Formulate policies that enhance stability and development
- iii. To mobilize local and external financial resources for public expenditure
- iv. To regulate financial management and ensure efficiency in public expenditure.
- v. To oversee national planning and strategic development initiatives for economic growth

### **3.6.11 Ministry of Gender, Labour and Social Development**

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

### **3.6.12 The Equal Opportunities Commission (EOC)**

The Equal Opportunities Commission (EOC), was established by the Equal Opportunities Act 2007. The Commission is mandated to provide a framework for redressing imbalances, which exist among the marginalized groups while promoting equality and fairness to all. The Commission was established pursuant to article 32 (3 – 4) of the Constitution and is a body corporate with perpetual

succession and a common seal and may sue or be sued in its corporate name and, may do, enjoy or suffer anything that bodies corporate lawfully do, enjoy or suffer. The Commission gives effect to the State's constitutional mandate to eliminate discrimination and inequalities against any individual or group of persons on the ground of sex, age, race, colour, ethnic origin, tribe, birth, creed or religion, health status, social or economic standing, political opinion or disability, and take affirmative action in favour of groups marginalized on the basis of gender, age, disability or any other reason created by history, tradition or custom for the purpose of redressing imbalances which exist against them; and to provide for other related matters.

### **3.6.13 The Iganga, Kaliro and Jinja District Local Governements**

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

## 4 ENVIRONMENTAL AND SOCIAL BASELINE

This chapter introduces the baseline for the project area. Initially the social economic baseline is described. Thereafter, the environmental baseline.

### 4.1 Social economic baseline

#### 4.1.1 Demographic characteristics

According to the 2014 National Housing and Population Census, Iganga district had a total population of 506,388 people comprised of 242,023 males and 264,365 females with a sex ratio of 95 males per 100 females. The population density of the district is 322 persons per Sq. Km. According to the 2014 National Housing and Population Census, the population of Iganga is generally young. The median age of the entire population is 16 years. This is an indication of high fertility which stands at 7.3. Thus, there is 103 persons in the dependent ages for every 100 persons in the working age. The high fertility plus immigration from the neighbouring districts have contributed to the high population growth rate of 3.2 percent. High fertility of 7.3 has also been coupled with high incidence of risky pregnancies.

Kaliro district has a total population of 236,927 people comprised of 115,160 males and 121,767 females. Kaliro Town council where the proposed water project will be has a population of 16,796 people with an average house hold size of 4.2 which is below the national average of 4.7. If the Town Council population continues to grow at a rate of 3.5 it is projected that the population would increase to 20,706 by 2020. Children less than 18years constitute 57% of the total district population and these are not employed or engaged in productive activities. The elderly (above60 years) make up 4.2% hence the district is left with 39.1% potential labour force. This is however reduced further by 16.6 to cater for the population still at school.

#### 4.1.2 Land use and settlement patterns

Though Kaliro and Iganga districts being of an upcountrysetting, the predominant land uses outside Kaliro town council and rural growth centers in Iganga where there are retail shops and a weekly market is subsistence agriculture-growing crops like, sweet potatoes, cassava, beans, maize, etc. and rearing animals such as cattle, goats and chicken. Settlements in the project area are nucleated around the trading centres and institutions.

#### 4.1.3 Public Health

This district has 16 Health Units of different categories. Some of them are Government hospitals while others are owned by Non -Government Organizations. The distribution is fair, but some of them lack the basic equipment to offer reasonable services. According to the district development plan

2015-2020, malaria has the highest prevalence among the population at 48% followed by pneumonia/cough at 25% as indicated in the graph below. Namungalwe and Namabale H.C III are some of the health units identified along the project area.

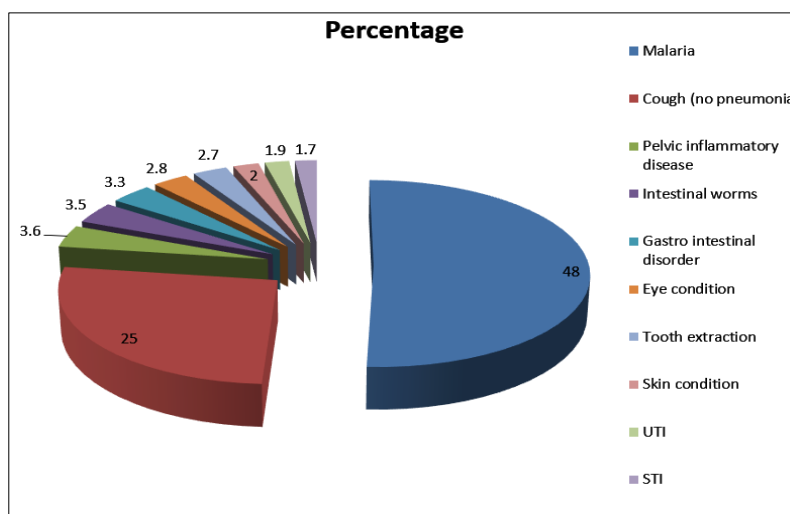


Chart 4.1: The top ten diseases in Iganga district

The HIV/AIDS prevalence rate in the district now stands at 4.3% and it is one of the major threats in Iganga District because it claims productive labour force.

Kaliro District provides curative, preventive and promotion services through the Health Centers grade IV, III, II and I. The Health Centers are a focal point for primary level of care. The district has 20 health facilities: 1 health centre IV, 6 health centre IIIs, 13 health centre IIs. The project area which is Kaliro Town Council is served by Kaliro H.C IV. Most common diseases in the area are as listed in the table below.

Table 4-1: Common illnesses in Kaliro

Disease	Percentage
Malaria (OPD)	54.04
No Pneumonia – cough/cold – OPD	19.43
Intestinal worms – OPD	9.27
Pneumonia – OPD	2.41
Other eye conditions – OPD	2.97
Diarrhea –acute -OPD	3.51
Skin diseases – OPD	2.80

Disease	Percentage
Urinary tract infections (UTI) – OPD	2.49
Other sexually transmitted infections - OPD	1.55
Ear, Nose and throat (ENT) conditions - OPD	1.54

Malaria, Pneumonia – cough/cold, Intestinal worms and Diarrhea are the major causes of illness in their order ranked followed by several others. The general geographical access to health facilities in Kaliro is 46% compared to the national average of 52.7% based on the Health sector strategic plan 2006 – 2010. The current HIV prevalence rate in the district is 6.7%. A number of predisposing factors drive the disease spread which include; poverty, sex workers and presence of a sugar factory.

#### **4.1.4 Housing**

Most rural houses in Iganga and Kaliro are of brick made houses though with rammed earth floor. The trading centres along the transmission route such as Namungalwe, Nambale and Nbitende are experiencing great improvement in physical structural development. Most dwellings in the project area were observed to be permanent in nature probably because the project targets urban areas and rural growth centres that are undergoing rapid development.

#### **4.1.5 Agriculture**

Agriculture employs over 95 % of the total districts population although 98 % of the entire agricultural practice is still subsistence. The main crops grown include; Cassava, Beans, Coffee, Groundnuts, Cow peas, Sorghum, Maize, Sunflower, Rice, Soy beans, Finger millet, sugar cane, Sweet potatoes and Green grams. Coffee used to be the main cash crop in the district this is no longer the case and food crops are increasingly doubling as cash crops. Crop farming is characterized by dependency on rain fed conditions, prone to drought, poor farmer organization, rudimentary tools, poor practices and above all low returns that accrue from low yields and poor marketing capability. Women play a leading role in the agricultural sector from production to marketing as well as ensuring food security at household level. It therefore means that efforts that support women initiatives in agriculture would contribute to improved livelihoods in rural areas. The livestock kept is of local breed which are characterised by low productivity. These include cattle, goats, sheep, chicken, turkeys, ducks, pigs and lately guinea fowl keeping. Animals are kept on free range system and are a major source of income while bulls are specifically reared for ploughing purposes.

#### 4.1.6 Economic activities

Survey results indicate that most of the household heads (about 24.8%) in the project area are engaged in farming as the main economic activity. Both food and cash crops (maize, cassava, beans, sweet potatoes, sorghum, rice etc.) are grown. On the other hand, trading activities in particular, account for 27.9% of the household heads in the sample. Trading in both merchandize and produce is included. Another employment category is of public officers. This includes teachers, police, religions organizations, NGOs, sub-county administration and civil servants. This category accounted for 8.5% of the household heads occupation

#### 4.1.7 Water and sanitation

Currently the safe water coverage for the district stands at 67% as at the end of 2013/14 financial year. If the proposed water and sanitation project is implemented most of the water stressed areas in Iganga would be served and the coverage would shoot to over 80%. The project area was observed to be water stressed with long queues at bore holes that were reported to be the major sources. According to the National and Housing Census, 2014, the number of households who use piped water and boreholes is 13,198 (12.9%) and 72,810 (71.1%) respectively. While those who do not have a toilet, facility stands at 4,215 (4.1%).



Plate 4-1: A crowded Nabitende borehole



Plate 4-2: A borehole in Nambale village

Safe water coverage is 58% while Pit latrine coverage for Kaliro district is 81% compared to the national average of 67.5%. The National target is 100% (According to Kampala Declaration of sanitation 2006- 2007). The project area has access to piped water. However, during community consultations, it was reported that the supply is not sufficient and the proposed project would be an added advantage. The proposed project is expected to increase access to safe water which will further increase the percentage of the population that access safe water.

For the current water system in Kaliro Town Council, the piped water supply is limited to the core areas of the town. The total connections are estimated at 601 in number. The breakdown of the connections is shown in Table 4.1.

Table 4-2 Breakdown of existing Water Connections in Kaliro Town (NWSC, May 2015)

#	Water Connection Type	Number
1	Domestic	508
2	Commercial/industrial	18
3	Institutions	74
4	Public Stand Pipe	1
<b>Total</b>		<b>601</b>

Some of the town population is served by a total of 25 boreholes spread out in the town council. On the other hand, it is evident that, the rest of the population entirely depends on unsafe water sources like stream/swamps and shallow wells thus posing health hazards to the community in the project area.

Access to safe and clean water in the entire sub county of Namungalwe is very low from boreholes, springs and shallow wells as the major sources of water supply. The Sub County has a total of 57 boreholes spread out in the seven parishes that make up Namungalwe Sub-County. There are also 4 protected springs and 19 shallow wells.

Table 4-3: Distribution of water point sources by parish

Parish	Boreholes		Springs	Shallow wells	
	Functional	N/Functional		Total	
Bulumwaki	7	2	9	2	-
Mwendanfuko	7	0	7	-	1
Namunkanaga	7	1	8	2	2
Nawansega	6	-	6	-	-
Namunsala	3	-	3	-	1



Namungalwe	13	1	4	-	8
Namunkensu	9	1	10	-	7
<b>Total</b>	<b>32</b>	<b>9</b>	<b>57</b>	<b>4</b>	<b>19</b>

*Source: Namungalwe Sub County Five Year DP 2011/2012 -2015/2016*

The baseline survey established that 80.10% of the households use boreholes as the main source of water whereas 12.6% use ponds/streams, 5.8% use traditional wells and only 1.6% use springs. 63% of the respondents reported that they treat their drinking water mostly by boiling.

#### **4.1.8 Gender dimension**

Gender simply refers to the socially and culturally constructed roles, privileges, status, responsibilities and opportunities given to women and men by society/culture. These distinctions can change according to the time, place, circumstance and development. For example, the roles associated with provision of basic needs for the family used to be the male domain and cooking, cleaning the house and the well upbringing of children was for the women in the early 19th century and before; however, this is hardly the case today. In relation to the proposed project women are the most affected by lack of sufficient water in the area. It was reported that women and girls who are in charge of water collection for domestic use spend a lot of time at water collection points because they are always crowded. During community meetings men reported that their wives often wake up in the wee hours of the night to go and collect water. Mothers also reported that this water stress has contributed to defilement, early marriages and unwanted pregnancies because girls' area exposed as they wait for water.

Overall the level of gender mainstreaming in development Projects Kaliro district is low. Therefore, the participation of women in developmental process is low. The communities in the district are largely patriarchal in nature. The place of women and men in terms of their roles in the community can be largely categorized into two; reproduction and production respectively. It is a practice that in more than 90% of the households and communities in the district, men hold sway in matters relating to control of resources and access to them. These resources mainly include productive assets like land, capital and finances. The males are by tradition the heads of households under the traditional clan systems.

#### **4.1.9 Transport and communication**

The Districts are accessed from Kampala by an all-weather highway. The project area is along Iganga-Kaliro road which was recently tarmacked. The district has one of the best road networks that are all weather. Iganga and Kaliro district has one Sub post office sand the telecommunication services offered by Airtel, MTN and Uganda Telecom Ltd networks. The local television reception in

the area include that of NTV, NBS, UBC and BABA tv. Various FM radios like Kiira, NBS, Simba, CBS, Empanga and many others are received. They serve as main channel for entertainment, making announcements and regular news bulletins.

#### 4.1.10 Education

According to the district development plan, Iganga District has 708 schools; 120 Nursery, 539 (153 govt aided UPE-Primary schools, 386 are privately owned), 47 secondary (12 of which are government aided), 1 PTC and 1 vocational /technical school. Following the inception of Universal Primary Education (UPE) Primary enrolment rose to over 99% of the school going age by April 2013 although the completion rate is 7% which is still very low. Several schools were identified along the project area and these are; United college Nabitende, Ebenezer model junior school, Ibanda Moslim primary school, Bukwangi primary school- Naibiri, Top care primary school-Naibiri, Naibiri primary school-Naibari, Light star day and boarding–Nambole, Hill top community education-center Namboole, FasertNambole vocational training institute, St mulumba primary school Nabole, Sunrise Christain school Nasuti, St Paul SS Nasuti c/u, Good Hope nursery and primary, Kigulu college Namungalwe mix day and boarding, Kigulu College the Gaint, Divine way nursery and primary school-Namungalwe, Uganda University of business science, Pearl secondary school, King David nursery and primary school, Nabikote c/u primary school, Falijala memorial junior school, Ruqayyah Islamic education center Bubogo, Comprehensive SS Bubogo, Bunyiuro Muslim primary school, Hands of hope Nursery school, St Peter Claver Bubogp primary school, Lukehill school Nursery and Primary school, Faith high school Bukaye, Bukaye parents nursery, Alban Islamic primary School, Hannahs Victory Junior School, Paradise Nursery and Primary School, Acacia Ridge school day and Boarding Primary School and several others. All the above schools are close to the proposed distribution network therefore are likely to be connected to water when the project is implemented.

Education institutions in Kaliro include primary schools, secondary schools, vocational institutions and tertiary institutions. The district has 36 private primary schools and 89 government primary schools. While it has 23 secondary schools of which 18 are privately owned while 5 are government owned. Education is a cross cutting phenomenon and it's a major determinant of many other indicators of well being such as access employment and fertility rates among others. The average literacy level of the district is at 56% although this is slightly higher within the town council which is the project area and lowest in Gudumire sub county. A list of schools likely to benefit from the project includes Hope of joy junior school Nabitende, Banada primary school, Victory preparatory school, Kaliro PTC, Kaliro secondary, KaliroTown S.S, Kaliro model primary school, Kaliro National teachers College, KaliroCollegeS.S, Divine High school, Queens Comprehensive College, Valley Hill Day and Boarding Primary and Secondary School.



#### 4.1.11 Child abuse

The types of child abuse common in Iganga District include; early marriages, defilement, neglect, abandonment, discrimination of children by sex (especially girl child) and over working. The weak law institutions set up to handle children cases/problems, culture and beliefs all are still dominant and promote cases of child abuse. From the above perspective girl children end up being the main victims of such practices. The main type of type of childe abuse in the project area is child labour. National statistics according to The Uganda Bureau of Statistics (UBOS) indicate that 45% of children (with ages of 5 – 17 years at the greatest risk) from households living below the poverty line are forced out of school to work and supplement their parents’ income. In the project area, many children have dropped out of school as early as primary school taking up work in sugarcane plantations.

#### 4.1.12 Physical cultural resources (PCR)

From community consultations, there are PCR sites in the district but not within the proposed project area of influence. The PCR sites are mainly worship centres and shrines. Other physical cultural resources included burial grounds. However, the only physical cultural resource along the water transmission route is Mr Hassan Waswa’s cultural tree/shrine located at E: 557051, N: 85711 in Nambale village. It is located 867 meters from the main road and about 800meters from the proposed project route on the Nambale trading centre T-off to St Mulumba Primary school. It is historically known to be a source of blessing to the community and has been preserved for many generations. Therefore, the proposed project will not traverse any PCR sites.



Plate 4-4: The traditional tree at Nambale village in Iganga

From community consultations, there are PCR sites in the district but not in the proposed corridor of the transmission/distribution network and associated infrastructure. The PCR sites are mainly worship

centres, burial sites and traditional healers' shrines. In Kaliro district cultural sites noted are, the Indian cemetery (about 500m from the proposed project components locations) and Ziribondho's palace (about 700m from the proposed transmission corridor) located within the town council. None of these features will be affected by the project activities as they are all outside the proposed project footprint for the project infrastructure.



Plate 4-5: Ziribondho's palace in Kamuli



Plate 4-6: The Indian cemetery in Kaliro



## **4.2 Physical Environment of the Project Area**

### **4.2.1 Topography**

The lowest point in the project area is the wetland area at the boarder of Iganga and Kaliro at about 1059 meters above sea level and the highest is at about at 1168m at the Iganga intake point. Generally, the project area descends from Iganga to Kaliro with a starting elevation of about 1170meters and ends at 1086 in Kaliro town.

### **4.2.2 Geology and soils**

Most of the area is a lowland lying between two wide valleys. The surface of the land is generally a well-developed complex associated with laterites depicting a mature landscape frequently diversified by tors in areas of massive jointed granite.

The soils in the districts may be described as predominantly ferralitic with reddish brown sandy loams. Much of the southern part has reddish brown sandy loams mixed with clay loams. These soils are associated with the Buganda surface and Kabira Catena, and their parent rocks are the gneisses and granites. They are of low to medium productivity and are mainly used for growing cotton, tea and robusta coffee. The eastern and northern parts of the project area are characteristically quartzite and laterites whose parent rock is the Buganda catena quartzite. These have very low fertility and are mainly used for cotton growing. The underlying rock is a mixture of the karoo system consisting ecca series and shales belonging to the Palaeozoic rocks (especially most of the south) and undifferentiated gneisses. Other underlying rocks are the Nyanzian system which consists of metavolcanoes, banded iron stones, quartzite and the granitoid Precambrian rocks. The western parts are underlain by small patches of granite gneisses.

### **4.2.3 Climate**

The mean annual rainfall is approximately 1250 mm. The area receives mainly conventional rainfall with two peaks associated with the equatorial trough in April - May and September - November. Two dry seasons are experienced, the longest in June - July and an interrupted one in December - February. Rainfall is on average 100 - 130 days per annum.

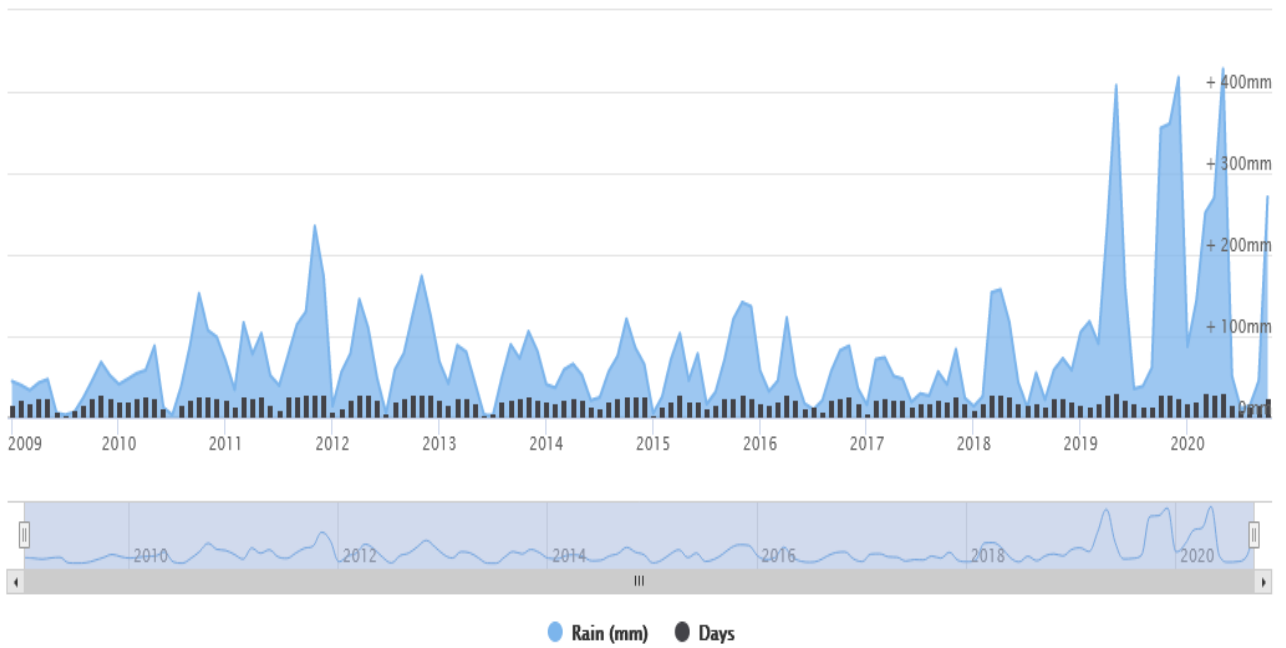


Figure 4-1: Average annual rainfall for Kaliro and Iganga districts for years 2009-2020

(Source: <https://www.worldweatheronline.com/kaliro-weather-averages/rakai/ug.aspx> accessed on 21/11/2021 at 08:26)

#### 4.2.4 Temperature

The hot season lasts for 2 months, from January to March, with an average daily high temperature above 88°F(31.1°C). The hottest day of the year is in February, with an average high of 90°F(32.2°C) and low of 64°F(17.8°C). The cool season lasts for 5 months, from April to September, with an average daily high temperature below 83°F(28.3°C). The coldest day of the year is in July, with an average low of 62°F (16.7°C) and high of 82°F (27.8°C).

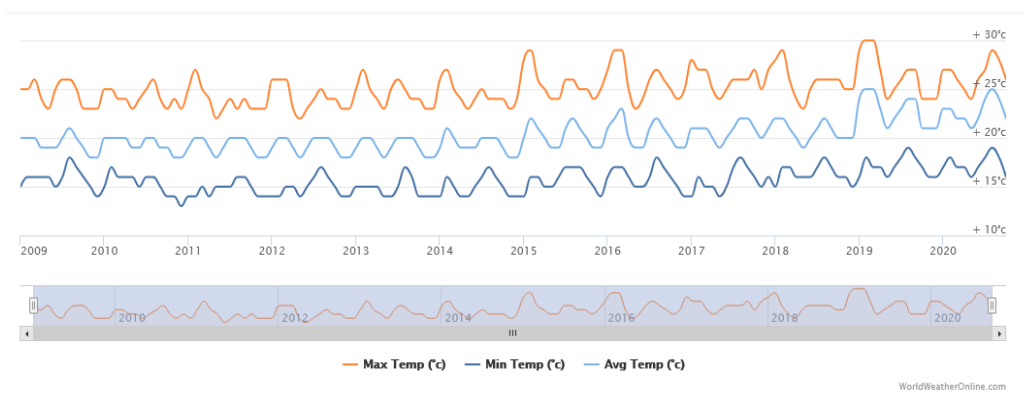


Figure 4-2: Average annual Temperature for Kaliro and Iganga districts for years 2009-2020

(Source: <https://www.worldweatheronline.com/kaliro-weather-averages/rakai/ug.aspx> accessed on [21/11/201=20](#) at 08:26)

#### **4.2.5 Noise**

Baseline noise conditions were investigated along selected segments of the proposed Iganga-Kaliro Towns Water Supply and Sanitation Project areas using an Extech 407730 Sound Level Meter. The areas for noise assessment were selected based on the sensitivity of the receptor areas. Figure 4.4 shows the areas where noise measurements were taken and Table 4.4 below presents some of the baseline noise levels taken at some selected points.



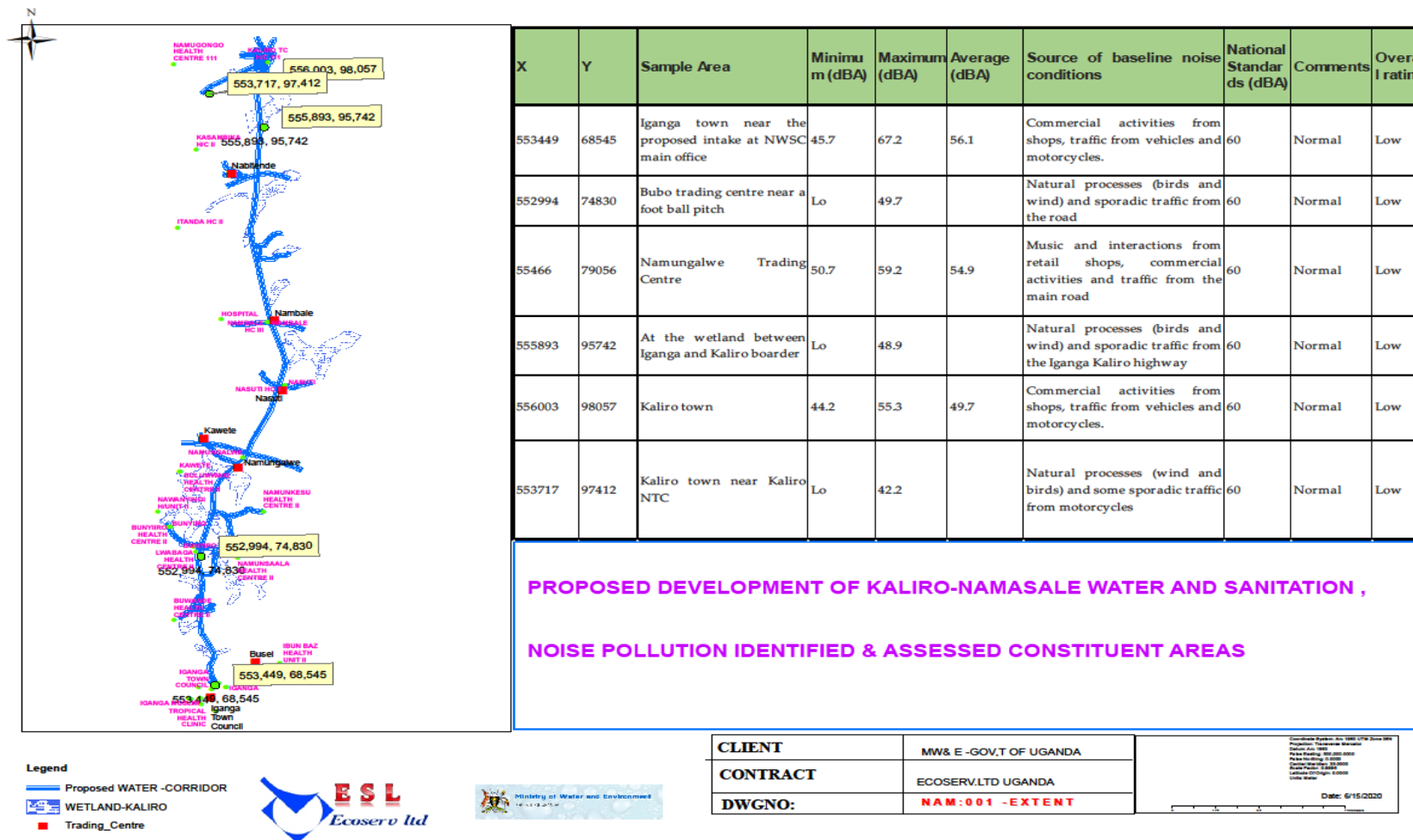


Figure 4-3: The map showing the areas where noise measurements were taken

Table 4-4: Summary of noise study findings at various points within and around the sampled project sites

Area Sampled	Minimum (dBA)	Maximum (dBA)	Average (dBA)	Source of baseline noise conditions	Coordinates	National Standards (dBA)	Comments	Overall rating
Iganga town near the proposed intake at NWSC main office	45.7	67.2	56.1	Commercial activities from shops, traffic from vehicles and motorcycles.	E:553449 N:68545 H:1160	60	Normal	Low
Bubo trading centre near a foot ball pitch	Lo	49.7		Natural processes (birds and wind) and sporadic traffic from the road	E:552994 N:74830 H:1152	60	Normal	Low
Namungalwe Trading Centre	50.7	59.2	54.9	Music and interactions from retail shops, commercial activities and traffic from the main road	E:55466 N:79056 H:1120	60	Normal	Low
At the wetland between Iganga and Kaliro boarder	Lo	48.9		Natural processes (birds and wind) and sporadic traffic from the Iganga Kaliro highway	E:555893 N:95742 H:1060	60	Normal	Low
Kaliro town	44.2	55.3	49.7	Commercial activities from shops, traffic from vehicles and motorcycles.	E:556003 N:98057 H:108	60	Normal	Low
Kaliro town near Kaliro NTC	Lo	42.2		Natural processes (wind and birds) and some sporadic traffic from motorcycles	E:553717 N:97412 H:1085	60	Normal	Low

Source: Field data

Noise levels along the proposed project area fluctuates greatly and this is due to the varied land uses in the project area environment. However, all the noise levels along the sampled project sites are within the permitted normal ranges for Residential + Industry or small-scale production + Commerce as indicated in the Standards for Maximum Permissible Noise Levels for various environments (The National Environment (Noise Standards and Control) Regulations, 2003).

Table 4-5: Standards for Maximum Permissible Noise Levels for various environments

<b>For General Environment</b>		
	<b>Noise Limits dB(A)</b>	
<b>Facility</b>	<b>Day</b>	<b>Night</b>
Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes for higher learning, conference rooms, public library, environment or recreational site.	45	35
Residential building.	50	35
Mixed residential (with some commercial and entertainment).	55	45
Residential + Industry or small-scale production + Commerce.	60	55
Industrial.	70	60
<b>Construction site</b>		
Hospitals, schools, institutions for higher learning, homes for the disabled, etc.	60	50
Buildings other than those prescribed in (i).		
<b>Accelerating vehicles</b>		
<b>Vehicle Category in dB(A)</b>		
	<b>Vehicle Category</b>	<b>Maximum sound level</b>
1	Vehicles intended for carriage of passengers and equipped with not more than nine seats, including the driver's seat	78
2	Vehicles intended for carriage of passengers and equipped with not more than nine seat including the drivers' seat and having maximum permissible mass of more than 3.5 tonnes-	
	With an engine power of more than 150KW	80
	With an engine power of less than 150KW	83

3	Vehicles intended for carriage of passengers and equipped with more than nine seats including driver's seat: Vehicles intended for carriage of goods- With maximum permissible mass not exceeding 2 tonnes.	79
	With maximum permissible mass exceeding 2 tonnes but not exceeding 3.5 tonnes.	80
4	Vehicles intended for the carriage of goods and having a maximum permissible mass exceeding 3.5 tonnes- With an engine power of less than 75KW.	81
	With an engine power of not less than 75KW but less than 150KW.	83
	With an engine power of less than 150KW.	84

Time frame:

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

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

### 4.3 Biological environment

Biological diversity along water pipeline routes for the Iganga-Kaliro Towns Water Supply and Sanitation Project were surveyed for one month between 31<sup>st</sup> August and 30<sup>th</sup> September 2018.

#### 4.3.1 Study area and sampling locations

Thirty sites with as natural landscapes as possible or with the dedicated taxa habitats were surveyed along the Iganga-Kaliro water pipeline route (Fig. 4.4, Tab. 4.6). Most of the landscape lies in flood plains with drained wetlands now under intensive agriculture dominated by rice and sugarcane growing. Several small man-made streams (Trenches dug within wetlands to drain water) crisscross the area. Raised areas with mixed hilly and low-lying plains have built up Rural Growth Centres (RGCS).

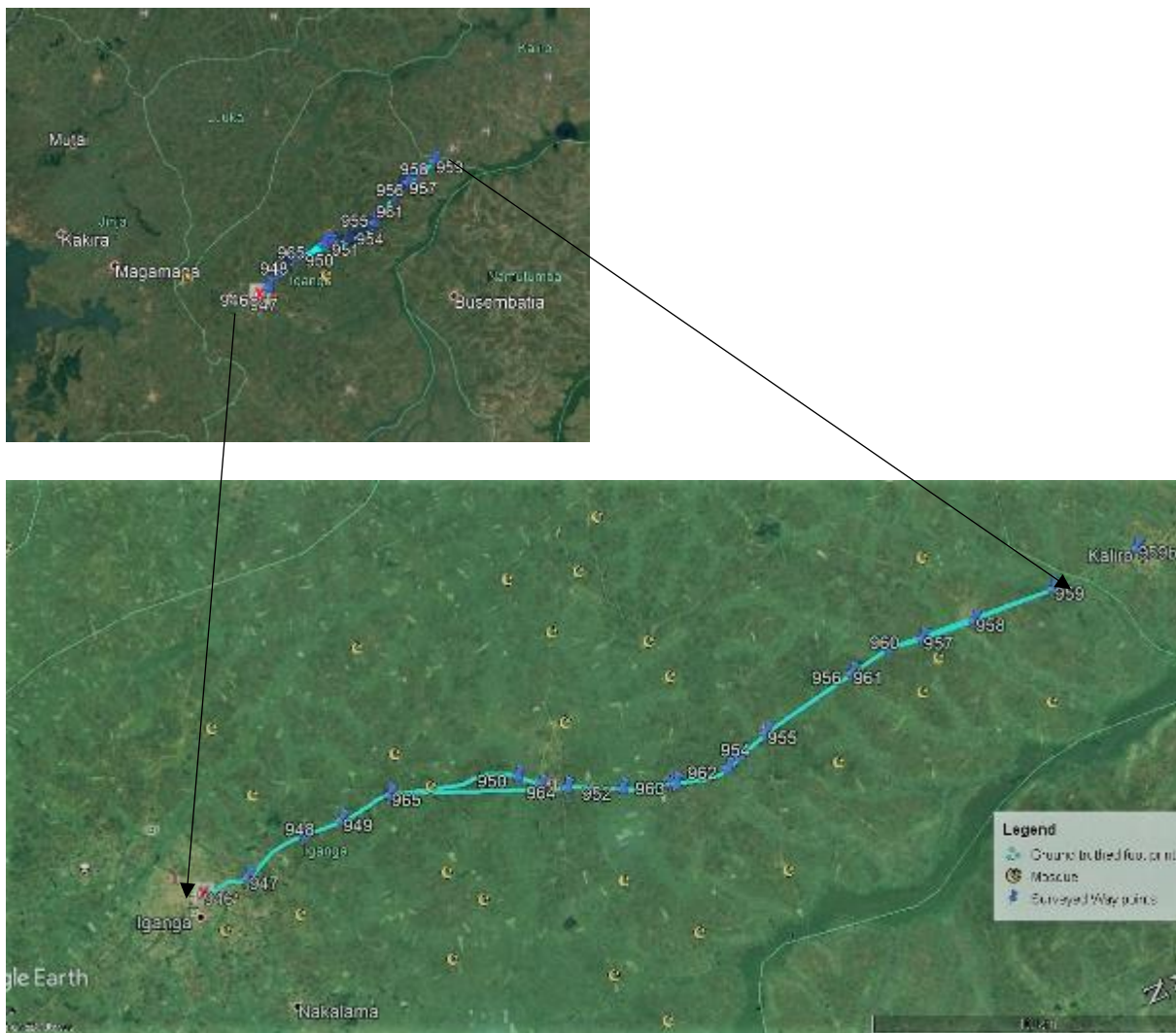


Figure 4-4: Google maps showing survey sites along the Iganga-Kaliro water pipeline route

Table 4-6: Geo-referenced way points for project area's key features along the Iganga-Kaliro water pipeline route

Way Point	Code Name	UTM	Altitude	Key Feature	Description
946	IK01	36 N 553345 68356	1152 m	Water & Sewerage Corporation Offices - Iganga, where the IK pipeline tees off	Built-up area, Urban environment
947	IK02	36 N 553501 69796	1135 m	Kigulu wetland	Wetland between Iganga and Kigulu; Has been modified for Rice and sugar can growing.
948		36 N 553041 71885	1158 m	Bukaye RGC	
949	IK03	36 N 553105 73099	1133 m	Nawagyo-Bukaye seasonal wetland	Seasonal wetland with crops, sugarcane, brick making and small-scale plantation forest
950	IK04	36 N 554140 78494	1100 m	Nabikote RGC going to Namugalwe in Namunkeso Parish	Seasonal wetland with Stream separating the two parishes,
951	IK05	36 N 554693 79022	1116 m	Namungalwe RGC	Nalukandwa wetland, going towards Nasuuti RGC
952	IK06	36 N 555832 81224	1083 m	Nalukandwa	Bwetland under heavy utilisation for rice growing and a bit of maize
953		36 N 556339 82639	1115 m	Nasuuti RGC	
954	IK07	36 N 556443 84904	1091 m	Wetland overlooking Nabaale RGC	Wetland under rice and sugarcane growing
955		36 N 556138 85920	1114 m	Nabaale RGC	
956	IK08	36 N 555590 89067	1105 m	Naibiri RGC (Wpt 424 - Bukenya)	Wetland under rice growing
957-	IK09	36 N 555543 91471	1068 m	Itanda-Kinu Wetland	

958				overlooking Nabitende RGC	
959b	IK10	36 N 555792 98607	1066 m	Kaliro Town	Built-up township

### 4.3.2 Sampling methodologies

#### 4.3.2.1 Sampling methods for flora

Due to intense human activity in the project areas, systematic-random sampling was found a better option with more points selected from areas with natural vegetation cover than in modified ones. At each study point, quadrats were established randomly according to nature and size of the habitat from which vegetation type, plant species, presence of disturbances signs and species of conservation interest including invasive species were made in an area of 100x100m<sup>2</sup>. Within these points records of features of landscape and environment including vegetation assemblages were made at specific points. The vegetative assemblages in the study sites were classified basing on Langdale-Brown *et al.* (1964) system in preference to that of National Biomass of 2003 for several reasons as indicated by Van Breugel *et al.* (2011). The Langdale system recognizes 22 ecosystem types identified by letters between A to Z as opposed to 13 adopted by the National Biomass System (USAID 2014). This greater level of resolution could necessitate assessment of the potential impacts of installation of water reservoir and distribution infrastructure on ecosystems to greater details. The A-Z system is based on plant community composition rather than just plant biomass, which was more relevant in characterizing vegetation, identifying plant species and sensitive habitats. Secondly, although much of Uganda's vegetation has been extensively altered over the past two-three decades, the A-Z system can still be considered to epitomize the potential of an area in supporting an ecosystem type and this was relevant to environmental impacts study (Kalema, *et al.*, 2010; Pomeroy, *et al.*, 2002). Species of plants recorded were assessed as percentage of total sampling point. The records generated from each day of field work were used to provide a detailed characterization of vegetation assemblages, generation of species list, identification of plant species of conservation concern and illustration of existing forms of disturbances. The species of plants recorded were further analyzed into growth forms and threat levels according to IUCN (2018) and the National data base of threatened species by WCS (2016). Presence of any form of legal protection by Uganda's acts and policies on conservation of biodiversity by organs such as NFA, WID and UWA was also quoted.

#### ***Critical Habitats and Vegetation in terms of Landscape features***

To precisely delineate the land cover in the project area, the landscape was put to phytosociological descriptions. Field observation and use of Langdale-brown *et al.* (1964) system made the basis for analysis of landscape cover types.



### ***Compilation of species lists***

Compilation of species list from each study point in a site as well as intermediate encounters enabled generation of a general species list for the entire project area. This species list was confirmed after identification of all the plants encountered during the surveys as well as identification of specimens collected. Identification of specimens was done by Makerere University herbarium. This list was crucial in a way that it facilitated further analyses including conservation status and invasiveness.

### ***Existing forms of disturbances***

Different forms of disturbances at each study point as well as occasional encounters along the water pipeline route were recorded and pictures taken for illustrations.

### ***Species threat levels and invasiveness***

The conservation status for each species was obtained from the published most recent IUCN (2018) red list data and the National red list of Uganda's threatened species (WCS 2016). Invasive species considered here included those that are exotic and pose threats to native species at both individual and ecosystem levels.

#### ***4.3.2.2 Sampling methods for water quality and aquatic species***

The study covered aspects of water quality, macro-invertebrate and plankton diversity. The geographical scope of the study was limited to selected aquatic resources along the proposed Iganga-Kaliro water supply pipeline routes. The aquatic resources included IK02, IK03, IK04, IK05, IK06, IK07, IK08 and IK09 (Refer to the map in figure 4.1 and Table 4.6 above). Investigation points were located along or within 300 metres of the shoulders of the proposed water pipeline route. Water quality and aquatic species were surveyed using various methods. The exercise was for each pipeline route at locations with permanent water. In situ measurements were undertaken at each investigated water body, with a handheld-probe meter (Hannar Combo meter H198128 model). Aquatic species observed were counted and recorded. The appropriate macrohabitats were initially identified (Arend, 1999) for further monitoring of the aquatic species. The coordinates of sampling locations were determined using a GPS unit.

### ***Water quality parameters***

Environmental (water quality) parameters that were determined include: dissolved oxygen concentration (DO), water temperature, pH, conductivity (CND), and water transparency, Nitrogen,

Phosphorous Biochemical demand and chlorophyll-a. Water temperature and dissolved oxygen concentration were determined in situ with an YSI oxygen/temperature meter. Conductivity and pH were measured using an YSI conductivity meter and an OAKTON pH Testr 1, respectively. Nitrogen and Phosphorous and chlorophyll-a were determined as described methods for the examined water. Water transparencies were estimated with a 20-cm Secchi disk. Water depths, substrates, and vegetation communities will also be described in general terms. Algal species in the area were also documented and monitored. Measurement of all the environmental parameters were done concurrently with sampling of macro-invertebrates and fish.

#### **4.3.2.3 *Sampling methods for aquatic macro-invertebrates and plankton***

Benthic macro-invertebrates or 'bottom-living' organisms are a highly diverse group which makes them excellent for assessing changes in biodiversity. In addition, different groups of macro-invertebrates have different tolerances to pollution, making them useful indicators of water quality. Biological monitoring using macro-invertebrates can therefore provide an effective method for determining if an environment has been impacted by pollution from various, cumulative or multiple sources. Phytoplankton are also good indicators of water quality. Blue-green algae are usually associated with eutrophic (rich nutrient) waters. Quantitative and semi-quantitative sampling for aquatic invertebrates was done at specific sites along each water pipeline route, on lakes, rivers, and wetland sites using an Ekman mud grabber (lakes), dip nets, and drift/kick nets (rivers). All sites were referenced as either disturbed or undisturbed, and the bottom types (e.g., stones in riffles, sticks in pools, leaf packs, and fine sediments) were recorded. Samples collected were sorted either before or after preservation in 30% ethanol for further analysis in the laboratory. Live sorting was done either on shore, or in the laboratory, and the different groups of invertebrates identified to the lowest practicable taxon (family or genus level), and enumerated using Merritt and Cummins (1996). Habitat features were also scored to qualitatively evaluate important habitat components. Water samples were collected using a 5 litre plastic container, filtered through a plankton net (45µm) mesh into a 25ml sample bottle and preserved with 70% ethanol for zooplankton analysis in the laboratory. For phytoplankton, the samples were preserved with Lugol's iodine solution for further analysis in the laboratory.

#### **4.3.2.4 *Sampling methods for Fish (Pisces)***

Habitat characteristics at each sampling point, including depth, substrate, water transparency, conductivity, temperature, dissolved oxygen, shoreline vegetation and, in some instances, aquatic macrophytes and activities along the river were recorded. The sampling points were marked using a GARMIN Global Positioning System (GPS). Depth was measured using a portable echo sounder, transparency using secchi disc. Conductivity, temperature, dissolved oxygen, and pH were measured using WTW multi-parameter probe. Fisheries data was collected using the following methods:

- 1 Fish sampling was carried out using monofilament gillnets of stretched mesh sizes 1 to 6 inches in increments of 0.5 inches. In habitats where gillnets could not be used, especially rocky areas, hooks of sizes number 18 and 20 were used.
- 2 Experimental fishing: this was done with the help of the fishermen in the area. It involved using normal fishing methods on the waters. These methods are Gill-net method using fishing nets of different sizes; Beach seine method where fishermen throw net into water using hands and using hooks.
- 3 Observations: The assessment was conducted during the dry season when some fish species can be seen in mud. Observation method was therefore used because of the fact that it was the dry season and no active fishing activities were taking place in the project area. Observations were done especially in the wetland areas along the project area. The data obtained using this method included: water type, fish species if any, nature of the wetland, status of the wetland, determine if the project will have an impact on the wetland and identifying the economic activities being carried out in the wetlands along the project area.
- 4 Interviewing: interviews were used to identify the species and size of the fish caught from the wetland during the wet season. The interviewees included the district fisheries officers, and the people that live along the wetlands in the project area.

#### **4.3.2.5 Sampling methods for herpetiles (amphibians and reptiles)**

Visual Encounter Surveys, opportunistic records and consultations were the key methods used in monitoring herpetofauna. Visual Encounter Surveys (VES) are a time-honoured technique. VES is similar to the Timed Constrained Count (TCC) method described by Heyer et al., (1994). Visual encounter surveys are used to document presence of amphibians and are effective in most habitats and for most species that tend to breed in lentic habitats. They generate encounter rates of species in their habitats in a unit hour. The method involves moving through a habitat, turning logs or stones, inspecting retreats and watching out for surface-active species. The data gathered using this procedure provides information on species richness of the habitat.

Opportunistic records are those made outside the sampling points but occur in the surrounding area to be impacted by the project. It helps complete the checklist of the animals as much as possible. Amphibians and reptiles are mobile and can therefore be encountered outside their preferred habitats both spatially and temporally. Several individual specimens were recorded outside the sampling time along transects. The species encountered this way were used in completing the checklists of transects surveyed but not be used in the analyses.

Local people were also interviewed to establish the reptilian species known to be present in the sites surveyed. This was treated as secondary data. Identification of herpetofauna followed (Schjötz, (1999), Spawls et al., (2002) and Channing & Howell (2006). The AmphibiaWeb (2015) and The Reptile Database (Uetz, P. & Jirí Hošek (eds.) 2015) were also used. The conservation status of the herpetofauna is reported using the IUCN Red Listing (IUCN 2018) and the Ugandan Red List (WCS 2016).

#### **4.3.2.6 *Birds (Aves) survey methods***

Birds were surveyed using Point counts or Timed Species Counts (TSC) method as were deemed necessary. Timed Species Counts are a method of rapid surveys which have been widely used in East Africa (Freeman et al., 2004). During each one-hour count, bird species are listed in the order in which they are seen, or heard. The time is also noted at 10-minute intervals so that scores can be allocated, thus: 6 for species recorded in the first ten minutes, 5 for those recorded in minutes 11-20, and so on to 1 for those only recorded in the final ten minutes. A commoner species will more often be recorded in the first ten minutes than a rare one, which will also be recorded in fewer counts. Where ten or more counts are made at the same site, these scores can be transformed into values that more closely reflect abundance. Identification were based on Stevenson and Fanshawe (2002).

A point count, or circular-plot survey, involves a series of points or stations at which birds are counted. Observers spend a prescribed time (usually 3 to 20 minutes, with longer times occasionally suggested for areas with more complex vegetation structure or where travel times between stations is a serious limitation) at each station, looking and listening for birds. Stations are to be separated by sufficient distance to preclude sighting the same bird at more than one station. Observers may restrict attention to birds within a prescribed distance of the station (fixed-distance circular plots) or record birds regardless of the distance (unlimited-distance circular plots). Although sighting distance might be recorded and used to develop estimates of density, typical point counts do not use information on sighting distance (Reynolds et al. (1980), International Bird Census Committee (IBCC) (1977), Blondel et al. (1981) and (Droege, 1990).

Both land birds and waterbirds were monitored. The exercise was done one day every week of each month for the whole year on islands upstream of the dam. Monitoring bird species will involve both land birds and waterbirds. Birds are classified according to their migratory and conservation status (if threatened, they are said to be Red-Listed (IUCN 2000) and habitat requirement (see, for example, Bolwig et al., 2004, Caswell et al., 2005).

#### **4.3.2.7 *Mammals survey methods***

Mammals were monitored using various methods. The exercise was done in every suitable habitat along proposed water pipeline route. Each mammal observed was geo-referenced, counted and

recorded. The identification of the mammals follows nomenclature by Wilson and Reeder (1993), and Davies & Vanden Berghe (1994). The conservation status of the species is reported using the IUCN Red Listing (IUCN, 2018). For the time allowed, to complete these monitoring studies, the mammalian fauna were surveyed on transect counts along the water pipeline route through signs of occurrence (run ways, feeding signs, etc) or counts of actual individuals sighted along the transects.

For large mammals, line transect sampling is the most efficient way to record their sign (browse, dung, tracks) and make direct observations of individuals. A transect was the sampling unit. . Transects were walked at a constant, average speed. Such ground transects are most frequently used at the site level, and often follow secondary roads or trails of predetermined direction. Notes on the habitats at locations where species are encountered were made to document the characteristics of the preferred habitats or the ranging habitats.

For small mammals, population size is easily determined by using traps to capture rodents and insectivores. Trap lines could be established, along which trap stations are located with two live traps placed at each trap station, with stations spaced more than 15m apart. Traps may be placed on the ground along natural features such as fallen logs, but avoid any site with flooding potential. A limited use of traps were used to record the species of small mammals present on the proposed water transmission line. Small mammals will represent the larger diversity of mammals along the proposed water transmission line as compared to large mammals. Changes in the community composition and relative abundance can be used fairly safely as indices of change induced by habitat changes.

#### **4.3.2.8 *Butterfly sampling***

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

#### **4.3.2.9 *Dragonflies survey methods***

Adult dragonflies were sampled using sweep nets. Some species were more easily caught when they fly about, perched or while basking.

### 4.3.3 Flora

#### 4.3.3.1 *Vegetation types and Crops*

Iganga to Kaliro water pipeline project traverses through an area with greatly modified vegetation. The route traverses through seven urban community centers, fields of cultivation and few sections of natural vegetation.

There are plantations of Pine sp, *Saccharum officinale* (Sugar cane) and rice together with mosaics of gardens. No single swamp had extensive natural vegetation however, within degraded swamps there were small patches of wetland vegetation with varying dominance patterns among species. *Leersia hexandra*, *Panicum setosum*, *Typha capensis* and *Cyperus dives* were among the dominant species in different swamp patches. Pictorial views together with the phytosociological descriptions of the vegetation cover types are provided in the figure (Plates) below.





Plate 4-7: Degraded wetland with; dug up patch, *Leersia-Cynodon-Mimosa* grassland and *Ficus-Lantana* bush land strip at IK01

Plate 4-8: Typha-Leersia patch in the middle of degraded swamp at IK01: This indicates dominant flora of the original swamp



Plate 4-9: Swamp cultivated with *Pinus pinus* and gardens of food crops at IK02

Plate 4-10: Harvested rice fields of a swamp at IK03





Plate 4-11: Manihot esculenta garden contiguous settlements with scattered trees fruit trees at IK07  
 Plate 4-12: Harvested garden currently a *Lantana-Clitoria-Cynodon-Tephrosia* bush land at IK08

Figures 4.8-4.15: Major landscape cover types along Iganga-Kaliro water pipeline project route

Major phytosociological descriptions included; *Lantana-Leersia-Cynodon* degraded seasonally flooded bushed grassland, *Echinochloa-Leersia-Persicaria* degraded swamp dominated by sugar cane, *Cyperus-Mimosa* degraded permanent wetland currently dominated by rice fields and *Lantana-Clitoria-Tephrosia-Tithonia* degraded bush land currently under fallow. According to IUCN, a site may be recognized as sensitive if it contains the following categories i) threatened taxa in accordance with IUCN assessment protocol, ii) rare species, iii) endemic species, presence of iv) fragile watersheds, v) steep slopes, and vi) riparian areas (Lucie *et al.* 2016).

#### 4.3.3.2 Plant species list and richness of sites

From a total of 09 survey points, 222 species of plants belonging to 53 families were recorded (Annex 5). Herbs dominated the sample with 46.9% of species followed by shrubs with 18%. Generally, from the figure it can be deduced that the areas had very few tree species and this is attributed to: i) Cultivation both mixed subsistence and plantation as evident from the many gardens with different crops. The swamps along the road were cultivated with sugarcane and rice plantations and a few with pine; and ii) Seven urban settlements were counted along the road and the entire section of this project area was in already modified landscape.

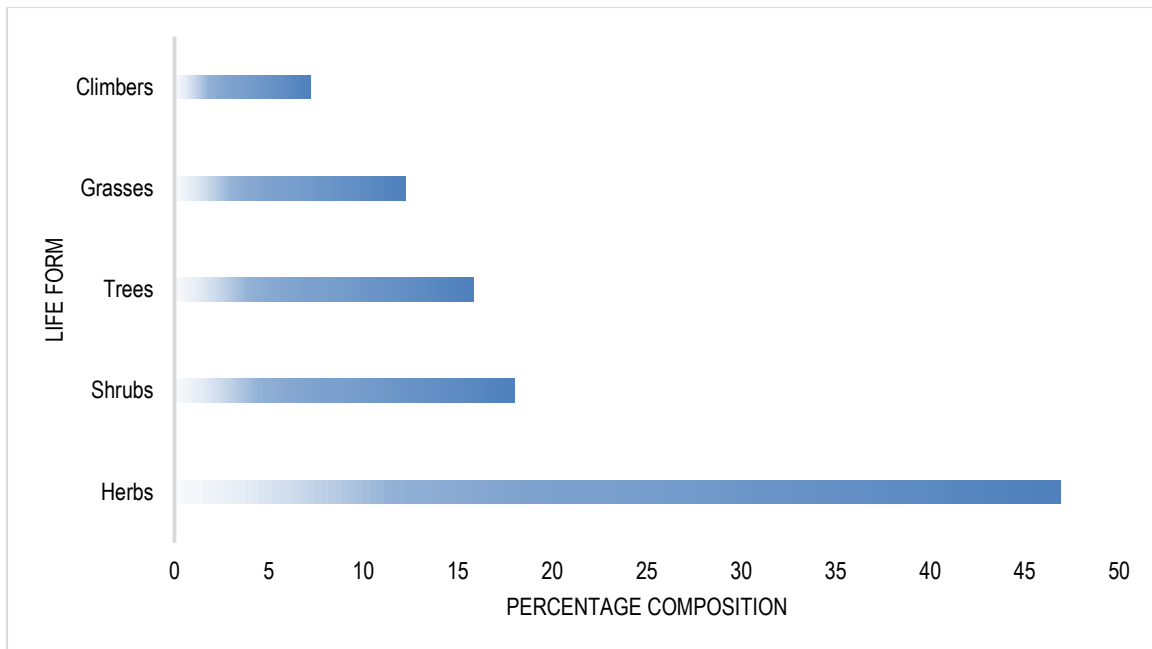


Chart 4.2: Percentage cover of plant species by life form in the project area for Iganga-Kaliro water pipeline project

#### 4.3.3.3 *Invasive (noxious) plant species*

A total of seven invasive species of plants were encountered along the project area. *Chromolaena odorata*, *Brussonetia papyrifera*, *Lantana camara*, *Mimosa pigra*, *Ricinus communis*, *Senna siamea* and *Senna spectabilis* were frequently encountered and some of these are shown in plate 4.9-4.12. Invasive species flourish due to disturbances that alter the environment to their favorable levels (Klinger & Brooks 2009). Due to their great dispersal characteristics, high tolerance to unsuitable conditions, large reproductive capacities and high growth rates invasive species easily overtake the natives.



Plate 4-13: Thicket of *Lantana camara* at IK01

Plate 4-14: Fallow patch dominated by *Imperata cylindrica* at IK02



Plate 4-15: *Senna spectabilis* in a fallow at IK01

Plate 4-16: Roadside strip of *Tithonia diversifolia* at IK04

Plate 4.16-4.19: Invasive plant species encountered along Iganga-Kaliro water pipeline project

#### **4.3.3.4 Existing forms of disturbances on vegetation**

Major disturbance to natural vegetation in the project area were mainly settlement infrastructures, plantation and subsistence agriculture, grazing and invasive species. As mentioned in sub section 4.2 many of the sites were in settlements and fields of cultivation while others existed as fallows. Pictorial illustration of some of the disturbances to the vegetation in the study areas are provided in Plate 4.20 – 40.21.





Plate 4-17: Cattle grazing in bushed grassland patch  
 Plate 4-18: Young rice garden at IK05  
 of a degraded swamp at IK01

Plates 4.20-4.21: Some of the forms of disturbance to vegetation along Iganga-Kaliro pipeline route

#### **4.3.3.5 Plant threat levels and species of conservation concern**

Majority of the plant species recorded from Iganga-Kaliro water project area were not on the list of those that have already been evaluated by IUCN. The few that were already evaluated by IUCN are of least concern (LC) however, a grove of *Khaya anthotheca* evaluated as Vulnerable (VU) was observed in the project area but not in proposed right of the way of project activities. Additional, *Khaya anthotheca* and two other tree species *Milicia excelsa* and *Tamarindus indica* that are on the national list of threatened species by WCS were recorded but were not in the proposed project footprint. *Khaya anthotheca* and *Milicia excelsa* were both assessed as Endangered (En) while *Tamarindus indica* as Vulnerable. Gps coordinates of locations and the pictorial illustrations for these species of conservation concern are provided (Plate 4.22-4.23). The area also, has invasive species (*Chromolaena odorata*, *Brussonetia papyrifera*, *lantana camara*, *mimosa pigra*, *Ricinus communis*, *senna siamea* and *senna spectabilis*) and these have the potential to cover large sections of the project area if not well managed.



Plate 4-19: Mature *Milicia excelsa* in *Musa* sp garden at IK02



Plate 4-20: Young *Tamarindus indica* tree in a fallow at IK07

Plate 4.22-4.23: Plant species of conservation concern encountered along the project route the locations of these species at IK02 and IK07 are presented in table 4.6.

#### **4.3.3.6 Wetlands (water type, nature of the wetland and status of the wetland)**

The wetlands along the project area all had the same characteristics. All of them were seasonal in nature and characterized by small man-made channels not exceeding 3 meters width with muddy waters. They mainly consisted of scanty wetland vegetation. Most of the wetlands in the project area have been encroached for human activities. These mainly include subsistence farming (rice, sugarcane and maize growing) and cattle herding. All the wetlands traversed by the proposed water transmission project have been modified by farming activities and are not expected to be significantly altered by the water transmission system. It is assumed that the water pipes are expected to be suspended while traversing wetlands and thus, no significant biological effects are expected.

#### **4.3.4 Water quality & aquatic ecology**

##### **4.3.4.1 Water quality**

A water sample was picked from one of the bore holes in the project area at Namungalwe (E: 555770, N: 79295). One sample from this borehole was taken since the water tables in the area communicate. The sampling point was chosen because it is located in the most populous trading centre to assess the quality of the current source of water. Given that the source is already known i.e. NWSC treated water, there was no need for comprehensive water quality mapping of ground water. The sampled water was analyzed at National Water and Sewerage Corporation (NWSC) to determine the key physio-chemical and bacteriological characteristics of the source. Specifically, the sample was analysed for BOD, Total Coliforms, COD, Calcium, Chloride, pH, sulphate, Total Phosphorous and turbidity. The results were compared with National Standards for portable water (Table 4.7). Detailed

results of the laboratory tests for the sample and parameters tested is presented in Annex 3 against permissible standards.

Table 4-7: Water quality results against Maximum permissible standards for selected parameters for potable water

Parameter	Units	National Standards for Portable water (Maximum permissible)	Water quality results	Comment
PH	-	5.5-8.5	6.25	Within permissible levels
Calcium: as Ca <sup>2+</sup>	mg/L	150	6.4	Within permissible levels
Chloride	mg/L	250	76	Within permissible levels
Biochemical Oxygen Demand (BOD) - 5 days at 20°C	mg/L	Not specified	1.05	Within permissible levels
Chemical Oxygen Demand (COD)	mg/L	Not specified	3	Within permissible levels
Nitrate - N	mg/L	45	0.02	Within permissible levels
Sulphate: SO <sub>4</sub> <sup>2-</sup>	mg/L	400	5	Within permissible levels
Total Phosphorous	mg/L	2.2	0.04	Within permissible levels
Turbidity	NTU	25	0.25	Within permissible

Parameter	Units	National Standards for Portable water (Maximum permissible)	Water quality results	Comment
				levels
Faecal coliforms	No./100mL	0	4.02	Above permissible levels

*Note: One sample was analyzed and their properties were compared against the national standards*

Table 4-8: Water quality assessment for the source along the project route

Name of sample	Coordinates at which sample was taken	Hydrological and or key particulars of the water source	Water quality results
Karwenyi Bore hole in Namungalwe	E: 555770 N: 79295	Source is a community bore hole that was established to meet water needs for community in Namungalwe trading centre. This was chosen as a representative sample because among the Trading centres where the project is traversing is the most populated one and also literature indicated that the water tables communicates with that of Kaliro town,	The sample showed complying physical-chemical characteristics of the source for natural portable water except for bacteriological characteristics which did not. For details of the water quality results, refer to Annex 3.



#### 4.3.4.2 Macro-invertebrates

The macroinvertebrates recorded within the project area of the Iganga-Kaliro route belonged to four major groups; hemiptera, coleopteran, Mollusca and annelidae (4.9). Hemiptera were the most diverse (four families), followed by Mollusca (two families) and coleoptera and annelidae (one family) each. In terms distribution, hemipterans in particular the Gerridae family was the most widely spread occurring at five of seven stations, while the coleopterans were the rarest group with only one family recorded at one of seven stations.

Table 4-9: Macroinvertebrates distribution in water resources along Iganga – Kaliro Route

Taxon	IK02	IK03	IK04	IK06	IK07	IK08	IK09
<b>No of organisms per sample</b>							
<b>Hemiptera</b>							
Corixidae	15	-	-	-	-	-	-
Gerridae	10	-	16	-	-	7	18
Nepidae	-	-	-	4	-	-	-
<b>Coleoptera</b>							
Hydrophilidae	-	2	-	-	-	-	-
<b>Mollusca</b>							
Pilidae	18	-	-	13	-	3	-
Bivalvia	-	-	10	-	-	-	-
<b>Annelidae</b>							
Tubificidae	-	6	-	-	7	-	-

#### 4.3.4.3 Phytoplankton

The phytoplankton community of the water resources studied along the proposed Iganga-Kaliro water supply route was composed of four major groups; blue-green and green algae, flagellates and diatoms (Table 4.10). Overall, green algae were the most diverse with four genera followed by blue-green algae (three), followed by flagellates (two) and the least diatoms with one genus. In terms of numbers, blue green algae were the most abundant, followed by green algae, followed by flagellates while diatom had the lowest numbers.

Table 4-10: Phytoplankton distribution in water resources along Iganga – Kaliro Route

Taxon	IK02	IK03	IK04	IK06	IK07	IK08	IK09
<b>No of cells per litre</b>							
<b>Blue - Greens</b>							
<i>Calothrix sp</i>	24	72	65	112	55	34	20
<i>Anabeana sp</i>	19	34	47	86	32	-	37
<i>Microcystis sp</i>	88	114	120	100	84	66	-
<b>Greens</b>							
<i>Desmidium sp</i>	42	-	-	69	57	88	101
<i>Spirogyra sp</i>	18	43	58	72	60	56	34
<i>Zygnema sp</i>	12	25	-	46	-	-	-
<i>Hildenbrandia sp</i>	-	-	32	50	68	-	-
<b>Flagellates</b>							
<i>Phacus sp</i>	10	02	02	-	-	-	-
<i>Uroglena sp</i>	-	-	-	18	06	-	-
Diatoms	-	-	-	05	02	-	-

#### Zooplankton

The zooplankton community of the water resources studied along the proposed Iganga – Kaliro water supply route was composed of two major groups; rotifers and crustaceans. Overall, rotifers were more

diverse (six genera) compared to crustaceans (two). Rotifers were also more abundant and widely spread compared to crustaceans (Table 4.11).

Table 4-11: Zooplankton distribution in water resources along Iganga – Kaliro Route

Taxon	IK02	IK03	IK04	IK06	IK07	IK08	IK09
<b>No of organisms per litre</b>							
<b>Rotifers</b>							
<i>Keratella sp</i>	52	68	-	-	18	46	-
<i>Brachlonus sp</i>	-	-	24	72	87	20	-
<i>Euclanis sp</i>	-	30	57	-	40	-	56
<i>Lecane sp</i>	46	-	-	32	-	41	48
<i>Proales sp</i>	38	53	66	-	-	83	62
<i>Ascomopha sp</i>	44	-	-	58	34	59	78
<b>Crustaceans</b>							
<i>Bosmina sp</i>	10	02	17	-	06	09	-
<i>Cyclops sp</i>	25	12	38	-	-	14	30

### **Fish**

Only two species were recorded in the surveyed sites along the pipeline. Fishing is mainly subsistence, taking place in the month of July when the rainy season is at its peak. The fish diversity of the project area is therefore very poor as the wetlands have been modified for mainly rice farming (Degraded). Fishing during the wet season is mainly done using local techniques like locally made hooks, baskets and hands. The main fish species reported were mainly the mud burrowing species that survive in modified wetlands. These included mainly *Clarias gariepinus*, *Clarias carsonii*, and *Protopterus aethiopicus* with average sizes of 100g. Table 4.12 below represents the fish species that were reported mainly from interviews are listed in the table below.

Table 4-12 : Table showing the fish species recorded in sites along Iganga-Kaliro pipeline route

Study site	Coordinates	Species	Conservation status (IUCN-red list)
Kigulu –IK01	N0037.887	<i>Clarias gariepinus</i>	Least Concern

	E3328.849		
		<i>Clarias carsonii</i>	Least Concern
		<i>Protopterus aethiopicus</i>	Least Concern
Bukaye - IK03	N0039.680 E03328.638	<i>Clarias gariepinus</i>	Least Concern
		<i>Clarias carsonii</i>	Least Concern
		<i>Protopterus aethiopicus</i>	Least Concern
Namungalwe IK04	N0042.608 E03329.194	<i>Clarias gariepinus</i>	Least Concern
		<i>Clarias carsonii</i>	Least Concern
		<i>Protopterus aethiopicus</i>	Least Concern
Nalukandwa IK06	N0044.090 03330.107	<i>Clarias gariepinus</i>	Least Concern
		<i>Clarias carsonii</i>	Least Concern
		<i>Protopterus aethiopicus</i>	Least Concern
Nasuuti – IK07	N05564.454 E0084.847	<i>Clarias gariepinus</i>	Least Concern
		<i>Clarias carsonii</i>	Least Concern
		<i>Protopterus aethiopicus</i>	Least Concern
Handa kino IK08	N0049.690 03329.957	<i>Clarias gariepinus</i>	Least Concern
		<i>Clarias carsonii</i>	Least Concern
		<i>Protopterus aethiopicus</i>	Least Concern
Nabitende – IK08	N0051977 E03330119	<i>Clarias gariepinus</i>	Least Concern

		<i>Clarias carsonii</i>	Least Concern
		<i>Protopterus aethiopicus</i>	Least Concern

Based on the baseline information collected, the fisheries in the project area is not commercial but subsistence and only done during the rainy seasons when the wetlands and streams are flooded with water. Also, none of the fish species in the project area is of conservation value.

The project is anticipated to cause no negative environmental impact on the aquatic biodiversity along the project area

### 4.3.5 Herptiles

#### *Importance and conservation of herpetofauna*

Up to 90 amphibian species have been documented for Uganda (Channing, 2006), Goodman, 1996, WCS, 2016, Amphibiaweb, 2018), while up to 190 reptilian species have been recorded (WCS, 2016, Spawl et al, 2002, Reptile Database of the World, 2018). Amphibians are entirely dependent on the existence of the right habitat. As such the biggest threat to amphibians is habitat destruction and alteration. Some amphibian fauna such as *Bufo vitattus* are known to be common inhabitants of the littoral and ecotone zones of lacustrine ecosystems and can even indicate how far inland the flood zones of a lake extends (Behangana, 2004). Reptiles on the other hand are also top carnivores in their environment for the food chain. The presence or absence of reptiles in an ecosystem can have considerable inferences on the habitat health and integrity of a certain area. Any activities in an area such as water pipeline construction will have impacts on the amphibians and reptiles.

Ecologically, amphibians and reptiles (herpetofauna) are important; they are mostly predators, acting as primary and secondary carnivores. Their prey consists mostly of insects, some of which are pests to crops or disease vectors. They are also inter-linked in food chains, often acting as food for other vertebrates, such as pigs, birds, snakes and sometimes man. Because of their ectothermic physiology, the life history and ecology of amphibians often differ markedly from that of birds or mammals. Herpetofauna are known to be easily recognizable taxa in given habitats; and populations are sometimes specialized within a narrow habitat. This makes it easy and practical to monitor changes in composition over time, given different conditions (Heyer et al., 1994). Impacts on their habitat are reflected in changes in numbers and species diversity in a short time. These are some of the factors that have made amphibians to be recognized, nowadays, as good indicators of habitat change.

Amphibians are excellent, although largely overlooked, indicators in assessing biodiversity of an area because:

- Most species are strictly habitat-dependent;
- Their taxonomy is reasonably clear

- It is easy and quick to obtain reasonably complete fauna lists by direct observation and listening to the voices at the right season
- The number of species is large enough to give meaningful figures for comparisons, and not so large that one is bogged down with identification problems
- The aquatic tadpoles of some species may serve as indicators of water quality.

Reptiles are important in nature. Most of the factors as for amphibians above apply making them excellent indicators in assessing biodiversity of an area. There is no amphibian species currently protected by national law in Uganda. The conservation of amphibians is claimed to be indirectly assured by other policies and legislations that target ecosystems, habitats and some species (Behangana and Luca, 2011). The same case applies to the reptilian species, only that the Nile crocodile (*Crocodylus niloticus* Laurenti, 1768) has some degree of protection from commercial harvesting in the range states (Ross, 1998). Subject to annual quota criterion, it is for example considered under CITES Appendix II (Ross, 1998). According to the Crocodile Specialist Group (2018) IUCN Red List, its conservation status is considered as Lower Risk, least concern (LR) although it can be threatened because of interactions with human beings in its range such along rivers and lake shorelines.

#### ***Amphibian diversity, distribution and status***

A total of nine amphibian species, belonging to one order Anura, five families and five genera were recorded during the study. The most species rich sites were IK08 with eight species, followed by IK03 (07spp), then IK04 and IK07 (6 spp each), while IK05 and IK09 had five species each. IK06 and IK02 had the least diversity (2 and 3 species respectively). Species abundance generally followed diversity except in site IK09 where amphibian abundance came second highest (18 individuals) despite having only five species, because of high numbers of *Hoplobatrachus occipitalis*, *Phrynobatrachus natalensis* and *Ptychadena nilotica*. The commonest species were *Phrynobatrachus natalensis* and *Ptychadena nilotica* recorded in all the eight sites, followed by *Hyperolius kivuensis*, *Hyperolius v.viridiflavus*, *Sclerophrys regularis* and *S.steindachner* (5 sites each). The least common species were *Ptychadena oxyrhynchus* (1 site) and *Hoplobatrachus occipitalis* (2sites). All the amphibian species recorded according to the red listing (IUCN, 2018; WCS, 2016) are of Least Concern (LC) both globally and nationally.

Table 4-13: Amphibian species of sites along Iganga-Kaliro pipeline route and their status

<b>Order</b>	<b>Family</b>	<b>Species</b>	<b>Common name</b>	<b>IUCN Global</b>	<b>IUCN Country</b>

Anura	Dicroglossidae	<i>Hoplobatrachus occipitalis</i>	African Groove-crowned Frog	Least Concern	Least Concern
Anura	Hyperoliidae	<i>Hyperolius kivuensis</i>	Kivu Reed Frog	Least Concern	Least Concern
Anura	Hyperoliidae	<i>Hyperolius v. viridiflavus</i>	Common Reed Frog	Least Concern	Least Concern
Anura	Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	Natal Dwarf Puddle Frog	Least Concern	Least Concern
Anura	Ptychadenidea	<i>Ptychadena anchietae</i>	Anchietae's Rigid Frog	Least Concern	Least Concern
Anura	Ptychadenidae	<i>Ptychadena nilotica</i>	Nile Grassland Frog	Least Concern	Least Concern
Anura	Ptychadenidae	<i>Ptychadena oxyrhynchus</i>	Sharp-nosed Frog	Least Concern	Least Concern
Anura	Bufo	<i>Sclerophrys regularis</i>	African Common Toad	Least Concern	Least Concern
Anura	Bufo	<i>Sclerophrys steindachneri</i>	Steindachner's Toad	Least Concern	Least Concern



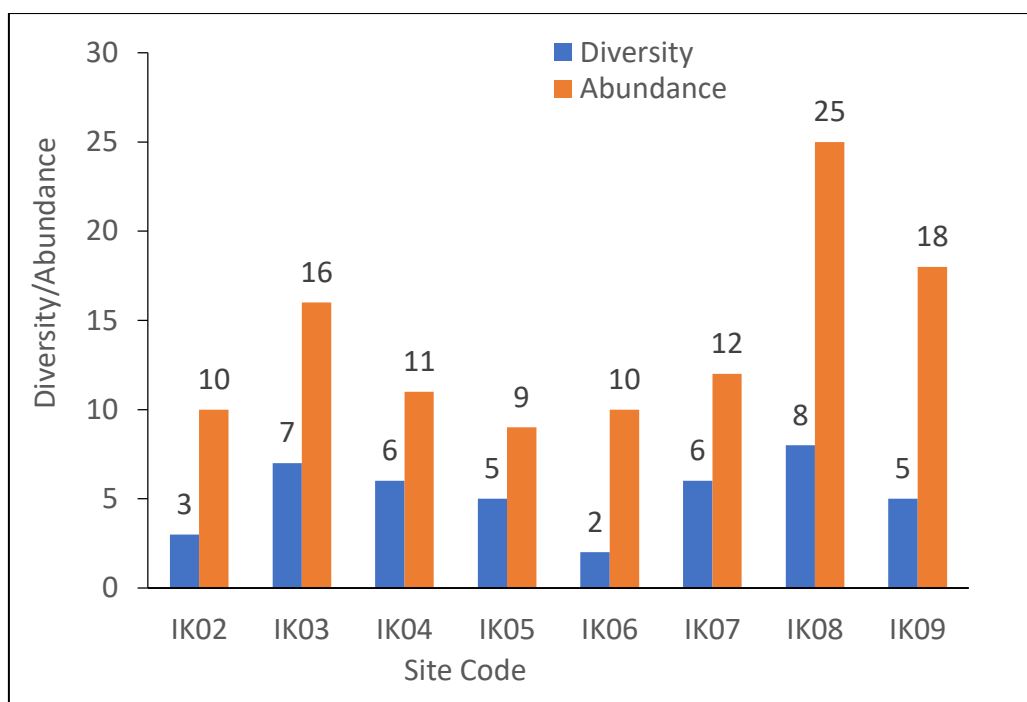


Chart 4.2: Amphibian diversity and abundance of sites along Iganga-Kaliro pipeline route

#### ***Reptilian diversity, distribution and status***

Only four reptilian species, belonging to two orders –Serpentes and Squamata, three families and three genera were recorded during the study in only three sites. Site coded IK02 was the most species rich with four species, followed by IK04 (03spp), while IK08 (1 species) had the least diversity. Species abundance generally followed diversity. IK02 had both the highest richness and abundance because it was the only site of the three where reptiles were recorded, with the most multiplicity of micro and macro habitats (some natural vegetation) for the taxa. Elsewhere, most of the other sites were seasonal wetlands under heavy agricultural activities, especially for rice and sugar cane farming. The reptilian species compassion the Iganga Kaliro pipeline route can be described as very poor. The commonest species was *Agama agama mwanzae* – the Mwanza Flat-headed Rock Agama, recorded in all the three sites, then the skinks - *Trachylepis maculilabris* and *Trachylepis striata* each recorded in two sites, while the Forest Cobra (*Naja melanoleuca*) was reported in only one site. The abundance of species across the sites also generally followed how common a species was. All the reptilian species recorded are of Least Concern (LC) nationally according to the red listing (WCS, 2016) but globally Not Evaluated (IUCN, 2018) except the *Agama agama mwanzae* which is both nationally and globally considered as of Least Concern.

Table 4-14: Reptilian species of sites along Iganga-Kaliro pipeline route and their status

Order	Family	Species/Site	Common name	IUCN Global	IUCN Country

Squamata	Agamidae	<i>Agama agama mwanzae</i>	Mwanza Flat-headed Rock Agama	Least Concern	Least Concern
Squamata	Scincidae	<i>Trachylepis maculilabris</i>	Speckle-lipped Skink	Not Evaluated	Least Concern
Squamata	Scincidae	<i>Trachylepis striata</i>	Common-striped Skink	Not Evaluated	Least Concern
Serpentes	Elapidae	<i>Naja melanoleuca</i>	Forest Cobra	Not Evaluated	Least Concern

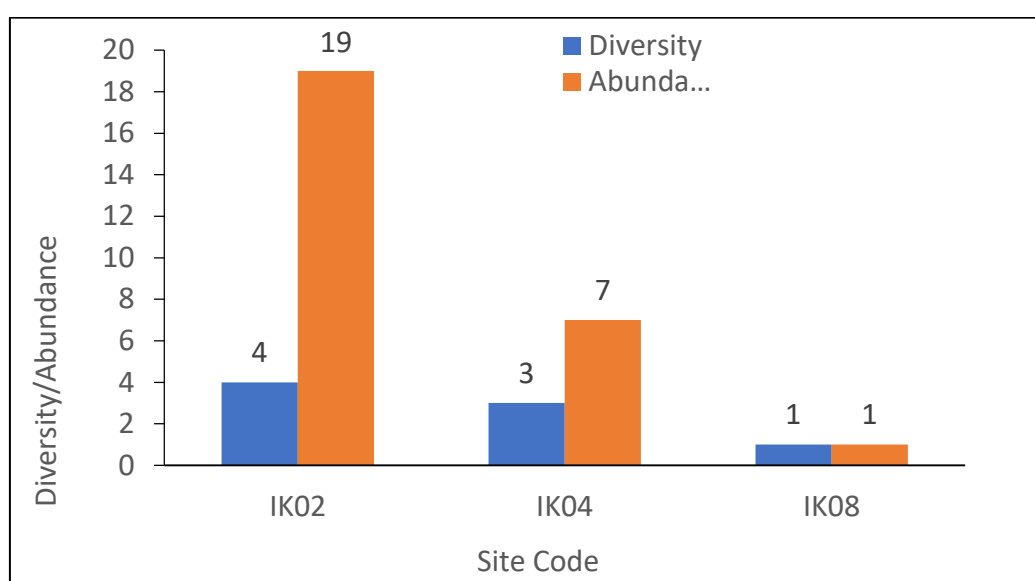


Chart 4.3: Reptilina diversity and abundance of sites along Iganga-Kaliro pipeline route

#### 4.3.6 Birds

Uganda has 1007 bird species, of which 7 are Endangered, 11 Vulnerable and 26 Near-threatened. 190 species are listed in the East Africa Regional Red List (Bennun and Njoroge 1996). The categories of birds according to their habitat include forest specialists (FF), forest generalists or forest edge species (F), forest visitors (f), species restricted to wetlands/open waters (W), water bird non-specialist, often found near water (w) and grassland species (G) (Caswell, *et al.*, 2005, Bennun and Njoroge 1996). Uganda has 134 are Palaearctic migrants (species that breed in Europe and Asia during summer and migrate to Africa during winter season). It is also a range state for 56 species that are Afro-tropical migrants (birds that migrate within the African continent) (Caswell, *et al.*, 2005).

Given the significance of birds for conservation planning and environmental assessments, there is a need for a better ecological understanding of the role of avian community structure in conservation decision-making. Thus, they are widely used in conservation and population trends in farmland are

one of the 15 'Quality of Life' indicators. In addition, small land birds in particular have often been proposed as potential indicators for the presence of other unrelated taxa or as environmental change indicators to be integrated into broader monitoring schemes. Furthermore, they are frequently included in evaluation studies for overall biodiversity conservation (Gregory *et al.*, 2004; Kati and Sekercioğlu 2006).

### ***Birds as biodiversity indicators***

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

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

### ***Habitat classification***

Birds recorded were classified into categories, where possible, basing on the standard habitat classification by Bennun and Njoroge (1996) and Carswell *et al.*, (2005). This classification is widely used in evaluation of avifauna in Uganda. The categories are;

- FF - Forest specialists (species of typical forests interior)
- F - Forest generalists (species less specialized also occur in small patches of forests)
- G – Grassland species
- f - Forest visitors
- W - Water bird specialists (normally restricted to wetlands or open waters)
- w - Water bird non specialists (often found near water)
- Ae – Aerial feeders

A species can fit into two ecological categories; for instance, it can be both a water non specialist at the same time forest visitor. In this categorization, it is important to note that species of the open areas are not categorized to finer details of vegetation descriptions and are based on generalizations of natural habitat types. Bush land, thickets and human modified habitats such as gardens and built areas are not directly included. Because they are not tied to any restrictions, species in the non-specialist categories i.e. G, f, F and w can inhabit a wide range of open habitats in the landscape including bush land, thicket, woodland, and cultivated areas. The 'FF', 'F' and 'f' species also comprise the tree species and stress the importance of trees in areas where they are recorded.

### ***Birds' species in the project area***

Overall 246 individuals of birds were recorded along the Iganga-Kaliro water pipeline route, representing 46 species (Appendix 10); Bird diversity was overall high in all sites, site Bukaye recorded the highest bird diversity followed by Kofi A and Nabikoote-Namungalwe. Species abundance was generally low amongst most species, *Lonchuracuculata* was the most abundant species (19) followed by *Hirundoangolensis* and *Passer griseus* with 15, and 12 individuals respectively. Relative species abundance also conformed to the abundance hollow curve implying a few species are common (abundant) while many are considered rare.

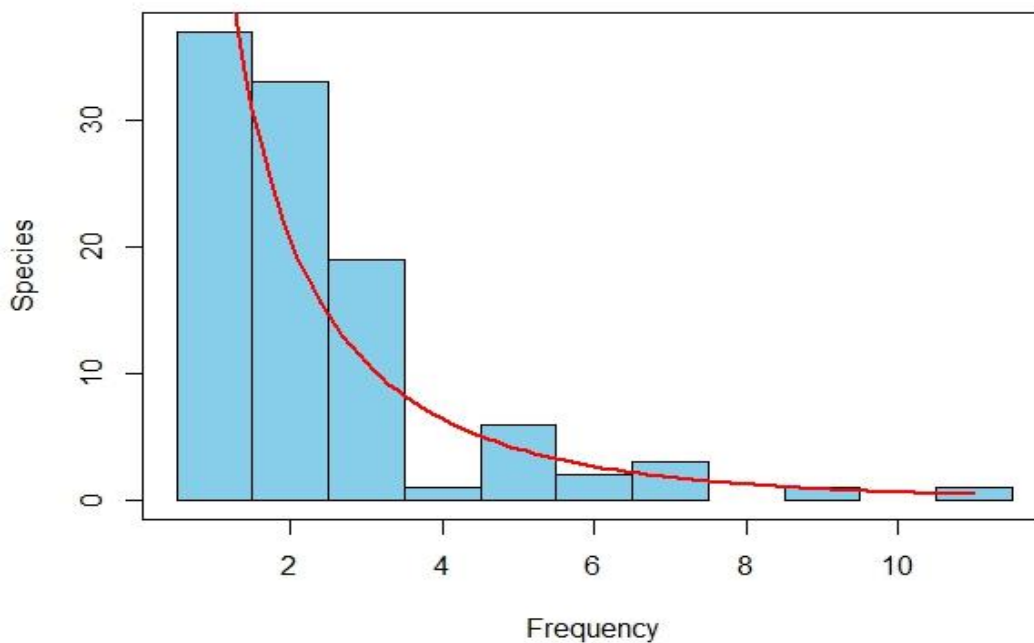


Chart 4.4: Universal hollow curve for the relative species abundance of the bird community along the proposed Iganga-Kaliro water pipeline route.

A comparison of species accumulation in relation to sample size using rarefaction curves shows that non of the curves for the surveyed locations attained the asymptote, only Bukaye site is starting to attain the symptote while curves from other sampling sites are yet to attain the asymptote. For the sites that did not attain the symptote it means that further surveys might yield more species. The smoothed averages of the individual curves (Figure 4.5) represent the statistical expectation of species accumulation curve per sampling site.

### ***Ecological status of birds recorded along the project area***

The entire habitat is comprised of fallows, degraded saturated grasslands, degraded marshes, settlements and gardens. Grassland specialists were dominant representing 17 individuals of all recorded birds followed by wetland visitors 12 individuals (Table 4.15). Marshy habitats including permanent riverine wetlands provide suitable habitat for water specialists such as the African Open-bill stork (*Anastomus lamelligerus*) and Grey-crowned Crane (*Balearicaregularum*). One migrant was recorded Black Kite *Milvus migrans* (Table 4.15 which doubles as Palearctic as well Afrotropical migrant. It should however be noted that Uganda has resident population Black kites. Much as the timing is not right for migrants Stevenson and Fanshawe (2002) noted that the links between East-African birds and weather patterns are unpredictable and as such presence of migrants is also almost always unpredictable.

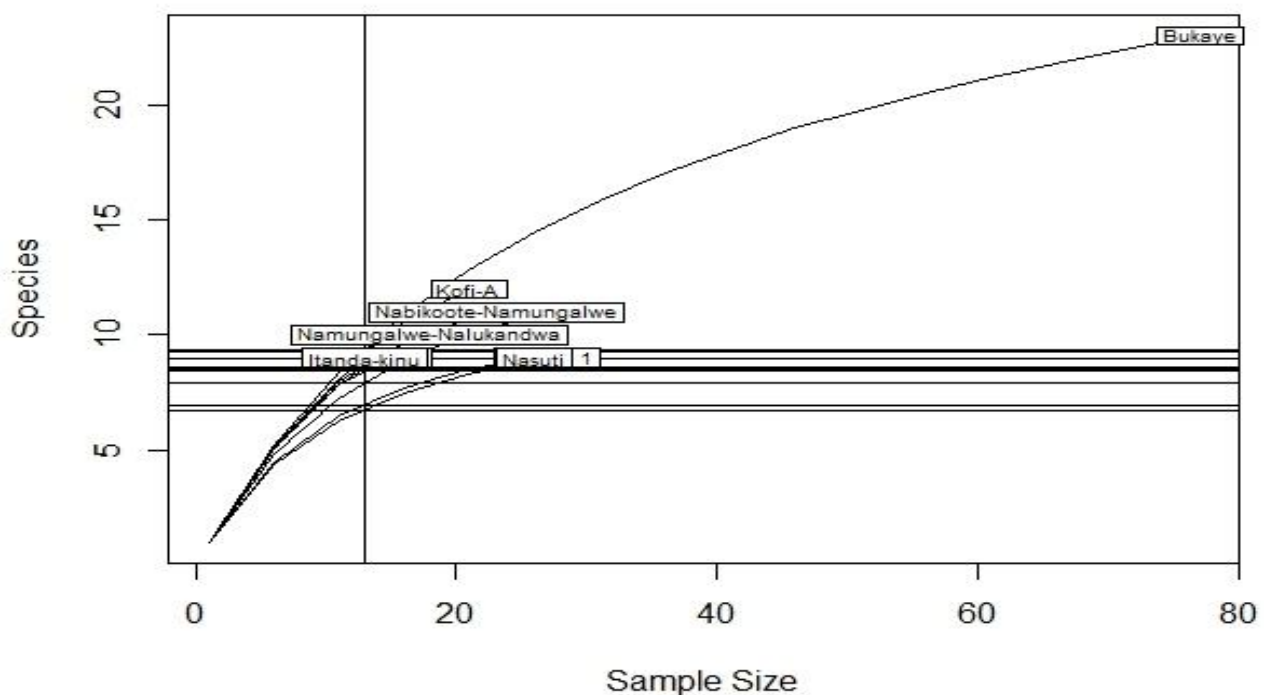


Chart 4.5: Rarefaction curves comparing birds sample size and species accumulation for the different sampling sites along Iganga-Kaliro water pipeline route.

### ***Species of conservation concern***

According to IUCN (2018), most species recorded are mostly considered as Least Concern basing on their wide distribution, stable populations and not facing any alarming threats. One Globally threatened species was recorded ie Grey crowned crane (*Balearicaregularum*) which is globally endangered, two species of regional importance were also recorded i.e. the Grey-Crowned crane Regionally Near threatened (R-NT) and the Red-chested sunbird with a regionally restricted range (R-RR). The Grey crowned crane is also the national bird of Uganda. It's highly specialised in its habitat

requirements preferring swampy areas. This makes it susceptible to threats such as drainage, burning and the over-exploitation of wetlands.

Table 4-15: Number of species in various categories of ecological classification along Iganga-Kaliro water supply pipeline route

Target species			No. Spp	
Ecological feature	Forest specialist		FF	0
	Forest generalist		F	0
	Forest visitors		f	7
	Wetland specialists		W	3
	Wetland visitor		w	12
	Grassland specialists		G	17
	Woodland		Af	8
	Generalists		Gen	8
	Aerial feeder		Ae	2
Migrants	Palearctic		P	1
	Afrotropical		A	1
Red-list Species	Globally	Critically	G-CR	
		Endangered	G-EN	1
		Near- threatened	G-NT	
		Vulnerable	G-VU	
	Regionally	Endangered	R-EN	
		Vulnerable	R-Vu	
		Near- threatened	R-NT	1
		Regional responsibility	RR	
		Regional restricted range	R-RR	1

	Uganda	Endangered	U-EN	1
		Vulnerable	U-VU	
		Near- threatened	U-NT	
Non-Red-list Species		Least- Concern	LC	44

#### 4.3.7 Mammals

Mammals exploit a broad range of niches and this is why they play crucial ecological roles that influence community structure and ecosystem functioning (Ripple *et. al.*, 2014). The presence and distribution of flora and fauna within an ecosystem be it aquatic or otherwise is a component of various factors; anthropogenic activities, altitudinal, flood regimes, habitat suitability, the amount of dissolved oxygen, nutrients and suspended solids. The distribution and occurrence of mammalian species in the study area is mainly as a result of anthropogenic activities. It was observed that areas with high levels of human disturbance recorded few species compared to those with limited disturbance.

##### *Small mammals*

These include rodents, shrews and bats and are a very significant component of any terrestrial ecosystem. Impacts on the dynamics of their populations, species composition and preferred habitats may have gross and irreversible impacts on the ecosystem for the larger species of mammals.

##### *Large and medium sized mammals*

Medium- sized and large mammals are conspicuous and mainly have a diurnal habit. Medium and large sized mammals are considered good bio indicators and have therefore been used in large-scale monitoring programs worldwide (Luzar *et. al.*, 2011 and Nobre *et. al.*, 2013). Data obtained from these rapid surveys will provide information on the current quality of the study areas and the mammal populations. Because anthropogenic disturbances are likely to affect occurrence and abundance of mammal species, these surveys will contribute to the understanding of human impacts on mammal assemblages and help identify local patterns of change. The results are intended to inform the development of new projects focused on protection and management of threatened species.

##### *Mammals in the project area*

A total of 12 mammalian species belonging to nine families were recorded along the Iganga- Kaliro water pipeline route. Mammal diversity was overall low along the proposed water transmission route



with Bukaye having recorded the highest diversity followed by Kofi-A and Naibiri these areas were characterised by more natural vegetation cover as compared to the other sites along the water pipeline route. Species abundance was generally low among most species, *Eidolon helvum* was the most abundant species (20) followed by *Heterocephalus glaber* (17). Relative species abundance was highest in Bukaye survey point compared to other sites.

Table 4-16: List of recorded mammals, their abundance and conservation status along the Iganga-Kaliro proposed water pipeline route

Family	Species	Common name	Abundance	Conservation status
Herpestidae	<i>Atilax paludinosus</i>	Mash mongoes	4	LC
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet monkey	6	LC
Viverridae	<i>Civettictis civetta</i>	Afrivan civet	3	LC
Pteropodidae	<i>Eidolon helvum</i>	Straw colored fruit bat	20	NT
Bathyergidae	<i>Cryptomys hottentotus</i>	African mole rat	17	LC
Bovidae	<i>Sylvicapra grimmia</i>	Bush duiker	1	LC
Thryonomyidae	<i>Thryonomys swinderianus</i>	Cane rat	4	LC
Muridae	<i>Otomys sp</i>	Shaggy swamp rat	6	LC
Muridae	<i>Mastomys natalensis</i>	Multi mammate rat	4	LC
Soricidae	<i>Crocidura olivieri</i>	African giant shrew	4	LC
Soricidae	<i>Crocidura nigrofusca</i>	African black shrew	7	LC
Muridae	<i>Lophromys aguilus</i>	Yellow spotted brush furred rat	7	LC

Table 4-17: Occurrence of mammalian species recorded in the different sites along the Iganga-Kaliro proposed water pipeline route

Species	Kigulu1	Kigulu2	Bukaye	Nabikoote	Namungalwe	Nasuti	Naibiri	Itanda-kinu	Kofi-A
<i>Atilax_paludinosus</i>	0	0	2	0	1	0	0	0	1
<i>Chlorocebus_pygerythrus</i>	0	4	0	0	0	2	0	0	0
<i>Civettictis_civetta</i>	0	0	1	0	0	0	1	0	1
<i>Eidolon_helvum</i>	20	0	0	0	0	0	0	0	0
<i>Heterocephalus_glaber</i>	0	0	9	0	0	8	0	0	0
<i>Sylvicapra_grimmia</i>	0	0	1	0	0	0	0	0	0
<i>Thryonomys_swinderianus</i>	0	0	2	0	0	0	1	1	0
<i>Otomys_sp</i>	0	0	0	1	0	1	0	2	2
<i>Mastomys_natalensis</i>	0	2	1	0	0	0	0	0	1
<i>Crocidura_olivieri</i>	0	1	0	0	0	2	0	1	0
<i>Crocidura_nigrofusca</i>	1	0	1	2	1	0	1	1	0
<i>Lophromys_aguilus</i>	0	0	0	0	3	0	1	0	3
Diversity	0.191	0.955	1.507	0.637	0.950	0.072	1.386	1.332	1.494

### Relative abundance

Species abundance was generally low amongst most species while other species were dominant in particular habitats. Species from the family Pteropodidae and Heterocephalidae were dominant within the surveyed area, while species from the family Bovidae were least abundant from the survey area. Overall *Eidolon helvem* which is categorised as a near threatened species (IUCN 2018) was dominant 24% followed closely by *Heterocephalus glaber* 20% and the least abundant species was *Sylvicapra grimmia* having 1%. A comparison of species accumulation in relation to sample size using rarefaction curves shows that most of the curves for the surveyed locations have not yet attained asymptote while curves for sampling sites (Bukaye and Nasuti) are starting to attain the asymptote. For the sites that did not attain the symptome it means that further surveys might yield more species.

The smoothed averages of the individual curves (Fig. 4.7) represent the statistical expectation of species accumulation curve per sampling site

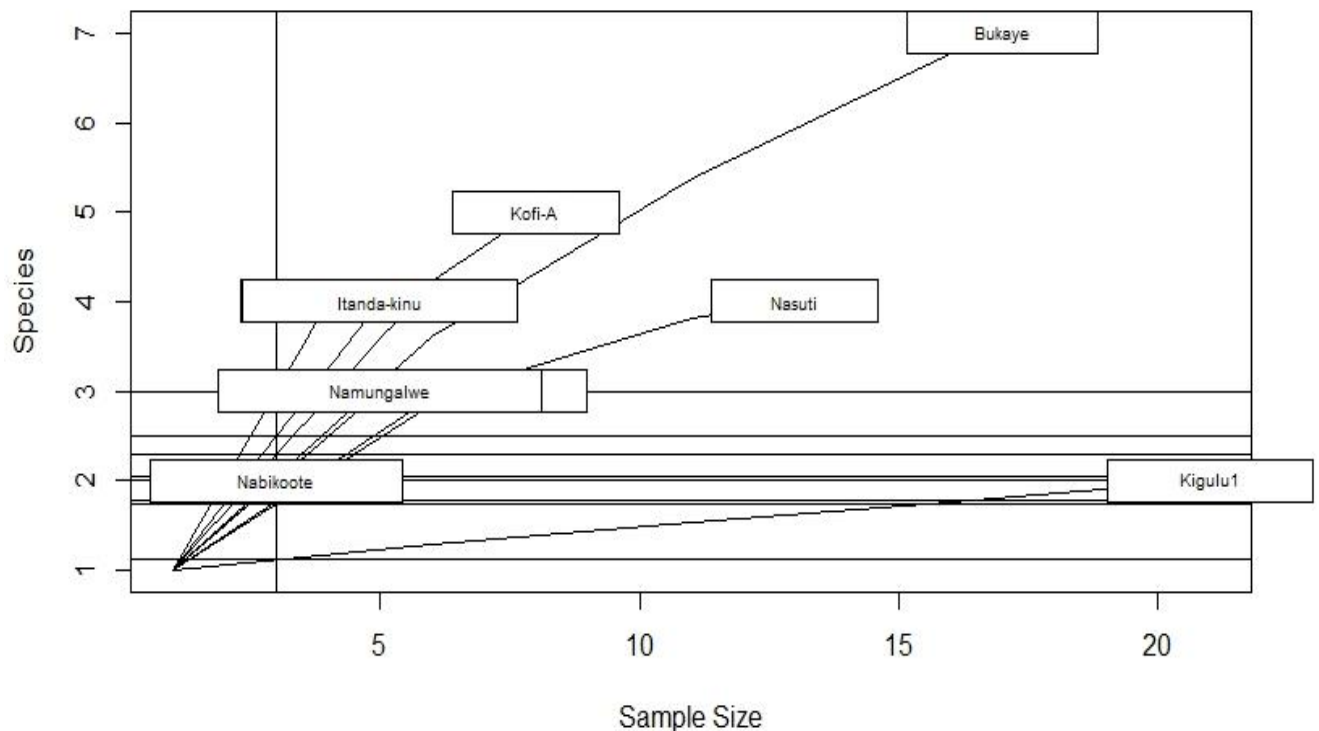


Chart 4.6: Rarefaction curves comparing sample size and species accumulation for the different sampling sites along Iganga-Kaliro stretch.

#### 4.3.8 Invertebrates

Insects are highly susceptible to the adverse effects of disturbances and land use changes have been found to alter abundance and species richness of many insect groups. Many tropical species are locally endemic or are rare and with patchy distribution which predisposes them to increased extinction risk when habitats are modified (Terborgh, 1992). Butterflies are known sensitive indicators of environmental change associated with natural and human-induced disturbances. Their populations are influenced by changes in local climatic conditions and the availability of host plants for larval and adult stages (Thomas *et al.*, 1998). The dragonflies that are predominantly diurnal, utilizing both aquatic and terrestrial habitats contribute greatly to the evaluation of environmental quality (Miller and Miller, 2003). They are known to be very sensitive to structural habitat quality and are used as indicator groups to evaluate landscape degradation. The adults are sensitive to habitat structure and are excellent indicators of river disturbances.

#### *Invertebrates in the project area*

A total of 39 butterfly species in five families were recorded in the different pipeline sections sampled) and seven dragonfly species were recorded (Tab.4.18). A number of habitat specific butterfly species were present for example three forests edge/woodland species, 12 migrant species, three open habitat species, 20 widespread species and one wetland/Swamp species.

Table 4-18: Butterfly species recorded from the different sites along Iganga-Kaliro water pipeline with their corresponding habitat preferences

Species	Ecotype	KK1	KK2	KK3	KK4	KK5	KK6	KK7	KK8	KK9
<b>Nymphalidae</b>										
<i>Acraea encedon</i>	W	1		1		1	1	1	1	1
<i>Acraea eponina</i>	W	1	1	1		1		1	1	1
<i>Acraea natalica</i>	W					1				
<i>Acraea zetes</i>	W	1		1		1	1	1	1	1
<i>Amauris niavius</i>	W	1	1	1		1		1	1	1
<i>Amauris tartarea</i>	f.					1				
<i>Bicyclus safitza</i>	W	1			1					
<i>Bicyclus vulgaris</i>	W		1							
<i>Byblia anvatarata</i>	M						1			1
<i>Charaxes etesipe</i>	f.	1			1					
<i>Charaxes varanes</i>	W		1							
<i>Danaus chrysippus</i>	M	1		1		1	1	1	1	1
<i>Eurytela dryope</i>	W	1	1	1		1		1	1	1
<i>Hamanumida daedalus</i>	W					1				
<i>Junonia chorimene</i>	O	1		1		1	1	1	1	1
<i>Junonia oenone</i>	W	1	1	1		1		1	1	1
<i>Junonia Sophia</i>	W					1				
<i>Junonia terea</i>	W	1			1					

Species	Ecotype	KK1	KK2	KK3	KK4	KK5	KK6	KK7	KK8	KK9
<i>Neptis saclava</i>	W		1							
<i>Neptis serena</i>	W						1			1
<i>Sallya occidentalum</i>	M	1			1					
<i>Tirumala petiverana</i>	M		1							
<b>Pieridae</b>										
<i>Belenois aurota</i>	M	1		1		1	1	1	1	1
<i>Belenois creona</i>	M	1	1	1		1		1	1	1
<i>Catopsilia florella</i>	M					1				
<i>Colotis antevippe</i>	O	1			1					
<i>Colotis danae</i>	W		1							
<i>Colotis eucharis</i>	W						1			1
<i>Eurema brigitta</i>	M	1			1					
<i>Eurema hecabe</i>	M		1		1		1		1	1
<b>Lycaenidae</b>										
<i>Eicochrysops Hippocrates</i>	W	1			1					
<i>Euchrysops malathana</i>	O		1							
<i>Leptotes pirithous</i>	M					1				
<i>Zizeeria knysna</i>	W	1		1		1	1	1	1	1
<i>Zizula hylax</i>	W	1	1	1		1		1	1	1
<b>Hesperiidae</b>										
<i>Metisella midas</i>	S	1			1					
<i>Pelopidas mathias</i>	M		1							
<b>Papilionidae</b>										
<i>Papilio bromius</i>	f.	1			1					

Species	Ecotype	KK1	KK2	KK3	KK4	KK5	KK6	KK7	KK8	KK9
<i>Papilio demodocus</i>	M		1		1		1		1	1
Total = 39 Species										

#### 4.4 Description of the key project sites

##### 4.4.1 Intake works

The proposed water source for Kaliro Town and the en-route RGCs is the existing Iganga Town Water Supply system. The tap off will be from the Iganga 900m<sup>3</sup> reservoir elevated on a 10m tower into a reinforced concrete sump on the ground from where the water will be boosted to Kaliro and the en-route RGCs by surface pumps. The source of water for the existing line where the project will tap off is Lake Victoria at the existing National Water and Sewerage Treatment Plant (NWSC). The intake is adequate and will not be affected by the project i.e. there shall not be any intake works by the project.



Plate 4.23: An existing in-take structure that will be the source of water for the project

##### 4.4.2 Water treatment works

The project shall augment the capacity of the clarifiers by construction of an additional unit of 10,000 m<sup>3</sup>/d capacity. This clarifier shall be constructed within the existing complex of the water treatment plant which is located in a developed area having a number of social-economic activities (industrial, hotels, fishing etc).





Plate 4.24: The clarifiers for the existing treatment works

The proposed clarifier shall be constructed near the existing two clarifiers and will affect one of the structures that will pave way for the construction activities.



Plate 4.25: The structure that will be affected by the construction activities

The water treatment plant is located in a relatively developed area with a number of economic activities that include transportation, industries as well as hotels. The key industries in the vicinity are next factor, Keswara and Sun Belt fabrics. The plant is located on a land owned by NWSC. To the south, it neighbours Lake Victoria, east is undeveloped land, west are industries and to the north is a road.





Plate 4.26: One of the key activities in the area – Hotel about 1 km from the project site

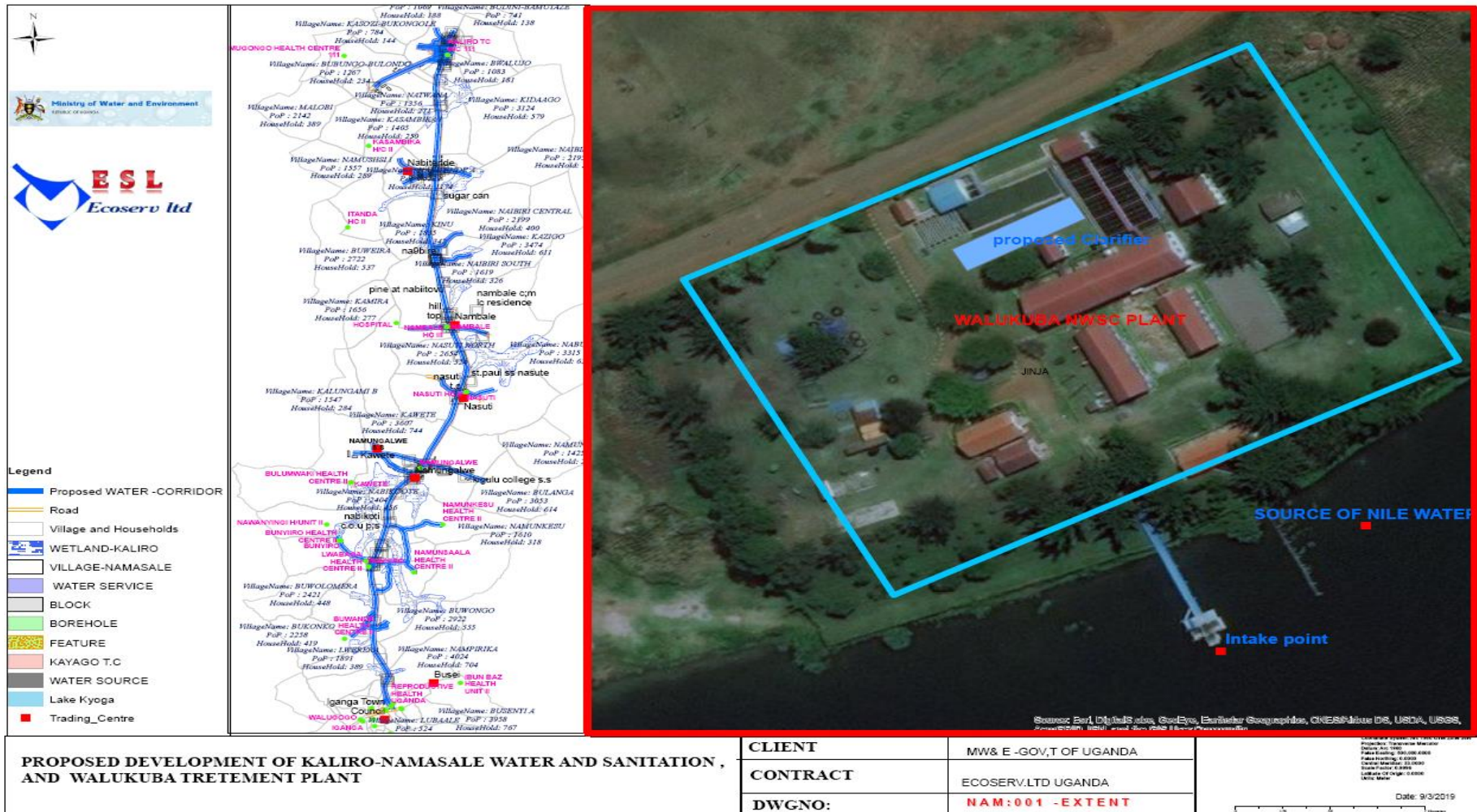


Figure 4-5: Map showing the location of the NWSC plant



### 4.4.3 Booster station

A booster station shall be constructed at Wairaka to meet the design demands for the years 2033, 2043 and 2048 with pumps installed in phases to meet those demands since electromechanical equipment have a life span of 10 years. The ultimate pumps shall have a capacity of utmost 435m<sup>3</sup>/hr and 250m head.

The proposed location of the booster station is within the fence of Wairaka College School. The site has some structures that had been put up by MWE for the booster station but later abandoned after realizing that it was not necessary. The structures in place are an incomplete tank as well as pump house. The proposed site is about 800m away from the office and classroom blocks as well as 500m away from the dormitories and 10m away from the main gate and Jinja-Iganga highway. The site is on a hill and characterized by brown laterite soils and are all accessible by a tarmac road off Jinja – Iganga highway. Apart from the school, the key land use in the surrounding areas comprises crop farming. The areas have neither sensitive ecosystems nor endangered species.

The proposed site already has a three-phase electricity line and only a transformer would be required to be installed. The school has a population of 300 students of which 120 are girls.



Plate 4.27: Dormitories near the proposed site



Plate 4.28: Administration and classrooms



Plate 4.29: The headmaster showing the abandoned tank site and on the left is a pump house



Plate 4.30: A pump house, the bushy part is the site where the incomplete tank structure is located



#### 4.4.4 Main storage reservoir structures

The storage capacity for the Kaliro water supply system has been considered as 30% of the maximum day demand. Based on a maximum day demand, the storage capacities for the ultimate years are shown in Table 2.4. The Reservoirs are the cold pressed steel type raised on a steel tower of 20 Metres. The tank capacities in Table 4.19 were adopted on the basis of using steel plates of size 1.22m.

Table 4-19: Storage Capacity for Kaliro Town and enroute RGCs

System Particulars	MDD (m3/d)	Storage Capacity (m3)	Reservoir Tank Adopted (m <sup>3</sup> )
Kaliro Town	1,573.4	472 (Less 217.9)	272.4 (8.54x8.54x3.66)
Nabitende RGC	394.9	118	109.0(6.1x4.88x3.66)
Naibiri RGC	261.3	78	87.2(4.88x4.88x3.66)
Nasuti RGC	406.7	122	136.2(6.1x6.1x3.66)
Nambale RGC	194.4	58	65.4(4.88x3.66x3.66)
Namugalwe RGC	645.3	194	196.1(7.33x7.33x3.66)
Namunkesu RGC	224.9	67	65.4(4.88x3.66x3.66)
Bukaye RGC	446.5	134	136.2(6.1x6.1x3.66)

Source: Project Estimates

All the sites are on hills and characterized by brown laterite soils and are all accessible by road. All the sites are characterized by fallow land. Key land use in the surrounding comprises crop farming, animal rearing and settlements (home steads). The areas have neither sensitive ecosystems nor endangered species.

#### 4.4.5 Distribution network

Kaliro Town will be served through the existing and new distribution network from the proposed Reservoir near the Town Council Offices to extend water to the unserved areas of the town with a total length of 14,251 meters. A new distribution network for Namungalwe and other rural growth centres has been considered with a total length of 10,858meters using HDPE and uPVC pipes of various specifications as specified in the feasibility study report. The description of the areas where the distribution areas will be constructed is covered under sections 4.1, 4.2 and 4.3.



## 5 PUBLIC CONSULTATION AND DISCLOSURE

National guidelines as well as the World Bank safeguard policies require the people likely to be affected by a development project to be consulted so that their views and fears are incorporated in planning. Community perspectives are important for project planning and implementation. Knowledge of what the community perceives will go a long way to help during the compensation and resettlement action plan. Therefore, during the ESIA process, consultations were conducted with relevant stakeholders, including potential beneficiaries, affected groups and local authorities about the project's environment and social aspects and their views considered. To meet this requirement, the EIA team held public consultations with all the villages affected by the proposed Iganga-Kaliro Towns Water Supply and Sanitation Project. National agencies and district local governments were also consulted

The stakeholder engagement and consultation process were undertaken as per the requirements of the Environmental Impact Assessment Regulations. Under sub-regulation (1) of regulation (12) of the Environmental Impact Assessment regulations for Uganda (1998) and best international practice, the project developer is required to undertake public consultations during the ESIA process as detailed below.

*1) The developer shall take all measures necessary to seek the views of the people in the communities which may be affected by the project during the process of conducting the study under these regulations.*

*(2) In seeking the views of the people under sub-regulation (1), the developer shall -*

*(a) Publicise the intended project, its anticipated effects and benefits through the mass media in a language understood by the affected communities for a period of not less than fourteen days;*

*(b) After the expiration of the period of fourteen days, hold meetings with the affected communities to explain the project and its effects; and*

*(c) Ensure that the venues and times of the meetings shall be convenient to the affected persons and shall be agreed with the leaders of local councils.*

### **Public participation objectives**

Stakeholders were engaged during the ESIA process to create awareness about the project and obtain their perceived positive and negative social and environmental impacts. Consultations were undertaken in order to;

- Explain the project and create awareness;

- Ensure Compliance with both national regulations and international best practice
- Obtain baseline environmental and social conditions in the proposed project area based on local knowledge;
- Obtain their perceived economic, social and environmental benefits so that they can be enhances during project implementation and operation;
- Obtain the perceived potential negative environmental and social impacts so that they can be mitigated;
- Provide equal opportunity to stakeholders to get involved in project planning;
- Manage expectations and concerns: by providing a mechanism for stakeholders to engage with the project about their concerns and expectations and provide a mechanism for receiving, documenting and addressing comments received
- Build trust with the stakeholders.

## 5.1 Stakeholder participation process

The ESIA team formulated a stakeholder matrix and identified key stakeholders to be engaged during the scoping phase. A stakeholder engagement plan was drafted clearly identifying stakeholders and their probable interest. These included; directly affected and indirectly affected community members, local leaders and Government Agencies. Stakeholders that have been consulted during the ESIA include; Communities within the project area, Iganga and Kaliro district local government, Iganga Municipal Council administration, Kaliro Town Council leaders, Ministry of Gender Labour and Social Development (Labour, OSH, community development departments) and Ministry of water and environment.

### 5.1.1 Methods of engagement

Stakeholder engagement exercise which was conducted between 5<sup>th</sup> and 9<sup>th</sup> September, 2018 involved different methods. These included formal meetings, key informant interviews, focus group discussions and public meetings as illustrated in the table 5.1 below.

Table 5-1: Summary of stakeholders identified and consulted during the ESIA process

Activities	Stakeholder	Purpose of Information sharing/disclosure
Awareness/sensitization meetings by the EIA team	PAPs and Land owners	General overview of project and implications
Focus groups	Women Youth	General overview of project and implications  Disclosure of mitigation measures

Activities	Stakeholder	Purpose of Information sharing/ disclosure
	Elderly Persons with disability Area leaders Other interest groups	and grievance mechanism Identification of views and expectations
Village meeting / public consultation	All PAPs Indirectly affected people	General project overview Identification of views and expectations Disclosure of mitigation measures Acquisition of information for input into ESIA
Formal meetings	Government bodies Local government NWSC Wairaka College School	Overview of project and implications Disclosure of mitigation measures Acquisition of information for input into ESIA
Key informant interviews	Local government Government officers Local and political leaders Cultural Leaders	Overview of project and implications Baseline data Feedback on the project proposals

Before community meetings were convened, members of the EIA team visited a Local Council I leader to introduce the subject and request for assistance to mobilize the community, who own land next to the road reserve where the proposed water pipe line will run and those with interest for a meeting. Letters of introduction for this purpose were issued by Ministry of Water and Environment to all Local Councils and District authorities. Details of institutions, communities and interest groups consulted and detailed minutes of the consultations are contained in Annex 1.

## 5.1.2 Findings

This section presents a summary of the key findings from the stakeholder engagement exercise that was conducted between 5<sup>th</sup> and 9<sup>th</sup> September, 2018. The details are presented in Annex 1.

### 5.1.2.1 Consultations at district level (Kaliro district)

The district officials (Assistant Chief Administrative Officer, Community Development Officer and District Environment Officer) stated that since the project will follow the Iganga-Kaliro road reserve which is already demarcated, they did not expect a lot of compensation related complaints. They stressed that the fact that the project would follow the road reserve should be stressed during all community meetings in order to manage community expectations. District officials said Nabitende town which is one of the targeted small towns was earlier offered a water scheme which they rejected on grounds that it would lead to permanent land take. In regard to access to safe water they said this stand at 62%. They mentioned that public stands should be distributed strategically considering population to be served. The meeting was concluded by officials stating that given the extent of the proposed works, community disturbance will be minimal.



Plate 5-1: Consultative meeting held with Kaliro District officials

### **5.1.2.2 Consultation at district level (Iganga)**

#### **The Chief Accounting Officer Iganga**

Community concern is always about acquisition of the ROW for the water pipe. He added that since Iganga Kaliro road reserve was clearly marked, it was a matter of informing and sensitizing the community about the proposed water project so that they relocate any activities they could be undertaken in the road reserve. In regard to laying the pipes, the CAO noted that communities would be interested in knowing which side of the road would be trenched. Given that this is a government project, communities could expect free services therefore this should be clarified during community meetings

#### **The District Natural Resources Officer Iganga**

The DNRO noted that compensation as a social issue was likely to be raised because communities are always expectant. On this note he stressed that this should be clearly articulated during all community meetings. He advised that in wetlands, the water pipe should be raised on pillars to minimise likely disturbance of ecosystem. He recommended that whenever practicable mature or major trees should be avoided. On a positive note the DNRO said rural growth centres would benefit. He said Namungalwe in particular was water stressed therefore the proposed project would be beneficial to the entire community.

#### **The Headmaster Wairaka College School**

The headmaster welcomed the project. He highlighted benefits and requested that the project should help and construct a reservoir tank for the school. He also indicated that MWE should formally request the School's Board for use of the land for the project.

#### **Assistant Water Officer Iganga**

He said the district's safe water coverage is at 64% which is still lower than the national target of 76% by 2020. As the district water office their mandate is mainly in regard to point water sources such as boreholes. He noted that after identification and siting of a water source water quality tests are undertaken to ascertain quality before it is handed over to the community.

#### **Community sensitization**

The project was disclosed to communities through meetings to all communities that will be affected by the project. A total of 8 meetings were held with members from 23 villages in the project host area. The villages were Silver, Bugumba, Kigulu, Bukaye, Nawandyo, Bunyiro, Nabikote, Bubogo A,

Bubogo B, Namungalwe A, Namungalwe B, Namungalwe Rural, Kawete, Busimba, Nasuti North, Nasuti South, Nabale, Naibiri, Nabitende A, Nabitende B, Buyale, Bukose, Busabi and Kaliiro T.C.

### 5.1.3 Mobilisation of Project Affected Persons

#### Overview

Project Affected Persons were mobilised by their respective area Local Council leaders in which a central location was chosen as the meeting venue. The meetings comprised all affected persons from the affected villages. Attendance was good and, in most instances, three to four villages converged at one central location. Several local leaders and community members attended these consultative meetings in each case as affected individuals or as public leaders (a full list of people consulted is appended to this report as Annex 2). All meetings commenced with disclosure of the project by ESIA Team Leader. During the meetings, community members were informed that this activity (ESIA process) was mandatory and a legal requirement by the laws of Uganda. They were informed that projects of this magnitude had great impact on their livelihood therefore their views were vital. The group discussion was then facilitated by the Team Leader who explored several social and economic aspects within the community. Specific information on livelihoods, culture and social networks was also collected from the meetings.

#### Villages consulted

A total of 369 people comprising of 115 females and 254 males were consulted. These were from 24 villages and their comments, complaints, questions and views as regards the water project were captured and have been considered during the preparation of this EIS. Detailed minutes of public consultations are presented in Annex 1 while a summary of these villages is presented in the table 5.2 below.

Table 5-2: List of villages from which project affected persons were consulted

Key contact person	Meeting date	Village
Ms Namyalo Rita 0777068544  Nailuba Forence (0752943789) & Mr Maveera Mwesigye (0705943789)	7 <sup>th</sup> /09/2018  11:00am	Silver
		Bugumba
		Kigulu
		Bukaye
Town Council Environment Officer	7 <sup>th</sup> /09/2018	Kaliro Town Council

	2:00pm	
Karimu Muwereza	7 <sup>th</sup> /09/2018	Nawandyo
0779768795	4:00pm	Bunyiro
		Nabikote
		Bubogo A
		Bubogo B
Mugabi Moses	8 <sup>th</sup> /09/2018	Namungalwe A
0771690591	9:00am	Namungalwe B
		Namungalwe Rural
		Kawete
Mukangala Patrick	8 <sup>th</sup> /09/2018	Busimba
0787015003	12:00pm	Nasuti North
		Nasuti South
Wasswa Paul	8 <sup>th</sup> /09/2018	Nambale
0701985647	2:00pm	
Mpambiro Hamuza	8 <sup>th</sup> /09/2018	Naibiri
0786921859	4:00pm	
Balisonyiwa Stephen	9 <sup>th</sup> /09/2018	Nabitende A
0788214628	9:00am	Nabitende B
		Buyale
		Bukose
		Busabi



## **5.2 Summary of Key Public Issues about the project**

During public consultations in the above areas, a number of concerns were raised most of which were common and repetitive in all areas. The issues raised included but were not limited to the following;

### **i. Distribution of public water stands**

They wanted to know how public water stands would be distributed. All major trading centres will have public stands and the number of stands will depend on the population to be served.

### **ii. Project impacts**

They mentioned that when projects are being initiated only anticipated benefits are articulated yet some times communities don't benefit. That is why the ESIA team is conducting consultative meetings so that identified or anticipated fears and challenges are addressed before project implementation.

### **iii. Destruction of property**

In all meetings stakeholders wanted to know whether property destroyed during project implementation would be compensated for. They were informed that a RAP will be undertaken and all property destroyed would be compensated.

### **iv. Delayed implementation of project**

They wanted to know when the project was likely to start. They were advised to be patient and be hopeful as government finalizes all funders' requirements.

### **v. Water scheme operator**

Some community members wanted to know if the water would be managed by NWSC or some other company. The communities were informed that the water scheme will be managed by NWSC since it lies within its operational territory.

### **vi. Community wells**

Concern from the community was that there are shallow wells that NWSC is trying to close yet they help the community. They were informed that under the law, one can not construct a well and this could be the reason why NWSC is closing shallow wells. The reasoning behind this is that NWSC water is safe since it is treated and its quality is monitored where as the quality of water from community/individual wells can not be guaranteed.

### **vii. Public access to water**

They were skeptical of the of the anticipated benefits because some projects come in disguise of being pro-people but end up being so expensive for most community members to afford. Water at public

stands will be relatively cheaper than that extended to individual households. Therefore, this is expected to be affordable.

**viii. Information sharing**

They wanted to know how information about the project would be conveyed to community members who had not attended the meeting. This project is particularly targeting the town council which is represented at the meeting so we hope members who are present will inform others about the project

**ix. Liaison office**

Need for a liaison office in the area? Yes, an office will be established within the project area to ease access to services.

**x. Source of water**

They wanted to know where the water would come from. They were informed that the water will be tapped from the Iganga town main.

**xi. Reserve tanks**

Community members wanted to know whether area where reserve tanks would be placed will be paid for. To this a response was that where the reservoir would be places shall be paid for

**xii. Areas not catered for**

The ESIA team was informed that some trading centres had not been included yet they had sizable populations. The areas that are not catered for will be reported but in case they are still not covered under this phase they will be considered in subsequent phases. They were informed that some are covered under T-offs because the project doesn't entirely follow the main road.

**xiii. Payment for water**

They wanted to know whether water would be paid for in Jerri cans or liters. At the community tap, the cost of water will be per Jerri can while that extended to households will be metered at that level and payment would depend on amount used.

**xiv. Extension to households**

They wanted to know the requirements to extend to the household? Shall we use our government or one has to buy their own pipes? Government will extend water and establish public stand. However, after that an operator will be contracted to distribute to household level and the costs will be covered by individual owners. This will be in the next phases.

**xv. The right of way**

In regard to the ROW, they sought clarification as to whether there would be permanent acquisition. The water project is permanent, so it will be around forever

**xvi. Employment of local people**

Community members wanted to know whether local people would be considered for employment during project implementation. The community was informed that priority is usually given to local people for opportunities for which they have the required skills.

**xvii. Timing of compensation**

Community members also wanted to know whether compensation for affected property would be before project activities commence. This will be before because the RAP team would follow shortly to address all compensation and corridor acquisition issues before the project is implemented.

In all the meetings, a majority of the participants were aware of the project but had not received formal communication since the meeting held were the first about the project in all villages they were held. Participants emphasized that proper community consultation by professionals should be carried out continuously for this project to progress with minimum interruption to the community.

As highlighted from the questions above, the affected communities were concerned most about when the project was to be implemented, compensation, the process and cost of getting a water connection, water source as well as the dispute with the land owner. These concerns were highly brought out in all the meetings. The affected communities were informed that the proposed project would follow the existing road reserve to minimise displacement and that all necessary processes would be followed to acquire land required for project activities. Details of minutes for each meeting are attached in Annex 1.

Community discussions and stakeholder interviews showed that communities will support the project if anticipated social issues are addressed in a comprehensive manner. The community and the key stakeholders expressed support for the project since they see it as a way of enhancing access to safe water in the area. The community also envisaged that the proposed project would promote development as well as employment creation for themselves or their children during construction. Despite the anticipated benefits, the project will lead to some negative social and economic impacts. To ensure that the project is managed to a logical conclusion, Ministry of Water and Environment should make the necessary budgetary provisions to ensure that mitigation commitments in the ESIA and monitoring programs are effectively implemented. In addition, public consultation and sensitization shall continue during the disclosure period in order to capture any other issues that could have been left out during the consultation exercise.

### **5.3 Public disclosure**

The disclosure of the project and environmental and social information is an integral part of stakeholder consultation. Providing stakeholders with complete, accurate and understandable information is essential to allow for meaningful participation. In addition, it is crucial to leave sufficient time between the provision of information and the start of consultations.

Information was made available to stakeholders through formal meetings and Focus Group Discussions. The World Bank as well as Ugandan requirements include the disclosure of the ESIA report and the Ministry of Water and Environment shall disclose this Report through the ministry's and NEMA websites and the World Bank's website. The stakeholders were reminded that hardcopies of the ESIA reports will be made available at the district, NEMA and Ministry's public libraries.

## 6 ANALYSIS OF ALTERNATIVES

In environmental impact assessment studies, it's important that alternatives be analyzed to maximize environmental safety. Alternatives can take on several forms including technological options, project site options, transportation options, labour sources and type and others. Several factors can influence the choice of alternatives to be considered by a Developer and in most cases, such factors are either technical, financial, socio or environmental. The best option is one which tries to strike a balance on the above factors with viable mitigations measures for residual impacts. In this project, the scenarios discussed under shall be as follows;

- Technological options of treating and evacuating water to the consumers
- Sanitation options
- Project or no project options

### 6.1 Sources of water

#### 6.1.1 Ground Water

Ground water is the main source of water supply currently in the project area. The feasibility study indicates that Kaliro town is served by three production boreholes yielding a total 43 m<sup>3</sup>/h. Further analysis of the well yields in the project area has been analysed using hydro census data from DWRM as indicated in the map below.

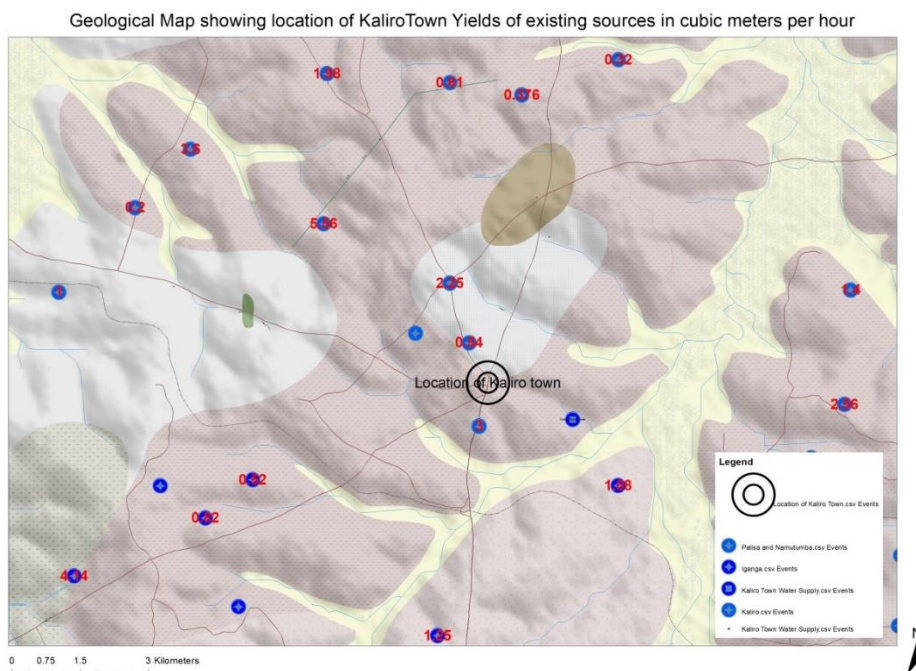


Figure 6-1: hydro census data from DWRM

The analysis indicated that the borehole yields range from 0.2 m<sup>3</sup>/hr to 30 m<sup>3</sup>/hr. In due consideration of the linear nature of supply areas and coupled with not so high yields from most of the boreholes, it has been found that a number of isolated production boreholes and associated infrastructure would be required per Rural Growth Centre to meet the projected water demand, making it a costly investment compared to extension from the existing water supply in Iganga.

### **6.1.2 Surface Water**

The project area has a number of options for surface water sources that were explored to establish their suitability for purposes of meeting the water demand in the town. However, it has been established by the feasibility study that Kaliro Town and the en-route RGCs could effectively be supplied from the NWSC Iganga Town water supply system. The source of water is the water supply system in Jinja City where the water is transported to Iganga Town via a 37km long DN300 steel pipe transmission main. The Jinja WSS abstracts raw water from Lake Victoria in the Napoleon gulf and treats it at Masese Water Works, Walukuba Division. Supplying the Kaliro-Namungalwe project from the Iganga WSS has the following advantages:

1. The scheme will be able to serve other RGCs along the Iganga-Kaliro stretch that are currently unserved with piped water. These include: Bukaye, Namunkesu, Namungalwe, Nambale, Nasuti, Naibiri and Nabitende with current (2014) domestic population of 41,775. This is a more cost-effective way of serving small towns/RGCs as opposed to developing individual systems for each small town/RGC.
2. The presence of NWSC in the towns of Iganga and Kaliro provides a strong management framework that would guarantee proper Operation and Maintenance of such a large scheme.
3. This option takes advantage of fully utilizing the existing water treatment plant in Jinja and as such minimize on the high costs associated with constructing a new water treatment plant.

The above reasons make this option attractive.

Therefore, water demand for Kaliro town and enroute towns (along the Iganga- Kaliro road) can only be cost effectively met by the existing water supply system to Iganga in the short-medium term. More investment (in terms of a new transmission line from Jinja) is required to enable the system meet the water demand in all the towns in the medium to long term.

The scheme has been designed to have;

1. A new horizontal flow clarifier at Masese water treatment plant in Jinja with capacity of 12,792 m<sup>3</sup>/d and sludge drying beds with sludge volume capacity of 51m<sup>3</sup>.
2. A booster pump station at Wairaka with capacity of 336m<sup>3</sup>/hr and 148m head in 2023; 377m<sup>3</sup>/hr and 210m head in 2033.

3. A booster station at the Iganga 900m<sup>3</sup> reservoir site with pump capacity of 159.1m<sup>3</sup>/hr and 120m head and reinforced concrete sump with capacity of 200m<sup>3</sup>.
4. A new transmission main along the Iganga- Kaliro Highway consisting of OD 250 uPVC PN16 – 16.57 km and OD225 uPVC PN20 – 16.61 km.
5. Tee-offs for the en-route population at Bukaye, Namungalwe, Nasuti, Nambale and Nabitende trading centers along the Iganga-Kaliro road.
6. A Cold Pressed Steel reservoir of 200 m<sup>3</sup> on an 18m elevated steel tower for Kaliro town.
7. A Cold Pressed Steel reservoir of 100 m<sup>3</sup> on an 18m elevated steel tower for Nabitende RGC.
8. A Cold Pressed Steel reservoir of 100 m<sup>3</sup> on an 18m elevated steel tower at Nambale for Nambale and Naibiri RGCs.
9. A Cold Pressed Steel reservoir of 100 m<sup>3</sup> on an 18m elevated steel tower for Nasuti RGC.
10. A Cold Pressed Steel reservoir of 170 m<sup>3</sup> on an 18m elevated steel tower for Namungalwe RGC.
11. A Cold Pressed Steel reservoir of 170 m<sup>3</sup> on an 18m elevated steel tower at Bukaye for Bukaye and Namunkesu RGCs.
12. A new distribution pipe network of total length 89.79 km of HDPE and uPVC pipes ranging in size from OD200 - OD50 mm PN10 for the entire Project area.
13. 30 Public stand posts
14. 2,000 consumer connections (Kaliro and the 7 enroute RGCs)
15. Water office- 1 No.
16. Public Toilets – 2 No.

## 6.2 Sanitation options

**Centralized Sewerage system:** This is the best option, however given the flat terrain of the town, it would very expensive to construct and operate as the gravity conventional system would not be technically feasible. Further, given that the town has a relatively smaller population coupled with the livelihood in the area, the centralized system wouldn't be economically viable.

**Decentralized sewage system (Septic Tank Technology):** This is where households or institutions construct their own septic tanks and when they are filled up, they are emptied and the sewage is taken to a sewage treatment plant. The existing sewage plant is in Iganga and is about 35km away from kaliro. This technology is relatively affordable although it is not pollution proof like the centralized sewage systems.



**Standalone pit latrines:** Although this is the cheapest sanitation option, it is not environmentally friendly as they may lead to ground water pollution if not lined. Secondary, in towns people own plots, and since latrines are used for disposal of other wastes like bottles etc (when the use is not well controlled), when it is filled up people opt to construct new ones as emptying is not easy and yet the plots are small. Finally, the pit latrines are aesthetically not good. This option is therefore not environmentally feasible.

Therefore, the ESIA is in agreement with the sanitation assessment of the feasibility study report that since the generated waste water from house connections and institutions cannot meet the minimum requirements for both the gravity conventional system and small-bore sewers, the individual connections dispose of their effluent in septic tanks, i.e. on-site storage. On being full, the septic tanks can be emptied using a cesspool emptier. The rest of the households shall be encouraged to use soak pits for waste water disposal. However, Kaliro district town is fast growing hence future plans to have a centralised sewage treatment plant should not be ignored completely.

**Public toilets:** This ESIA is in agreement with the recommendations of the feasibility study that at least 8 public toilets be constructed.

### **6.3 The “No Project” Alternative Project Justification**

#### **Key Benefits of the “No Project” Option**

- The water resource potential of the proposed water supply source, River Nile, would remain unchanged as water will not be extracted.
- Short-term impacts such as noise, dust generation, vibrations, etc., emanating from construction activities would be avoided.
- The loss of the relatively small amounts of agricultural land to the construction of water treatment works, sanitation works, and storage reservoirs would be avoided.
- Temporary inconveniences emanating from construction activities within urban areas such as temporary road closure for pipeline crossings, would be avoided.
- The health risks associated with handling of harmful water treatment chemicals would be avoided.
- The associated dangers of releasing of wastewater directly into receiving water in case of treatment system failures would be avoided.

#### **Key Benefits of Improved Water Supply if Project Is Implemented**

- Easy access to potable water within homesteads at various levels – stand posts, yard taps and house connections;

- Reduction in incidences of diarrheal and other water borne diseases; this leads to reduction in mortality and morbidity, especially of children;
- Improvement in hygiene and sanitation from increased use of hand washing, personal hygiene and environmental sanitation;
- Reduction in hours spent searching for and fetching water from distant sources which would significantly increase the time allowed for other activities; this is expected to lead to better livelihood for women and the girl child, who are traditionally, responsible for fetching water;
- Reduction in domestic violence and abuse of women as people in the homestead compete for the little potable water;
- Reduction incidences of promiscuity which are often carried out in the guise of fetching water, some involving children; this leads to incidences of child abuse, domestic violence and early pregnancies;
- Possibility of improving the quality of life in the poor neighbourhoods of the town where the most vulnerable people live;
- Cleaner and more conducive environment for urban activities such as sports, markets, publicplaces, etc.;
- Higher quality hotels, restaurants and entertainment places since the developers can erect and maintain high quality toilets;
- Employment opportunities at all stages of the project – from construction, operation and marketing of the services; this leads to increased skills transfers to the community;
- Increased revenue to the local authority and the country in general through the collection of taxes.

### **Key Benefits of Improved Sanitation Facilities If Project is implemented**

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

- Increased revenue to the local authority and the country in general through the collection of taxes.

### **6.3.1 Conclusion on the ‘No Project’ Option**

Project option means proceeding with the current plan and implementing the project as it is with some modifications to avert environmental damage and risks associated with community and occupational safety. The proposed Iganga-Kaliro Towns Water Supply and Sanitation Project is urgently needed by the community and local leaders to accelerate development in the project areas.

## 7 IMPACT ASSEMENT AND MITIGATION

This chapter identifies and evaluates significant environmental consequences of the construction and operation phases of the proposed commercial structure. While 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.

### 7.1 Impact evaluation and analysis

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

- a) **Extent:** within limited area (<500m from site), local (up to 10 km) or wide (regional or global)
- b) **Duration:** Temporary (1 year), short term (1-5 years), Medium term (5 -10 years), Long term (> 10 years – 50yrs) or Permanent;
- c) **Magnitude of impact:** Low, Medium or High/Very high
  - **Very High (VH) and High (H):** These denote that the impact is un-acceptable and further mitigation measures must be implemented to reduce the significance.
  - **Medium (M):** Impacts are considered tolerable but efforts must be made to reduce the impact to levels that are as low as reasonably practical.
  - **Low (L):** Impacts are considered acceptable.
- d) **Probability of occurrence:** Highly unlikely, Unlikely, Possible, Likely or Almost certain as presented in table 7.1 below.

Table 7-1: Likelihood of occurrence classification

Probability of occurrence		
Level	Probability	
5	Almost certain	Expected to occur in most circumstances if controls are not applied. Could occur either immediately or within a short period of time (likely to occur most weeks or months)
4	Likely	This impact will probably occur in most circumstances if controls are not applied (several times a year)
3	Possible	This impact could occur at some time if controls are not applied (May happen every 1 to 2 years)
2	Unlikely	This impact is not likely to occur. Known occurrence in distribution line activities (Could occur sometime in 2 to 5 years)
1	Highly unlikely	This impact may only happen in exceptional circumstances. May have happened in the water and sanitation project every 5 to 30 years.

e) **Overall assessment of impact:** Negligible, minor, moderate, substantial or severe as presented in Table 7.2 and Table 7.3 below.

Table 7-2: Criteria for rating overall impact severity (environmental parameters)

Impact rating	Description of impact
Severe	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 exceedence of water/air quality and noise guidelines representing threat to human health in long and short term. Causing widespread nuisance both on and off site.
Substantial	Highly noticeable effects on the environment, difficult to reverse. Widespread degradation of resources restricting potential for further usage. Significant contribution to a known global environmental problem when

Impact rating	Description of impact
<p style="background-color: red; color: black; text-align: center; padding: 5px;"><b>High</b></p>	<p>compared with the industry world-wide.</p> <p>Sub-lethal effects upon a globally or regionally endangered species compromising reproductive fitness and/or resulting in long-term disruption/disturbance to normal behavior.</p> <p>Air quality/noise approaching occupational exposure limits. Water quality parameters approaching maximum stipulated values.</p> <p>Periodic widespread nuisance both on and off site.</p>
<p style="background-color: yellow; color: black; text-align: center; padding: 5px;"><b>Moderate</b></p>	<p>Noticeable effects on the environment, reversible over the long term.</p> <p>Localised degradation of resources restricting potential for further usage.</p> <p>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.</p> <p>Elevated contribution to global air pollution problem partly due to preventable releases.</p> <p>Frequent breaches of water/air quality and noise guidelines.</p> <p>Causing localised nuisance both on and off site.</p>
<p style="background-color: lightgreen; color: black; text-align: center; padding: 5px;"><b>Minor</b></p>	<p>Noticeable effects on the environment, but returning naturally to original state in the medium term.</p> <p>Slight local degradation of resources but not jeopardising further usage.</p> <p>Disruption/disturbance to normal behaviour of a globally or regionally endangered species returning to normal in the short term.</p> <p>Small contribution to global air problem through unavoidable releases.</p> <p>Elevation in ambient water/air pollutant levels greater than 50% of guidelines.</p> <p>Infrequent localised nuisance.</p>
<p style="background-color: lightgreen; color: black; text-align: center; padding: 5px;"><b>Negligible</b></p>	<p>No noticeable or limited local effect upon the environment, rapidly returning to original state by natural action.</p> <p>Unlikely to affect resources to noticeable degree.</p> <p>No noticeable effects on globally or regionally endangered species.</p> <p>No significant contribution to global air pollution problem.</p> <p>Minor elevation in ambient water/air pollutant levels well below guidelines.</p> <p>No reported nuisance effects.</p>

Table 7-3: Criteria for rating overall impact severity (social economic parameters)

Criteria	Significance Definition	
Harm to People	Potential to cause multiple fatalities or widespread chronic health problems for many people	Severe
	Potential; to cause fatalities, mutilations or serious chronic health problems for up to 3 people	Substantial
	Potential to cause Lost Time Incidents	Moderate
	Not likely to result in Lost Time Incidents	Minor-Negligible
Assets	Extensive damage to infrastructure, possibly including off-site structures	Severe
	Major damage to on-site infrastructure, halting operations and incurring substantial delay to supply replacement equipment	Substantial
	Minor damage to individual item of equipment for which a spare part or replacement can be quickly mobilized to the development	Moderate
	Damage resolved by on-site reserves, maintenance equipment and on-site personnel	Minor-Negligible
Reputation	Incident attracting international negative press coverage causing lasting harm to corporate reputation, or for which the company could be prosecuted and fined a large amount of money	Severe
	Incident attracting critical reporting requiring the company to take measures to maintain its reputation, or for which the company could be prosecuted and receive a token fine or be required to pay compensation to third parties	Substantial
	Incident attracting local news coverage and complaints, and which involves expense in engaging local communities to apologize, clarify issues and make amends	Moderate
	Incident that does not provoke complaints	Minor-Negligible

### Other considerations in impact analysis



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

- a. Environmental;
- b. Occupational Health and Safety;
- c. Community Health and Safety.

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

## 7.2 Impact determination

### 7.2.1 Construction Phase impacts

This section of the report details and defines the impacts that will be encountered during construction phase of the project. It also details the significance of impacts if mitigation is implemented adequately.

#### 7.2.1.1 Impacts on land use and settlement patterns

MWE intends to mostly use road reserves of the existing public roads which are government land probably up to 98%. The booster station shall be located at Wairaka college school whose land is government own while the clarifier shall be constructed at NWSC plant whose land is also government owned. The sanitation facilities will also be constructed on a Public land at a market to be agreed on with the district local government. However, land that shall be acquired for laying of the reservoir tanks shall be compensated for in accordance with the land act and World Bank Environmental and Social safeguard policies as well as relevant national laws. In the event that it is deemed inevitable to use private land for water transmission, distribution and its associated works, MWE will continue to engage the land owners for their free non-coerced consent for access to their land. The probability that the construction activities of the proposed Iganga-Kaliro transmission and distribution water project will affect private land and settlement patterns is minimal.

#### Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of land to the water project components	Local	Medium	Long term	Certain but minimal	Moderate

#### Mitigation measures

- The water transmission line routes should be as much as possible restricted within the road reserves;
- 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.
- Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the 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.

### 7.2.1.2 *Impact on public Health*

This project is expected to attract various categories of people who will seek employment on project activities during construction. It is apparent that part of the labour force will be procured and housed in rented houses among the locals. Some of these will be local labour while others will come from places far away from the project site. Those who will come from far are unlikely to be accompanied by their spouses. HIV prevalence rate in Iganga and Kaliro is 5.6% and 6.7% respectively which is relatively high. The Covid-19 pandemic is also on the increase in the country. The project will obviously lead to establishment of social networks among the locals and the project workers, which can promote the spread of socially transmitted diseases especially Covid-19, HIV/AIDS and other STIs. There has always been sporadic outbreak of communicable diseases in districts such as Cholera and others. According to the community, HIV/AIDS scares them most. Pressure on the existing health services is likely to increase. Although not many skilled workers are expected, the impacts of diseases have a multiplier negative effect. Garbage and human wastes generated by workers, if not properly managed may compromise water quality and may cause water related diseases in the area. Interraction of wokers with communities may enhance chances of the impact on health services and the health of the residents is likely to be minor to moderate since the number of imported workers may be less than 30 in each. Construction dust can lead to lung and sight related health risks. Dust will be generated during excavation works, movement of haulage trucks, grading and levelling of ground surfaces, operation of stone crushers, etc. In general, the impact of dust emissions, though medium in magnitude, will be localized, temporary, reversible and is non-cumulative.

#### **Risk assessment matrix**

<b>Impact</b>	<b>Extent</b>	<b>Magnitude</b>	<b>Duration</b>	<b>Probability of occurrence</b>	<b>Overall Assessment</b>
Public Health concerns due to labour influx	Local	High	Short - medium	Possible	Minor - Moderate

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
			term		

### Mitigation

- Workers and the community shall be sensitized on protective behaviour and practices during work by distributing appropriate education materials to workers and the surrounding community.
- The Contractor shall develop and implement an HIV prevention and management Plan.
- High risk groups such as the youths especially students shall be continuously sensitized on the dangers of casual sex, consequences of early marriages, teenage pregnancy and monitored to ensure that such groups are not at risk of falling victims.
- The Contractor shall provide surveillance and active screening and treatment of workers and the community where a communicable disease is discovered.
- All impacts of public health nature shall be mitigated using a well-coordinated approach that must involve health units in the affected sub-counties including collaborations with local NGOs involved in similar activities to pool resources (especially human resources) and increase efficiency of mitigation measures being instituted.
- Alcohol abuse shall be discouraged as a policy among project construction workers.
- The contractor shall have adequate sanitation facilities for the workers at both places of residences and at all work places.
- Domestic and other construction wastes shall be managed in accordance with the National requirements(Details of waste management are described in section 7.2.1.20)
- The contractor or subcontractors shall procure a secure and descent accommodation for all staff either through renting the existing structures in the project area or by constructing new houses in consultation with MWE and local authorities.
- 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).

For prevention of Covid-19, the following measures shall be adhered to:

- Establish a daily screening protocol for staff and visitors, to ensure that potentially infected staff do not access worksites.
- Regularly clean and sanitize surfaces like desks, doors, printers, vehicles, toilets, and other shared equipment and spaces.

- Establish a hand washing station at the entrance to the worksite and the security MUST ensure that all people accessing the worksite wash their hands.
- Employees and visitors must at all times maintain the recommended social distancing and must not make unnecessary make direct contact with the staff and clients. The Ministry of Health proposal for working in shifts MUST be complied with. In this regard, recommend that a rotational timetable for staff be prepared and communicated.
- The Developet/contractor should provide protection materials i.e. (i) face shields which must be put on all the time when the employees are on duty and (ii) Hand sanitizers to be on every work desk/station.
- The physical meetings must be minimized and virtual meetings encouraged.

For prevention of dust, the following measures shall be adhered to:

- Construction sites (clarifier, storage tanks and booster station) shall be hoarded off to restrict dust to within site boundaries;
- Sprinkle water on vehicle pathways;
- PPE like dust masks shall be availed to workers whenever needed;
- Loose materials like sand that are susceptible to dust generation during haulage be covered with tarpaulin;
- Limit vehicle speed to 30km/hr on murram roads using speed bumps in trading centres.

### **7.2.1.3 Impact on housing (Buildings, kiosks and other structures)**

#### **Positive impacts**

The value of property (Housing, land etc) within the project area could go up due to the likely increase in activity in the area. MWE intends to acquire land for storage tanks and will obvious raise the land value in the project area as many people will tend to buy land near these facilities in anticipation of water. Also, direct and indirect project workers may require accomodation thereby increasing the demand for houses.

#### **Negative impacts**

Although there were no permanent structures in transmission corridor, there are houses in project area that are permanent. At the Water Treatment Plant in Jinja, one structure will be demolished to pave way for construction of a clarifier (See sec 4.2.5). There are no structures or houses at the proposed sites for water reservoirs, booster station and the public toilets. Although the proposed Iganga-Kaliro Towns Water Supply and Sanitation Project will be undertaken using the road reserves of the existing

public roads, the possibility of displacing kiosks cannot be ruled out. Trenching within trading centers such as Namungalwe, Nabitende and Kaliro Town Council and others may displace some kiosks, signpost, business stalls that were constructed within the road reserve. The ESIA studies did not identify any permanent house in the transmission corridor which will be affected by the project but detailed RAP studies may identify some especially if slight changes are made in the final project design. Besides, it is anticipated that the pipes will be laid at the extreme end of the road reserve to avoid future displacement of the pipes in case UNRA intends to upgrade and expand the road. Therefore, such a scenario may affect some structures which are slightly into the road reserve. Therefore, such encumbered areas need to be approached with due care and compensation issues handled well in accordance with the law.

**Risk assessment matrix**

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impact on buildings, kiosks and other structures	Local	Medium	Long term	Almost certain	Moderate

**Mitigation measures**

- MWE shall work with local council committees, sub-county committees, Councillors, district land boards, CAOs, RDCs, Politicians and other local leaders to sensitize all people to be affected on the intentions of land acquisition.
- MWE shall conduct a Resettlement Action Plan (RAP) in accordance with the Land Act and World Bank environmental and social Safeguard Policies especially Involuntary Resettlement (OP 4.12).
- MWE shall send a valuation team to negotiate with land and structural owners in compliance with local market prices and government rates so as to establish rational figures for compensation and resettlement.
- All sorts of compensation and settlements must be done at least 6 months before structures are demolished.
- All physically or economically displaced people should be offered an option between either a full resettlement package, including the provision of replacement residential land and a house, or cash compensation.
- Any grievances in the course of project implementation shall be addressed in accordance with the grievance redress mechanism presented in section 13.
- The demolition wastes shall be disposed off in accordance with the National Environment (Waste Management) Regulations. 2020.

#### 7.2.1.4 Impact on agriculture (crops and animals)

The project mostly traverses settled and built-up areas and modified areas under cultivation or animal rearing. The clearing of corridor, movement of equipment and contractor staff and laying of pipes may lead to spot destruction of crops. At the time of the survey, about 70-80% of the water pipeline corridor segment has been turned into farmlands of for animals beans, maize, rice, cassava and sugarcane and the biggest portion of this land is for animal grazing. Rice and Sugarcane are mainly in wetlands. Since Rice and Sugarcane are in wetlands, their clearance will be minimal as pipes will be suspended in wetland areas. The reservoirs, the booster station as well as the clarifier will be located in areas without crops and therefore they will not have impacts on agriculture. The transmission and distribution network will mainly be installed along the road reserve, hence the destruction of crops and destruction caused by vehicles delivering materials will be minimal. The excavated trenches and pits if not attended to, may result into animals falling into these trenches and pits.



Plate 7-1: Rice and sugar cane cultivation in the road reserve along the transmission route

In general, the impact on agriculture, will be localized, minor in magnitude, reversible but non-cumulative, thus a minor change will occur. Therefore, the impact of construction activities on agriculture is expected to be Negligible to minor following the implementation of the mitigation measures

### Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of crops	Limited area	Medium	Temporarily	Almost certain	Negligible-Minor

### Mitigation measures proposed

- Before valuation exercise for crops or any other affected property, adequate sensitization meetings shall be conducted among all the affected persons to prepare them psychologically and to address any concerns at hand.
- 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.
- The laying of pipework should be done concurrently with excavation and covering of trenches to avoid accidents.
- Prior to compensating the affected persons, adequate community sensitization meetings shall be carried out to ensure that the PAPs are aware of the entire program including visitation schedule per village, parish and or sub-county and how each PAP will be contacted and approached for payment.
- Prior to the compensation process, the Project Affected Persons (PAPs) shall be individually notified about the compensation amount to be paid. The PAPs may accept or refuse the compensation proposed depending on their expectations, market rates and damages incurred.
- The construction of the proposed water infrastructure shall only commence when all the affected farmers have been fully sensitized of the pending activities. Prior to the construction phase, farmers shall be sensitized on the pending project at least 6 months in advance such that cultivation under the line and within the water pipe corridor is stopped or reduced. This will give affected farmers ample time to plan in advance so as to avoid going into several negotiations with The Developer at later stage when the contractors have come in to implement the project.
- 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 crops.



- The contractor should only excavate trenches where pipe laying and backfilling can be done in one day. i.e. no excavated trench should be left open for more than a day. The excavated pits shall be secured and access to it be regulated by installing warning tapes.

### 7.2.1.5 *Impact on the local economy and associated dynamics*

#### *Positive impact*

According to the social baseline study conducted in the Project Site, farming (crop production) is the second major economic activity in the Project Area with over 24.8% of the population being directly involved, the first being trading with 27.9% of the households. The main crops grown include maize, cassava, beans, sweet potatoes, sorghum, and rice. The project construction activities therefore will eventually boost communities' incomes and accelerate development at both village and domestic (family) levels. The boost will be as a result of sell of food and other merchandise to the project. Overall, this direct and indirect impact is categorised as positive with major significance.

The GoU 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.

This impact will be enhanced through:

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

#### *Negative impact*

##### *Influx of workers*

The project will attract a number of workers (Between 50-100 workers) seeking economic activities. The influx of workers (About 20-40), typically young males seeking construction jobs is sometimes associated with a series of social challenges such as crime, alcoholism/illicit drug abuse and prostitution. These are often related to the spread of sexually transmitted diseases including HIV/AIDS. Vices such as drug abuse and prostitution would affect social coherence and security in project communities tarnishing the image and intent of an otherwise good project. Unless sensitization of all workers is undertaken by contractor, the likelihood of the impact occurring is medium (considering some level of awareness among general populace).

#### **Risk assessment matrix**

<b>Impact</b>	<b>Extent</b>	<b>Magnitude</b>	<b>Duration</b>	<b>Probability of occurrence</b>	<b>Overall Assessment</b>
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Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Increased crime, drug abuse and prostitution	Local	Medium	Temporary	Likely	Moderate

### Mitigation

- The contractor shall involve local (LC) leaders in labour recruitment to ensure that people hired have no criminal record.
- The local content provision shall be emphasised to minimize labour requirements needed from outside the community.
- Local governments and the contractor shall collaborate with police to contain criminal activities.
- The Developer together with the Contractor and the Iganga/Kaliro district local governments shall undertake comprehensive awareness to avoid/minimize risks related to drug use and prostitution.

#### 7.2.1.6 Impact on Water and Sanitation

Surface water is used for domestic and wild animals, and plays a critical role in the agro-ecosystem of the area. The groundwater in the area is abstracted by the local community through wells and boreholes. Water flows to lower areas where it feeds into wetlands and water bodies making them very highly sensitive receptor to contaminants especially from, erosion of excavated soils, construction camps or sanitary wastes. The works will involve excavations of trenches and later back filling and if poorly compacted, loose soils may be eroded leading to siltation of natural drainage systems and water courses. The Contractor shall have mobile toilets for the construction crew and therefore poor management of sanitary wastes may end up polluting water sources. Domestic wastes and Hazardous materials (fuels, lubricants etc) handling if not well done may also impact on surface water quality. Servicing of project vehicles if done inappropriately may lead to pollution of water sources.

### Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impact on Water and Sanitation	Local	Medium	Temporary	Likely	Moderate

### Mitigation Measures

- The contractor to ensure disturbed sites, particularly the trenches are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion
- At the camp and material storage areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;
- If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites
- The movement of hazardous liquid chemicals like oils will be done on drip trays to avoid spillage to the ground;
- No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;
- All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line
- All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes.
- Mobile toilets for the construction crew shall be periodically emptied, and the contents shall be disposed off at Iganga Sewage Treatment Plant.
- Wastes shall be handled by licensed waste firm and disposed off at a gazetted waste disposal facility.

#### **7.2.1.7 Impacts on gender**

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

#### **Risk assessment matrix**

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

### Mitigation measures

- Workers will be sensitized on their sexual rights. MWE shall Work with the contractor on establishing zero tolerance policies and codes of conduct related to violence against women and girls (VAWG). All employees must be made aware of the zero-tolerance policy and codes of conduct for employees.
- All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences.
- To the extent possible, there will be gender sensitivity in task allocation;
- The contractor shall conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others and;
- There will be a Specialist (Social Specialist) to oversee gender mainstreaming in the project.
- Workers will be informed about national laws and funder’s policies that make sexual harassment and gender-based violence a punishable offence which is prosecuted;
- Worker Code of Conduct will be part of the employment contract, and including sanctions for non-compliance (for example, termination);
- The contractor, where a case arises, will cooperate with law enforcement agencies in investigating complaints about gender-based violence.

#### 7.2.1.8 Impact on transport (*Interference with traffic and diminished road safety*)

The proposed project will cut across several access roads within the project areas as presented in project maps in chapter 1 and 4. The activities that may lead to this impact include roadside works, cutting across the roads that involves excavation of trenches, and use of project vehicles and equipment. With the understanding that the water pipelines will be constructed along the road reserves of the existing public roads, the impact of construction works on road safety can be a major challenge. The movement of project vehicles while dropping woekers and delivering materials may also compromise the safety of the road. If proper mitigation measures are put in place, construction works across and along these roads could result into critical interferences with traffic or accidents. It’s therefore necessary that key precautions be undertaken at such road crossing to avoid accidents and impairing traffic activities.

### Risk assessment matrix

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

### Mitigation measures

- The Contractor shall develop and Implement a traffic management plan
- To minimize interference with traffic, digging trenches and piping across roads shall be conducted in hours with less traffic or on weekends. Depending on the alternative roads available, either the affected road shall be temporarily closed and vehicles diverted or 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.
- 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.
- The contractor will have to notify traffic police in advance and work with it during trenching across major roads.
- All company vehicles used in the transportation of construction workers, material and equipment to and away from the site shall be in sound mechanical conditions. Evidence shall always be provided by recording the status of the vehicle in the Daily Vehicle Inspection Form (Annex 4) before usage.
- All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits.
- 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 Municipality 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.
- 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).

### 7.2.1.9 *Impact on Education (schools and learning process)*

The proposed booster shall be constructed within the fence of Wairaka colleged. Also, as indicated in sections 4.1.1.14 and 4.1.2.4, some schools will benefit from the project and construction activities are likely to impact on the learning process. Noise from trench excavation activities and lying of water pipes may disrupt the learning process. There is also a probability of occurrence of accidents in locations near schools due to project vehicle movements. Male workers could also lure school girls with money and other gifts which could lead to child abuse. School attendance may be affected as some children might decide to skip school so as to earn money from the project while others may spend time simply watching construction works. This is a highly sensitive impact of moderate magnitude because its duration is short term.

#### **Risk assessment matrix**

<b>Impact</b>	<b>Extent</b>	<b>Magnitude</b>	<b>Duration</b>	<b>Probability of occurrence</b>	<b>Overall Assessment</b>
Impact on schools and learning process	Local	Medium	Temporary	Likely	Moderate

#### **Mitigation measures**

- Schools shall be sensitized on the need to keep off construction sites.
- Working schedule shall be consulted with the school administrator to avoid critical quite hours. The working schedule shall be designed considering the school schedule and any potential adjustments needed to minimize any disturbances to student education and learning performance.
- Workers to be instructed to observe silence while working across sections of the project and transmission line which are considered nearby schools.

- The contractor shall not employ any person below 18 years and any pupil or student above 18 shall not be employed during school time. Students above 18 years can be employed only during holidays.
- Workers shall be required to strictly adhere to the code of conduct designed for the project
- For Wairaka College, the construction areas shall be hoarded off and a new gate created near the main gate to avoid construction activities from interfering with school activities.
- The workers shall not be allowed to interface with the students of the affected schools. The Code of conduct that shall be signed by all workers and will have a requirement of workers not interacting with school children.

### 7.2.1.10 Potential child abuse

The project area is prone to child marriages, defilement, neglect, abandonment, discrimination of children by sex (especially girl child) and child labour (See sections 4.1.1.15 and 4.1.2.15). The weak law institutional set up to handle children cases/problems, culture and beliefs all are still dominant and promote cases of child abuse. The proposed project traverses areas with a number of schools and settlements and it is likely that some project workers could engage in sexual relations with school and under aged children. This could result in increase in child pregnancy/marriage, sex work involving children and school dropout/Defilement of school children/marrying school girls. In addition, during the construction phase contractors could be tempted to use children as laborers in order to save money on labour costs, which amounts to child labour and abuse. Sensitivity is medium due to relative public awareness about child abuse which makes the overall impact significance substantial.

### Risk assessment matrix

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

### Mitigation measures

- Child labour is prohibited on the project and the contractor shall be
- A child protection plan will be developed by MWE and provided to all the contractors prohibiting them from using children as laborers. All workers seeking employment shall be required to present National IDs as a way of avoiding recruiting children on the project. The Plan shall be implemented by the Contractor and monitored by MWE, District Local Governments as well as Minsitry of Gender Labour and Social Development



- Ensure that the community and local leadership have access to and know of and report abuse using the national child abuse hotline 611. The existence of the hotline can be displayed throughout near the construction site and in the community at large.
- The contractor shall ensure that mechanisms for close monitoring of worker's behaviour/conduct are in place e.g. contractor could discreetly engage the police to identify anonymous informers from among the workers to monitor and report any negative behaviour by the workers including child abuse related misconduct, display a call line or suggestion box where the community can provide feedback on workers behaviour.
- MWE and the contractor shall ensure that all local leaders and women/child representatives are fully oriented to the labour force related risks for children engaging in construction related activities.
- Talks with the contractor and his workforce by relevant guests (including the police) on child protection shall be encouraged and appropriately scheduled, including continuous popularization of the child help line 611. Parents/guardians shall be sensitized and held accountable for children leaving and arriving home before dark.
- Any person involved in child abuse shall be dealt with in accordance with the law.
- The contractor will ensure that children and minors are not employed directly or indirectly on the project.

#### 7.2.1.11 Impacts on Physical Cultural Resources

Some cultural properties as highlighted in Chapter 5 exist in the project area but will not be affected by the project as they are not in the project footprint (All of them are more than 500m from the project sites). The key PCRs are the Nambale cultural shrine belonging to Mr. Hassan Waiswa (About 800m from the project sites), the Indian cemetery (about 500m from the proposed project sites) and Ziribondho's palace (about 700m from the proposed transmission corridor). Although most of the major cultural sites, churches and mosques identified are quite far from the water pipeline and associated project facilities, the possibility that some cultural features along the transmission route can be encountered can't be ruled out. In general, the impact on cultural property will be minor since a few or hardly any existing cultural property are likely to be affected.

#### Risk assessment matrix

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

## Mitigation

- At the local level, additional consultations will be carried out prior to commencement of works by the contractor at the project sites.
- Where cultural resources are encountered, compensation will be provided including support for relocation, such as graves, where applicable in a culturally acceptable manner.
- Excavation of sites of known archaeological importance should be avoided, and the routing of water transmission/distribution lines or location of their project components should be designed to avoid graveyards or sites of historical or spiritual importance;
- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artifacts before commencement of work. Such training should be administered in liaison with DMM
- In the event of any chance finds of significance by the contractor, following the discovery of possible PCR, the Contractor will be required to follow a “chance finds procedure” in section 12. The Contractor will be required to stop works and contact MWE to inform the Department of Museums and Monuments (DMM). The Contractor should have the artefacts secured or protected, and prevent any access.
- DMM will then undertake investigations, and works will only resume once authorization is provided.

### 7.2.1.12 Impact on topography (Aesthetics pollution)

The topography of the area is relatively flat with most of the area in a lowland lying between two wide valleys (See section 4.2.1). Excavations and heaping of spoil soil or storage of the construction materials will be visible because of the flat nature of the area and may be unaesthetic to some people. The project will involve construction of 7 above ground water storage facilities, an office and a booster station. These being above ground may lead to visual pollution for those who do not want to see these facilities. Because of this, the project may attract resistance and complaints from a section of the affected people which may slow down the project implementation pace. A well planned and designed development of this nature with well-kept green areas may be aesthetically pleasing to the eye compared to the current land use. Since the project will mainly be implemented in trading centres the impact is rated as minor

### Risk assessment matrix

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

**Mitigation Measures:**

- Excavated soil shall be heaped for a short time (1-5 days) and re-used for backfilling. In case the soil is not required for backfilling, it shall be ferried to designated waste desposal sites in the districts of Iganga, Kaliro and Jinja.
- The affected area shall be restored through landscaping and leaving it to undergo natural colonisation by plants.
- The materials shall be stored in a way that the height does not cause visual intrusion. Preferably the height should not be more than 2 metres.

**7.2.1.13 Susceptibility to soil erosion**

The soils in the districts are reddish brown sandy loams mixed with clay loams (See section 4.2.2). The sandy nature of soils makes it susceptible to erosion if exposed. The site earthworks during construction of water distribution pipework network, water storage reservoirs, clarifier and the booster station will reduce soil stability and hence make the soils aggregated and more susceptible to erosion especially during the rainy season.

The impact of soil erosion is likely to be Negligible-Minor since width of the trenches for the pit is not big (for transmission lines the trenches are Diameter 6 feet x Depth 1.2m, for the distribution its Diameter 3feet x Depth 1m), excavated soil is used to backfill the trenches immediately after laying the pipes and the impact is localised and for a short time. Where as for clarifier, the amount of soil that will be excavated is a lot (about 30m<sup>3</sup>) and if not well handled may be washed away by rain thereby silting silting water sources.

**Risk assessment matrix**

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

**Mitigation measures**

- The construction sites for storage tanks, booster station and clarifier will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by

storm water. The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation.

- No spoil soil shall be temporarily placed in water ways.
- The top soil shall be kept separately so that it is used last in backfilling of the excavated areas. This is to ensure that the living soil (top soil) is available for plant growth in disturbed areas.
- MWE will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. Native vegetation must be used for re-seeding the excavated site.
- The excess soil shall be spread along the trench by the Contractor but in liason with the local people; special attention would be made not to dispose of such construction wastes in swamps on any sensitive ecosystem.
- The excavated soil from the pit for the clarifier shall be removed from the site every end of the day and disposed off in accordance with the National Environment (Waste) Management Regulations, 2020.

#### **7.2.1.14 Impacts on Sources of Raw Materials**

Construction raw materials such as aggregates and sand for the clarifier as well as the booster station will be required and these will be sourced from either Jinja district or the neighbouring districts. The sources of materials have not been identified by this ESIA. The Contractor shall identify the sources and subject them to ESIA inline with the national and the World Bank requirements. Mining activities lead to a number of impacts, including impacts on air quality, hydrology and water quality, ecology and biodiversity, social concerns, health and safety concerns, and resource issues.

#### **Risk assessment matrix**

<b>Impact</b>	<b>Extent</b>	<b>Magnitude</b>	<b>Duration</b>	<b>Probability of occurrence</b>	<b>Overall Assessment</b>
Impacts due to the sourcing of raw materials	Local	Moderate	Temporary and non-cumulative	Certain	Moderate

#### **Mitigation measures**

- Raw material extraction be carried out at NEMA approved sites to be identified by the Contractor during project implementation;

- NEMA approved site management plan be prepared by contractors for each raw material extraction site;
- Cover extracted loose raw materials with tarpaulin during transportation; do not overload vehicles to avoid accidents.
- Active borrow pits shall be fenced off with clear markings to avoid accidents etc.
- Any new borrow pits established by the project and would not be used later, shall be restored to as close to pre-project conditions as possible immediately after use. Native vegetation must be used for re-seeding the excavated site.
- Materials will be preferentially sourced locally to minimize transport distances. For the existing material sources, the Contractor will be required to undertake due diligence to establish operational compliance status of these sites before procuring the material.
- In case the Contractor identifies a new site, s/he shall subject the site to environmental and social impact assessment and acquire all the necessary approvals as required by the National and World Bank requirements.

#### **7.2.1.15 Exposure to high vibrations and noise levels**

The sound measurements made during the ESIA exercise indicated that noise levels were within the national standards (See Figures 4-3 and 4-4). The construction activities that involve use of heavy equipment are likely to generate noise beyond the current levels and those stipulated in The National Environment (Noise Standards and Control) Regulations, 2003. The use of heavy equipment is also likely to generate vibrations . Exposure of communities and workers to high noise and vibration levels can be a health concern and needs to be mitigated. High noise and vibrations levels are likely to be generated by workers and movement of equipment. The noise levels should not be above 85dBs as stipulated by the National Environment (Noise) Control Regulations, 2003.

#### **Risk assessment matrix**

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

#### **Mitigation measures**

- No employee should be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. (National Environment (Noise) Standards

and Regulations). Workers operating equipment generating noise levels greater than 80 dBA over long hours must be given earmuffs;

- Workers be provided with the necessary personal protective equipment (PPE) such as ear muffs as found appropriate;
- The use of hearing protection by all the workers should be mandatory. The mandatory use of hearing protection equipment (earmuffs) should be enforced by the management of the Water Treatment Plant.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.
- Sites must be hoarded to curb noise impacts to neighboring communities.
- 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.
- For Wairaka college, the site should be hoarded off, materials should be brought it during non-learning hours i.e. during weekends, in the evening after classes or in the morning before classes to reduce on vehicular noise.

#### **7.2.1.16 Impact on Flora (Vegetation and crops)**

The project mostly traverses settled and built-up areas and modified areas under cultivation or animal rearing. Very little remaining natural vegetation remains in the project area, due to extensive human activities. There is no characterisation of rare and/or restricted-range species. The conservation value of species found was rated as below average, with no restricted-range or endemic species.

The clearing of corridor, movement of equipment and contractor staff and laying of pipes will lead to spot destruction of vegetation especially in areas under fallow. Biodiversity surveys carried out along the entire proposed water transmission and distribution corridor show that the project area is heavily degraded and comprises mainly subsistence farmlands. At the time of the survey, about 70-80% of the water pipeline corridor segment has been turned into farmlands of beans, maize, rice, cassava and sugarcane. The rest of the corridor is either land under fallow or homesteads/trading centres. *Khaya anthotheca* evaluated as Vulnerable (VU) was encountered in the project area, however it will not be directly impacted by the project activity. Encountered in the proposed water pipeline corridor. Although the systematic clearing of the 2-meter strip of land in the road reserve will result into destruction of some vegetation and crops, the impact on the conservation status of the affected flora & ecosystems is expected to be minor-low. The extent of damage is also minor-low. However,

movements of the contractor and the entire crew may spread invasive species from one locality to another. Such species include *Imperata cylindrical*, *Lantana camara*, *Mimosa pigra*, *Ricinus communis* and *Senna spectabilis* and others as listed in chapter 4.

There are no critical habitats within or near the proposed project area. There are no rare or endangered species of flora within the project footprint. However, *Khaya anthotheca*, *Milicia excelsa* and *Tamarindus indica* which are on the national list of threatened species were recorded within the project area but outside the project area of influence hence shall not be affected by the project activities.

In general, the impact of vegetation and crops, will be localized, minor in magnitude, reversible but non-cumulative, thus a minor change will occur. Therefore, the impact of construction activities on the crops, vegetation and terrestrial habitats is expected to be Negligible to Minor following the implementation of the mitigation measures

#### Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of vegetation, crops and terrestrial habitat	Limited area	Medium	Temporarily	Almost certain	Negligible-Minor

#### Mitigation measures proposed

- Before carrying out valuation of the affected crops, adequate sensitization meetings shall be conducted among all the affected persons to prepare them psychologically and to address any concerns at hand.
- A RAP shall be developed and implemented by MWE to ensure that affected property is compensated.
- As part of the RAP, a comprehensive property impact survey shall be conducted which shall indicate all affected properties within the water transmission corridor/way leave, their owners and the replacement costs. Valuation of such property shall be conducted by experienced valuers in association with the district land board and local leaders.
- Prior to compensating the affected persons, adequate community sensitization meetings shall be carried out to ensure that the PAPs are aware of the entire program including visitation schedule per village, parish and or sub-county and how each PAP will be contacted and approached for payment.



- Prior to the compensation process, the Project Affected Persons (PAPs) shall be individually notified about the compensation amount to be paid. The PAPs may accept or refuse the compensation proposed depending on their expectations, market rates and damages incurred.
- The construction of the proposed water infrastructure shall only commence when all the affected farmers have been fully sensitized of the pending activities. Prior to the construction phase, farmers shall be sensitized on the pending project at least 6 months in advance such that cultivation under the line and within the water pipe corridor is stopped or reduced. This will give affected farmers ample time to plan in advance so as to avoid going into several negotiations with The Developer at later stage when the contractors have come in to implement the project.
- The Developer shall set aside funds to contribute towards local environmental programs like biodiversity offset programs if any. The Developer may remit funds towards district and sub-county afforestation projects to compensate for biomass lost during corridor clearing. The compensation shall be done after RAP and property and offset valuation studies done by the developer. The biodiversity off-set program is unlikely as the proposed project area is highly modified and no critical biodiversity was found in the area. In case the destruction is due to contractor's negligence, it will be the responsibility of the contractor to make compensation. MWE shall take the overall responsibility however, the contractor takes liability of those plants/trees destroyed either knowingly or unknowingly and which are outside the Corridor
- 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.
- 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.
- The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been reoved before pitting the trenches for the pipeline should be put back to cover the trenches so that the crops can regrow in a natural environment. Excess soil, stones and boulders should be dumped in an area that has been approved by the District Environment Officer

#### ***7.2.1.17 Disturbance and degeneration of wetlands and aquatic ecosystems***

All the wetlands along the project area are modified by farming of sugarcane and rice and they are located along the water transmission route between Iganga and Kaliro. The fish, reptilian and micro-invertebrates recorded in the area are of no conservation value. In addition, the species composition in

the project area is very poor. Therefore, the project is anticipated to cause no negative environmental impact on the aquatic biodiversity along the project area

The project will not construct access roads. The main activities that will be undertaken in the wetlands are installation of pillars to for anchoring the distribution lines. Anchoring and installing the water transmission system within these wetlands can increase total suspended solids. However, the impact on these wetlands is likely to be minor since the wetland is already disturbed with rice and sugarcane cultivation. It is assumed that no clearing of wetland vegetation will be necessary for construction or operation phases since the water pipes will be suspended on top of the wetlands using concrete or metallic stands, and further given that the areas are already cultivated. Thus, no significant biological effects including on fish and other micro-organisms are expected. Further, no Critical Habitat species was found along the proposed project route and hence no impact on critical habitat is expected to be caused by the project. There will also not be likely implications on the human activities of subsistence fishing and farming. However, the exact number and locations of concrete or metallic stands for suspending the water transmissions pipes will be determined on the ground at the time of construction (and in consultation with Wetlands Department), to minimize social and environmental impacts.

**The standard construction procedure for pedestals (pipe supports) in wetlands (swamps) is as follows**

Based on the Engineers route and alignment, the Contractor undertakes a confirmatory survey to set out the actual pipeline route. 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.

- i) 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.
- ii) Once approved by the Engineer – reinforcement works for the pedestal base and column are undertaken until the pedestal is ready to receive the pipe.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Disturbance and degeneration of wetlands and aquatic ecosystems	Local	Medium	Temporary	Unlikely	Minor

### Mitigation measures

The following mitigation measures will be used to minimize disturbance of the wetland, and avoid permanent intrusion into the wetland areas:

- Construction works across wetlands will use existing road corridors for construction and operational access wherever possible.
- Where the route requires the suspension points for the water pipes to be located in the swamp and in areas which cannot easily be accessed from existing roads or causeways, temporary access ways built from Terramats or similar structures will be used and removed after.
- Obtain wetland user permits from NEMA before constructing across or along wetlands and follow all guidelines given.
- All project workers should be sensitized to minimize damage to flora and fauna.
- Close monitoring and supervision of the construction operations to ensure compliance to the NEMA permit conditions and avoid causing further damage to undesignated project areas.
- The water transmission pipes shall be built over the already degraded wetland and the artificial streams thereinto prevent abnormal flow during the rainy seasons.

#### 7.2.1.18 Impacts on water quality

The project will entail excavations and generation of wastes. The project will traverse areas with streams (See section 4.3.3.6). The clarifier will be constructed at about 300m from L. Victoria. 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 (see Table 4-7 and 4-8). The excavations for pipes, clarifiers and 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. If mitigation measures are implemented, ground water quality will not be affected while impact on surface water quality will be minimal. The overall impact significance therefore is negligible.

**Risk assessment matrix**

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Pollution of Surface Water or interfering with surface water flow	Local	Low	Temporary	Likely	Negligible-Minor

**Mitigation Measure:**

- The Contractor shall construct a drainage system with silt traps to reduce impacts of storm water from the construction site.
- 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.
- 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 centers (garages) away from the water transmission and distribution corridor.
- All other forms of hazardous waste regardless of their hazardous properties such as plastics, polythene and others shall be collected out of the project site and disposed in gazetted NEMA waste disposal sites.
- 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, 1999. 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.

#### 7.2.1.19 Impacts on fauna

The baseline studies recorded a total of nine amphibian species, four reptilian species, 246 individuals of birds were recorded, 12 mammalian species, 39 butterfly species and 7 dragonfly species in the project area. All the amphibian, mammalian and invertebrates species recorded according to the red listing (IUCN, 2018; WCS, 2016) are of Least Concern (LC) both globally and nationally. All the reptilian and avian species recorded are of Least Concern (LC) except the *Agama agama mwanzae* which is both nationally and globally considered as of Least Concern. All birds encountered were of no conservation concern except Crowned Crane which is a national bird. The fauna like amphibians. Reptiles and mammals can be trapped in excavated trenches but the trenches will be backfilled concurrently with pipework laying and excavations. For other fauna like birds the impact would be due to clearance of their habitats but the project will be implemented in a highly modified environment with no habitats. Therefore, the construction activities of the project will have minor impact on the fauna diversity of the area. However, preventive mitigation measures have been proposed.

#### Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impacts on fauna	Local	Medium	Temporary	Unlikely	Minor

#### Mitigation measures

- Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to fauna.
- The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been removed before pitting the trenches for the pipeline should be put back to cover the trenches so that the mobile fauna is not affected.
- If wild animals are encountered, the Contractor shall notify UWA so that it is picked and taken to a secure place.

- Trenching, pipework laying as well as well as backfilling will be done concurrently. For pits like at the clarifier and the booster pump, the contractor shall ensure that every evening, the pits are covered with timber while being secured with a warning tape.

#### 7.2.1.20 Generation of Solid Waste

The proposed project will generate waste of various types. Waste will be generated during construction of the clarifier, booster and laying of water transmission and distribution pipes. Such waste may include plastic offcuts from the HDPE and uPVC pipes and other accessories associated with water and sanitation projects. Organic waste will also be generated at temporary eating places such as food stuffs and human excreta. Plastics waste such as mineral water bottles, polythene bags (Kaveera), Jerricans, cups, plates and other plastic accessories may be found along the corridor if not well managed. 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 impact of littering waste is likely to be Negligible-Minor since much of the waste is not expected to be hazardous or infectious.

#### Risk assessment matrix

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

#### Mitigation measures

- All sorts of waste generated during construction such as HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and delivered to recycling facilities. Other forms of waste which are inert or ceramic in nature (construction wastes - waste generated by demolition of the building to pave way for construction of a clarifier) 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 Municipal and/or Town Council landfills for disposal in Kaliro, Iganga and Jinja

- 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 Iganga Kaliro and Jinja for onward transmission to Plastic Recycling Industries Ltd in Kampala and other plastic recycling facilities in Kampala and Jinja.
- The project should make provision for construction of an additional drying bed since the current one is working beyond its capacity.
- Human excreta shall be managed using a mobile toilet and then disposed at the National Water and Sewerage Treatment Plants in Kaliro, Iganga and Jinja.
- 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.
- The contractor will work with the respective Local governments to facilitate sound waste handling and disposal. All wastes must be taken to the approved d waste desposal facilities. Proof of delivery and safe disposal of waste will be provided and records maintained at all times.

## **7.2.2 Operation Phase Impacts**

Once the water transmission and distribution pipes have been constructed, the environmental impacts associated with the operation phase will be minimum. Most of the impacts of the operation phase are associated with the water transmission and management, social impacts, Sewage collection and management all of which have been discussed already in this chapter under construction phase. Additional impacts during operational phase as detailed down below;

### **7.2.2.1 Impact on public Health**

#### ***Positive impact***

The proposed Iganga-Kaliro Towns Water Supply and Sanitation Project will contribute towards reduction in occurrences of waterborne diseases, especially cholera, dysentery and diarrhea. This expected since the communities will access clean water for drinking and domestic activities. The



project will also support construction of two 8 stance toilets at public places. The people will have access to safe water and improved sanitation facilities. The project will have significant strategic benefits in reducing the burden on the cost of health care services as diseases could be reduced. Improved water supply and sanitation will promote good health and reduce health care costs thus making overall national savings for investment in other developmental activities.

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

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

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

***Negative impact***

The project is also expected to have some negative impacts in the project area. This is because it is expected to attract various categories of people who will seek employment on project activities during operation of the project. The project will obviously lead to establishment of social networks among the locals and the project workers, which can promote the spread of socially transmitted diseases especially Covid-19, HIV/AIDS and other STIs. According to the community, HIV/AIDS scares them most. Pressure on the existing health services is likely to increase. Although not many skilled workers are expected, the impacts of diseases have a multiplier negative effect. Interraction of wokers with communities may enhance chances of the impact on health services and the health of the residents is likely to be minor since the number of imported workers for the operation of the water and sanitation project may be less than 10.

When completed, the project will have two 8 stance public toilets in additions to sanitary facilities at offices. The public toilets if not cleaned on a daily basis, provided with water all the time and if septic tank emptying is not done on time, it may become a public health risk in the area. The public health impacts dur to sanitary facilities is major if the mitigation measures are not implemented. The overall impact assessment is moderate.

**Risk assessment matrix**

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Public Health concerns due to labour influx and sanitation	Local	High	Short – medium	Possible	Moderate

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
			term		

### Mitigation

- The public toilets should have an adequate water storage facility to ensure that water is available 24 hours even when the supply from the main is off.
- The project should provide for provision of adequate hand washing facilities at the public toilets
- The Operator should ensure that the public toilets are clean at all times
- The Contractor shall provide surveillance and active screening and treatment of workers and the community where a communicable disease is discovered.
- All impacts of public health nature shall be mitigated using a well-coordinated approach that must involve health centres in the project area.
- All workers shall be orientated and sensitized about responsible sexual behaviour in project communities.
- The Operator will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).

### For prevention of Covid-19, the following measures shall be adhered to:

- Establish a daily screening protocol for staff and visitors, to ensure that potentially infected staff do not access worksites.
- Regularly clean and sanitize surfaces like desks, doors, printers, vehicles, toilets, and other shared equipment and spaces.
- Establish a hand washing station at the entrance to the worksite and the security MUST ensure that all people accessing the worksite wash their hands.
- Employees and visitors must at all times maintain the recommended social distancing and must not make unnecessary make direct contact with the staff and clients. The Ministry of Health proposal for working in shifts MUST be complied with. In this regard, recommend that a rotational timetable for staff be prepared and communicated.
- The Developet/contractor should provide protection materials i.e. (i) face shields which must be put on all the time when the employees are on duty and (ii) Hand sanitizers to be on every work desk/station.
- The physical meetings must be minimized and virtual meetings encouraged.

### **7.2.2.2 Impact on the local economy and associated dynamics**

The proposed project would result in increase of volume of water for production which could result in improved livelihoods of the local people. Water is indispensable for survival and improving the quality of life – for health (drinking, eating and bathing) and for economic development (agro-processing and business). The project would, therefore increase productive activities through reduced sick days and time saved in fetching water. This impact will be enhanced through the following:

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

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

Human capacity building and the creation of jobs in water management through the involvement of private operators in the management, repair and maintenance of water supply facilities will come along with this project. These will constitute skilled, semi-skilled and unskilled labourers. Skilled personnel will be employed as Managers, Supervisors, and in other Technical positions whereas unskilled laborers will be support staff and perform non-technical work. The income accruing from such activities will obviously change their standards of living. About 10-20 people will get jobs during operation phase. More employment will be created to the local proprietors who will be providing services like food, accommodation, medical care, among other services.

#### **Negative impact**

The project may also have negative impacts on the economy of area. There is one social group, the water vendors, who are likely to have their livelihoods undermined following project implementation. The water vendors are the men (very rarely are women) who currently collect water and sell it on to individual users. The project will support construction of 14 public post where communities will be fetching water from. The public posts will bring water closer although it might reduce the amount of money each jerrycan was being paid for. Therefore, the livelihood may not be lost but the income of the vendors will reduce as the distance from where the water will be fetched will be shorter than the current distnaces.

#### **Risk assessment matrix**

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

### Mitigation Measures

- MWE should sensitise existing water vendors in the area about adapting to the new developments in the area. This would eliminate their negative attitude towards the proposed project and result in total project support.
- The community Development officer (CDO) should 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 could continue selling water to those who would wish to get water at their door steps.
- Vendors would be encouraged to be involved in casual work in the course of the construction works.

#### 7.2.2.3 Impact on Water and Sanitation

##### *Positive impacts*

One of the positive impacts of the proposed project will be bringing improved water and sanitation services closer to the people. This will ease the burden of fetching water which is one of the most arduous tasks for women and young girls in the rural areas. Therefore, the time which has always been wasted on water fetching can be invested into the development of income-generating activities especially for the women. This impact will be enhanced if the following are done:

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

##### *Negative impacts*

The project will support construction of two 8-stance public toilets as well as sanitary facilities at the markets. Any mismanagement of sanitary waste generated during the operation may lead to pollution of the area which may end up polluting the water sources. This may cause risk to public health.

However, given that the project will use septic tank technology for handling of sanitary wastes, proper planning for emptying and disposal makes the significance of the impact negligible.

**Risk assessment matrix**

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Soil and water pollution	Local	High	Temporary	Less Likely	Negligible

**Mitigation measure**

- A Periodic maintenance regime including desludging will be put in place and implemented.
- Use of manifest system to ensure that the wastes are disposed off at the National Water and Sewerage sewage Treatment plant in Iganga.

**7.2.2.4 Impacts on gender**

**Positive**

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

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

**Negative**

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

### Risk assessment matrix

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

### Mitigation measures

- The Operator will develop and implement zero tolerance policies and codes of conduct related to violence against women and girls (VAWG). All employees must be made aware of the zero-tolerance policy and codes of conduct for employees.
- All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences.
- To the extent possible, there will be gender sensitivity in task allocation;
- The contractor shall conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others and;
- Worker Code of Conduct will be part of the employment contract, and including sanctions for non-compliance (for example, termination);

#### 7.2.2.5 Impact on Education (schools and learning process)

The operational phase of the project will have positive impacts on education. Due to UPE, the enrolment rate is about 99% at primary school level in the project area. However, the completion rate stands at 7% which is very low. Therefore, the project is expected to translate into an increase in the completion rates, especially for girls. 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 o taffordable piped water.

Access to good water would save time and keep children healthy so that they would be able to attend school regularly. Good environmental sanitation and water facilities would foster a healthy school environment. This impact will be enhanced through targeting and connecting schools that are within the project footprint.

### 7.2.2.6 Impacts of Solid Waste generation

During the operation of the project, solid waste will be generated and especially from the water offices. The waste shall be generated from the activities of the office as well as activities of maintaining the water the water transmission and distribution line. The waste stream will include food remains, package bags, stationery waste, obsolete pipes and other forms of waste. If not well managed, the area could be prone to nuisance from foul smell, breeding of vermin and vectors, and lead to outbreak of diseases. But with measures in place to manage the waste, the significance of the impact is negligible.

#### Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Soil, water, air and aesthetic pollution	Local	Low	Temporary	Likely	Negligible

#### Mitigation measures

- Waste collection bins will be provided at strategic positions at the water offices/reservoirs 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 facility operator will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA.
- Waste management plan will be developed and implemented

### 7.2.2.7 Impacts from damages of the distribution 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. Therefore, measures to prevent or minimize potential community health risks associated with damaging of water distribution system need to be undertaken. These impacts can be caused by leakage of or brokage of pipes e.t.c.

#### Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Water contamination during	Within limited	Medium	Temporary-	Possible	Moderate



Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
distribution	area		short term		

### ***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:
  - a) Minimizing microbial growth and biofilm development (e.g. by ensuring adequate residual disinfection levels). 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;
  - b) Choosing residual disinfectant (e.g. chlorine or chloramines) to balance control of pathogens and formation of potentially hazardous disinfection by products;
  - c) Using construction materials that do not contribute to release undesirable metals and other substance or interact with residual disinfectants.

### **7.2.2.8 Wastewater and septage collection**

The project will support two 8 stance water borne gender disaggregated public toilet in Kaliro to serve the residents in the busy areas such as the main park and market. The office facilities will also be fitted with toilet facilities. The area has no sewerage system and therefore it will have a septic tank system. Therefore, the collection, transportation and disposal of sewage must be done correctly to minimize or avoid health risks to communities. Measures to minimize potential community health risks can therefore be achieved in the collection and treatment of wastewater and sludge. Collection of sewage and transportation away from public toilets as well as the office toilet while not alone sufficient to protect public health, is nevertheless generally the most important aspect of sanitation. Under the Iganga-Kaliro Towns Water Supply and Sanitation Project, human waste will be managed by use of septic tanks which shall be emptied and treated at a site (waste treatment plant) gazetted by NEMA. Therefore, measures need to be put in place to ensure all waste water and sewage from septic tanks is fully collected and disposed appropriately.

### **Risk assessment matrix**

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Public health impacts(Diseases, foul smell, unwanted visual impacts	Within limited area	Medium	Temporary-short term	Possible	Moderate

### Mitigation measures

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

#### 7.2.2.9 Impacts on Surface Water flow

The project will not affect surface flow regimes and drainage of water will continue via the natural drainage. It is, however, important to note that not much storm water run-off shall originate from the proposed site/ water offices. An increase in storm water runoff though small will result from the site due to these premises and paved areas, which do not allow infiltration of rainwater. Storm water runoff from the fuel in the parking areas may contain some hydrocarbons from minor oil or fuel leaks/spills. Storm water run-off typically also contains silt and suspended solids/particles.

### Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Stagnation of surface water as well as its contamination,	Local	Low	Temporary	Likely	Minor

### Mitigation Measure:

- Proper drains will be constructed and all the water from the roof tops will be harvested for use at the facility for sanitation purposes. The car parking area will be paved and the green areas maintained to avoid erosion.
- A purpose designed drainage system will ensure adequate drainage of the site. The drainage network will be designed to carry storm water to the boundary of the site where it will then discharge into the existing storm water drainage system in the area. Maintenance of the drainage

network will involve regular clearing of drains of sediment and other waste. Harvesting rain water from structure roofs (this is much water) into both overhead tanks. This water can be used for sanitation purposes among other uses.

- The Developer will also construct an oil interceptor within the stormwater drainage system to trap any oily substances

### 7.2.2.10 Risk of fire from offices

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

#### Risk assessment matrix

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

#### Mitigation measures

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

### 7.2.3 Decommissioning Phase Impacts

The Iganga-Kaliro Towns Water Supply and Sanitation Project has been planned to operate up to 2039 after which a system upgrade may be required. Therefore, for the next 20 years, full scale decommissioning of the project is not anticipated to take place except a site construction decommissioning approach which can be considered at the moment in this study. During construction phase auxiliary facilities like camps shall be established. These facilities might not be aesthetically pleasing to communities or the land onto which they were established was compacted and therefore

can not be re-used for agriculture. Decommissioning of these facilities will depend on whether the host communities want these facilities. In case they want them, the contractor shall enter into a handover MOU. However, if they are not required, the Contractor shall decommission them. The practical decommissioning will for now involve the following:

- Restoration of disturbed sites through levelling and re-vegetation measures;
- Removal of obsolete equipment and associated equipment parts;
- Demobilization and return of imported labour force after the project;
- Grievance management mechanisms with the host communities before site closure;
- Repairs of damaged roads and restoration of access routes and rout deviations;
- Removal of construction debris and unused materials.

Within 3months before decommissioning, the operator shall develop a, detailing the following;

- Requirements and procedure for removing equipment and structures from the site,
- Requirements and procedures to restore the site to a useful condition;
- Site investigation to determine contaminated areas and extent of contamination;
- Description of options for remediation of contaminated areas on site, post decommissioning land use, information on how possible socio-environmental impacts will be minimized during decommissioning and measures to protect the public against risk or danger resulting from site conditions prevailing after decommissioning,
- Plan on how decommissioning will be funded.

The developer shall submit the decommissioning plan to NEMA for approval. Decommissioning shall also have a restoration plan to adequately remediate any onsite contamination and restore site to the maximum extent consistent with anticipated post decommissioning use.

### **Positive impacts of decommissioning**

The following positive impacts are associated with the decommissioning phase of the project

#### *(i) Site Rehabilitation*

Decommissioning of the project support facilities will be carried out to restore the site to its original status or to a better state than it was originally. This will include replacement of topsoil and re-vegetation which will lead to restoration of the visual quality of the area.

#### *(ii) Employment Opportunities*

For demolition to take place properly and in good time, several people will be involved. As a result, several employment opportunities will be created for the demolition staff during the demolition phase of the unwanted facilities. The impact will be direct, temporary and minor.

### **Negative impacts of decommissioning**

The following three negative impacts discussed below are associated with the decommissioning phase.

(i) *Noise and Vibration*

The demolition works will lead to significant deterioration of the acoustic environment within the project decommissioning facilities' areas. This will be as a result of the noise and vibration that will be experienced as a result of demolishing the structures. **The impact will be direct, temporary and minor.**

*Mitigation*

Workers shall be provided with adequate protective wear (Ear muffs)

(ii) *Solid Waste Generation*

Demolition of the structures will result in generation of solid waste. The waste will contain the materials used in construction including concrete, metal, wood, glass, paints and adhesives. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. **The impact will be direct, permanent and major.**

*Mitigation*

Solid waste shall be managed in accordance with the National laws. A licensed waste handler shall be contracted to transport and dispose wastes at a gazette waste disposal facility

(iii) *Generation of Dust*

Some dust will be generated during demolition works . This will affect demolition staff as well as the neighbours. **The impact will be direct, temporary and minor.**

*Mitigation*

(a) *All workers shall be provided with adequate and appropriate Dust masks*

(b) *Communities shall be informed of the plan to decommission and shall be sensitized on potential impacts*

### **7.2.4 Cross-cutting impacts**

This section presents impacts that are common to both construction and operation phases of the project.

### 7.2.4.1 Occupational health and safety of workers

The project personnel, including subcontractors and workers are very sensitive receptors who could be affected by construction works and water system operations activities thus the sensitivity of the receptor will be high. Infrastructure projects like water and sanitation facilities are often physically demanding and may involve hazards such as open trenches and pits. These hazardous are brought about by excavation of trenches for the pipes, pits for the clarifier and booster station. Operating heavy equipment and driving of project vehicles present transport hazards. Working at heights and operating especially during construction of water offices, booster station, water storage reservoirs and sanitary facilities will present potential falling safety risks. Work at water storage facilities may also involve entry into confined spaces and wet wells which present suffocation and slipping safety risks. Handling of chemicals during storage or dosing for water treatment may expose workers to chemical toxicity risks. Operation of equipment and vehicles will generate noise and emissions which may affect the health and safety of workers. OHS risks or problems could also result from insufficient medical capability at the construction site; or neglect of safety equipment, precautions and procedures. Other causes of OHS problem include but not limited to:

- Lifting of heavy and sharp objects;
- Poor transportation of materials for for construction during construction phase and maintenance during operational phase;
- Improper storage as well as handling and use of dangerous substances/ chemicals;
- 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;
- Lack of adequate PPE; and
- Biological hazards (vermin, mosquitos, pathogens, etc.).

The transmission lines including the distribution lines will cover a total distance of 33.18km, the project will also support construction of an office, public toilet, clarifier and seven water storage facilities under which over 40 workers will be exposed to different risks during construction phase and over 10 workers during operational phase hence the magnitude of the impact is anticipated to be Major.

Table 7-4 : Occupational health and safety of workers-Impact Assesment Summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Physical hazards (all phases)	Major	Workers and the public-High	Major
Poor sanitation	(all Major)	Workers and the	Moderate to Major

phases)	public-Medium
Occupational hazards Moderate (Operation)	Workers and the Moderate to Major public-High

### **Mitigation measures**

- The contractor/Operator should have in place a Health and Safety Policy and Action Plan, addressing workers' occupational health and safety issues, workers' welfare and working conditions in line with the Occupational Health and Safety Act of 2006, and World Bank Group EHS general Guidelines, and the EHS guidelines for water projects
- The Contractor/Operator should have HSE induction for all workers, and undertake daily tool box meetings prior to works, including work at heights
- Ensure adequate provision of PPEs (gloves, safety shoes, safety belts, overalls and goggles, ear muffs as well as dust musks), as well as continuous awareness on the need for use of PPEs and enforcement of usage
- Ensure good housekeeping practices on site (have all equipment, materials, containers well stacked or stored) to avoid trips and falls on site
- All workers on sites should be well trained on the risks and their tasks
- Workers should regularly be taken through safety drills and emergency preparedness training allowing for quick and efficient responses to accidents that could result in human injury or damage to the environment.
- First aid facilities should be provided on site and accessible to all personnel. It should among others contain rubber gloves, bandages, pain killers and cotton wool to cater for minor accident victim.
- Secure site boundaries with fences or hoardings as appropriate;
- The Operator will ensure that incompatible chemicals are not stored together. The Chemicals storage facility should not be accessed by unauthorised employee and, for all chemicals used on site and in storage, Material Safety Data Sheets should be provided
- The contractor to have in place a traffic management plan, and guidelines for drivers to avoid accidents. For example, speed limit of 30km/hr should be enforced.
- Ensure safe working heights through provision of work platforms, scaffolds and adequate supervision by ensuring regular inspection of formwork, false work and temporary supports before loading or pouring concrete;
- Install caution signage around the site to discourage the public from being close to the site, for example, "falling debris", "keep off the site" etc. .
- The Client through the contracted Construction Supervisor will continually monitor Contractors' compliance with Health and Safety measures.



- Safety signage shall be installed in key areas warning people on the possible risks and also indicating what should be done to avoid the risks,

#### **7.2.4.2 Labour issues and employee conduct**

A number of workers will be engaged by the contractor to ensure completion of works as per schedule. Similarly, the Operator will recruit a number of workers for the operation of the project. Working conditions including wages, working hours, provision of PPE, use of child labor, provision of medical care, water and food, provision of sanitary facilities, sexual harassment among workers and to the community, and workers' grievances may arise. There is also the possibility of a transient or migrant workforce, with associated impacts of child abuse, fraternisation breaking marriages and possibility of spread of diseases including HIV/AIDS. The sensitive receptors are the workers, women, children and the host communities in the project area.

The impacts of working conditions and welfare and those resulting from interactions with the host community will be temporary, lasting the construction period, but some impacts may be long term or permanent especially for the operational phase. Cases of early pregnancies will have long term impact on the girl child welfare. Where workers' grievances are not addressed in a timely manner, works may be delayed and may affect the delivery of project benefits as per schedule. The sensitivity of receptors is rated high and magnitude of impact medium.

#### **Mitigation measures**

- Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism
- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement
- To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly.
- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.
- Contractor to have in place a workers' code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour

- While recruiting workers especially to fill up the non-skilled nature of jobs such as casual jobs or where skills can be obtained easily on job, the Developer or Contractor shall give the local people first priority.
- In the employment contracts, workers shall be entitled to work for 8 hours beyond which overtime will be paid.
- All workers shall be given appointment letters indicating their obligations as employees.
- All workers shall be entitled to free medical care if the cause of the injury or sickness is as result of working at the distribution line or any activities of the Contractor or Developer.
- All contract workers must be paid as per the contract. All casual labourers must receive a fair day pay for a fair day's work done.
- Exploitation of workers and refusal to pay workers is an offence and the contractor must be monitored to ensure that all workers are paid.
- All workers must be paid promptly and correctly.
- Workers need to be sensitized of their rights and need to be represented by a mediator in the affected districts through the office of the labour officer.
- The contractor shall employ an onsite Environment Health and Safety Officer with a Safety Committee in place.
- The Contractor shall develop and implement a health and safety management plan that at minimum has safety risks and their corresponding mitigation measures.

## **8 SOCIAL AND ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**

### **8.1 General Considerations**

The Environment and Social management and monitoring plan proposed in Table 8.1 specifies mitigation measures and monitoring actions with time frames, specific responsibilities assigned and follow-up actions defined in order to check progress and the resulting effects on the environment by the construction works, and subsequent operation, of the project. Monitoring shall begin right away and shall continue through both the construction stage and through to the operation phase. One important aspect of monitoring shall be to assess the effectiveness of the mitigation measures suggested. Where they are found lacking, appropriate new actions to mitigate any adverse effects shall be undertaken.

Implementation of these measures have to be carried out at different stages of project construction & operation phases. During the detailed design stage, the consultant shall incorporate proposed mitigation measures in the design and tender documents. The contractual agreement shall also include articles to enforce the environmental issues. Construction stage activities are mainly the responsibility of the contractor and that of the construction supervision consultant. The actual physical implementation works are carried out mostly at this stage. The execution of construction works for the proposed Iganga-Kaliro Towns Water Supply and Sanitation Project shall also equally treat the implementation of the physical works of environmental mitigation measures.

## 8.2 Environmental and Social Management Monitoring and Plan matrix for the project

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
General Provisions									
1.	All impacts	All activities in Project Site	All phases	All project sites	<ul style="list-style-type: none"> <li>a) Achieve full compliance with the the national and World Bank safeguards requirements, upon which this ESMP is based, through regularly monitoring and address on-site situations and through applying the relevant mitigation measures.</li> <li>b) The Environmental Officer can issue penalties, in consultation with relevant authorities, for incidents of non-compliance, and always in liaison with NEMA.</li> </ul>	MWE	<ul style="list-style-type: none"> <li>a) Compliance with all ESMP requirements.</li> <li>b) Number of non-compliance fines issued.</li> </ul>	NEMA, MoLGSD, DWRM, DLGs	-
2.	All impacts	All activities in Project Site	Construction	All project sites	<ul style="list-style-type: none"> <li>a) Sensitise all Contractors, including foremen, supervisors and labourers in the requirement for and full implementation of the ESMP.</li> <li>b) Employ an adequately qualified and experienced Environmental and Social Safeguards Officers to ensure environmental and social safeguards requirements are integrated in the design and construction phases of the project.</li> <li>c) Put in place simple Construction Method Statements for activities in sensitive areas, like wetland areas and densely populated areas.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Sensitisation reports</li> <li>Appointment letters of safeguards personnel</li> <li>Component specific work procedures in place</li> </ul>	MWE, NEMA, MoLGSD, DWRM,	48,000
Specific provisions									
3.	Impacts on landuse and settlement patterns	Laying of pipes interfering with settlement patterns as well as land use	Design and Construction	All project sites	<ul style="list-style-type: none"> <li>a) The water transmission line routes should be as much as possible restricted within the road reserves;</li> <li>b) 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.</li> <li>c) Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the 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.</li> </ul>	MWE	<ul style="list-style-type: none"> <li>Pipeline routing designs</li> <li>Community engagement plan and reports</li> <li>RAP report and compensation reports</li> </ul>	NEMA, MoLGSD, MoIUD DWRM,	10,000
4.	Impact on public Health	Interraction of workers with communities Dust generation Waste generation	Design and Construction	All project sites	<ul style="list-style-type: none"> <li>a) Workers and the community shall be sensitized on protective behaviour and practices during work by distributing appropriate education materials to workers and the surrounding community.</li> <li>b) The Contractor shall develop and implement an HIV prevention and management Plan.</li> <li>c) High risk groups such as the youths especially students shall be continuously sensitized on the dangers of casual sex, consequences of early marriages, teenage pregnancy and monitored to ensure that such groups are not at risk of falling victims.</li> <li>d) The Contractor shall provide surveillance and active screening and treatment of workers and the community where a communicable disease is discovered.</li> <li>e) Excessive alcohol abuse shall be discouraged as a policy among project construction workers.</li> <li>f) The contractor and subcontractors ought to</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Stakeholder engagement reports</li> <li>HIV prevent and management plan</li> <li>Substance abuse policy</li> <li>Accommodation facilities</li> <li>Code of conduct developed and signed by all employees</li> <li>SOPs for Covid -19 prevention</li> <li>Hoarded sites</li> <li>Records of sprinkling</li> </ul>	MWE, NEMA, MoLGSD, MoIUD DWRM, DLGs	25,000

<sup>1</sup> Indicative costing provides an indication of scale and costs will ultimately be more accurately determined according to the availability of funding and support from other ministerial agencies, at the stage of rolling the project out on the ground.

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>have adequate sanitation facilities for the workers at both places of residences and at all work places.</p> <p>g) The contractor or subcontractors shall procure a secure and descent accommodation for all staff either through renting the existing structures in the project area or by constructing new houses in consultation with MWE and local authorities.</p> <p>h) All construction workers shall be orientated and sensitized about responsible sexual behaviour in project communities.</p> <p>i) The contractors will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).</p> <p>For prevention of Covid-19, the following measures shall be adhered to:</p> <p>j) Establish a daily screening protocol for staff and visitors, to ensure that potentially infected staff do not access worksites.</p> <p>k) Regularly clean and sanitize surfaces like desks, doors, printers, vehicles, toilets, and other shared equipment and spaces.</p> <p>l) Establish a hand washing station at the entrance to the worksite and the security MUST ensure that all people accessing the worksite wash their hands.</p> <p>m) Employees and visitors must at all times maintain the recommended social distancing and must not make unnecessary make direct contact with the staff and clients. The Ministry of Health proposal for working in shifts MUST be Complied with. In this regard, recommend that a rotational timetable for staff be prepared and communicated.</p> <p>n) The Developet/contractor should provide protection materials i.e. (i) face shields which must be put on all the time when the employees are on duty and (ii) Hand sanitizers to be on every work desk/station.</p> <p>o) The physical meetings must be minimized and virtual meetings encouraged.</p> <p>For prevention of dust, the following measures shall be adhered to:</p> <p>p) Construction sites (clarifier, storage tanks and booster station) shall be hoarded off to restrict dust to within site boundaries;</p> <p>q) Sprinkle water on vehicle pathways;</p> <p>r) PPE like dust masks shall be availed to workers whenever needed;</p> <p>s) Loose materials like sand that are susceptible to dust generation during haulage be covered with tarpaulin;</p> <p>t) Limit vehicle speed to 30km/hr on murram roads using speed bumps in trading centres.</p>		PPE issuance records		
		Interaction of workers and communities during connections and maintenance activities	Operation	Water offices At all project infracture	<p>a) The public toilets should have an adequate water storage facility to ensure that water is available 24 hours even when the supply from the main is off.</p> <p>b) The project should provide for provision of adequate hand washing facilities at the public toilets</p> <p>c) The Operator should ensure that the public toilets are clean at all times</p> <p>d) The Contractor shall provide surveillance and</p>	Operator	<p>Engagements reports</p> <p>Hand washing facilities</p> <p>Employment records for cleaners</p> <p>Code of conduct developed and signed by all employees</p>	MWE, NEMA, MoLGSD, DWRM, DLGs	10,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>active screening and treatment of workers and the community where a communicable disease is discovered.</p> <p>e) All workers shall be orientated and sensitized about responsible sexual behaviour in project communities.</p> <p>f) The Operator will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).</p> <p>For prevention of Covid-19, the following measures shall be adhered to:</p> <p>g) Establish a daily screening protocol for staff and visitors, to ensure that potentially infected staff do not access worksites.</p> <p>h) Regularly clean and sanitize surfaces like desks, doors, printers, vehicles, toilets, and other shared equipment and spaces.</p> <p>i) Establish a hand washing station at the entrance to the worksite and the security MUST ensure that all people accessing the worksite wash their hands.</p> <p>j) Employees and visitors must at all times maintain the recommended social distancing and must not make unnecessary make direct contact with the staff and clients. The Ministry of Health proposal for working in shifts MUST be Complied with. In this regard, recommend that a rotational timetable for staff be prepared and communicated.</p> <p>k) The Developet/contractor should provide protection materials i.e. (i) face shields which must be put on all the time when the employees are on duty and (ii) Hand sanitizers to be on every work desk/station.</p> <p>l) The physical meetings must be minimized and virtual meetings encouraged.</p>		SOPs for Covid -19 prevention		
5.	Impact on housing (Buildings, kiosks and other structures)	<p>Laying of water pipes which may displace structures like kiosks.</p> <p>Demolition of structures like houses</p>	Construction	All project sites	<p>a) MWE shall work with local council committees, sub-county committees, Councillors, district land boards, CAOs, RDCs, Politicians and other local leaders to sensitize all people to be affected on the intentions of land acquisition.</p> <p>b) MWE shall conduct a Resettlement Action Plan (RAP) in accordance with the Land Act and World Bank environmental and social Safeguard Policies especially Involuntary Resettlement (OP 4.12).</p> <p>c) MWE shall send a valuation team to negotiate with land and structural owners in compliance with local market prices and government rates so as to establish rational figures for compensation and resettlement.</p> <p>d) All sorts of compensation and settlements must be done at least 6 months before structures are demolished.</p> <p>e) All physically or economically displaced people should be offered an option between either a full resettlement package, including the provision of replacement residential land and a house, or cash compensation.</p> <p>f) Any grievances in the course of project implementation shall be addressed in accordance with the grievance redress mechanism presented in section 9.3.</p>	MWE	<p>MOUs with local leaders</p> <p>Engagement reports</p> <p>RAP report</p> <p>Negotiation minutes with the land owners</p> <p>Grievance redress reports</p> <p>Records of demolition waste management</p>	NEMA, MoLGSD, MoLHUD, DWRM, DLGs	<p>Costs of engagement already catered for in the engament activities in 1-4 above</p> <p>RAP and costs of compensation to be determined by RAP studies</p>

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					g) The demolition wastes shall be disposed off in accordance with the National Environment (Waste Management) Regulations, 2020.				
6.	Impact on agriculture (crops and animals)	Clearance of corridor Movement of equipment	Construction	At all project sites	<p>a) Before valuation exercise for crops or any other affected property, adequate sensitization meetings shall be conducted among all the affected persons to prepare them psychologically and to address any concerns at hand.</p> <p>b) 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.</p> <p>c) The laying of pipework should be done concurrently with excavation and covering of trenches to avoid accidents.</p> <p>d) Prior to compensating the affected persons, adequate community sensitization meetings shall be carried out to ensure that the PAPs are aware of the entire program including visitation schedule per village, parish and or sub-county and how each PAP will be contacted and approached for payment.</p> <p>e) Prior to the compensation process, the Project Affected Persons (PAPs) shall be individually notified about the compensation amount to be paid. The PAPs may accept or refuse the compensation proposed depending on their expectations, market rates and damages incurred.</p> <p>f) The construction of the proposed water infrastructure shall only commence when all the affected farmers have been fully sensitized of the pending activities. Prior to the construction phase, farmers shall be sensitized on the pending project at least 6 months in advance such that cultivation under the line and within the water pipe corridor is stopped or reduced. This will give affected farmers ample time to plan in advance so as to avoid going into several negotiations with The Developer at later stage when the contractors have come in to implement the project.</p> <p>g) 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 crops.</p>	MWE Contractor	Sensitisation reports  RAP report  Notifications to PAPs	MWE, NEMA, MoLGSD, DWRM, DLGs	Costs of engagement already catered for in the engagement activities in 1-4 above  RAP and costs of compensation to be determined by RAP studies
7.	Impact on the local economy and associated dynamics	Employment of locals Influx of workers Sell of goods by locals to the contractor and workers Renting of houses	Construction	All project sites	<p>a) The contractor shall involve local (LC) leaders in labour recruitment to ensure that people hired have no criminal record.</p> <p>b) The local content provision shall be emphasised to minimize labour requirements needed from outside the community.</p> <p>c) Local governments and the contractor shall collaborate with police to contain criminal activities.</p> <p>d) The Developer together with the Contractor and the Iganga/Kaliro district local governments shall undertake comprehensive awareness to avoid/minimize risks related to drug use and prostitution</p>	Contractor	Recommendation letters from LCs  No of local people employed on the project  Engagement reports	MWE, NEMA, MoLGSD, DLGs	Costs of engagement already catered for in the engagement activities in 1-4 above
		Water distribution	Operation	Entire project area	a) MWE should sensitise existing water vendors in the area about adapting to the new	MWE	Engagement reports with vendors	MWE	5000



No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>developments in the area. This would eliminate their negative attitude towards the proposed project and result in total project support.</p> <p>b) 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.</p> <p>c) Vendors would be encouraged to become scheme or kiosk operators; vendors would be encouraged to tender for public water points.</p> <p>d) Vendors could continue selling water to those who would wish to get water at their door steps.</p>	Operator	MOUs with water vendors to operate kiosk operators	Operator	
8.	Impact on Water and Sanitation	Excavations Waste and materials Management	Construction	All project sites	<p>a) The contractor to ensure disturbed sites, particularly the trenches are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion</p> <p>b) At the camp and material storage areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;</p> <p>c) If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites</p> <p>d) The movement of hazardous liquid chemicals like oils will be done on drip trays to avoid spillage to the ground;</p> <p>e) No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;</p> <p>f) All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line</p> <p>g) All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes.</p> <p>h) Mobile toilets for the construction crew shall be periodically emptied, and the contents shall be disposed off at Iganga Sewage Treatment Plant.</p>	Contractor	<p>Restoration plans and restoration closure reports</p> <p>Bunded storage facilities for fuels and lubricants</p> <p>Servicing records of vehicles</p>	MWE, NEMA, MoLGSD, DWRM, DLGs, NWSC	9000
		Emptying of septic tanks Run-off from the buildings	Operation	Public toilets and offices	<p>a) A Periodic maintenance regime including desludging will be put in place and implemented.</p> <p>b) Use of manifest system to ensure that the wastes are disposed off at the National Water and Sewerage sewage Treatment plant in Iganga.</p> <p>c) Proper drains will be constructed and all the water from the roof tops will be harvested for use at the facility for sanitation purposes. The car parking area will be paved and the green areas maintained to avoid erosion.</p> <p>d) A purpose designed drainage system will ensure adequate drainage of the site. The drainage network will be designed to carry storm water to the boundary of the site where it will then discharge into the existing storm water drainage system in the area. Maintenance</p>	Operator	<p>Maintainence plan and records for the system</p> <p>Waste management records</p> <p>Drainage system in place</p> <p>An oil interceptor</p>	MWE, NEMA, MoLGSD, DWRM, DLGs, NWSC	Costs of drainage system and an oil interceptor catered for in the civil works BoQs

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					of the drainage network will involve regular clearing of drains of sediment and other waste. Harvesting rain water from structure roofs (this is much water) into both overhead tanks. This water can be used for sanitation purposes among other uses. e) The Developer will also construct an oil interceptor within the stormwater drainage system to trap any oily substances				
9.	Impact on gender	Employment Compensation Sexual relationships	Construction	All project sites	a) Workers will be sensitized on their sexual rights. MWE shall Work with the contractor on establishing zero tolerance policies and codes of conduct related to violence against women and girls (VAWG). b) All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences. c) To the extent possible, there will be gender sensitivity in task allocation; d) The contractor shall conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others and; e) There will be a Specialist (Social Specialist) to oversee gender mainstreaming in the project. f) Workers will be informed about national laws and funder's policies that make sexual harassment and gender-based violence a punishable offence which is prosecuted; g) Worker Code of Conduct will be part of the employment contract, and including sanctions for non-compliance (for example, termination); h) The contractor, where a case arises, will cooperate with law enforcement agencies in investigating complaints about gender-based violence.	Contractor	Enagement plans and reports  Policies related to gender developed and implemented  Social development expert recruited  Code of conduct developed and implemented	MWE, NEMA, MoLGSD, DLGs	Social Development Expert already catered for in 2 above.
			Operation	All project sites	a) The Operator will develop and implement zero tolerance policies and codes of conduct related to violence against women and girls (VAWG). b) All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences. c) To the extent possible, there will be gender sensitivity in task allocation; d) The Operator shall conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others and; e) Worker Code of Conduct will be part of the employment contract, and including sanctions for non-compliance (for example, termination);	Operator	Enagement plans and reports  Policies related to gender developed and implemented  Code of conduct developed and implemented	Operator	4000
10.	Impact on transport (Interference with traffic and diminished road safety)	Excavations across roads	Construction	Road crossings	a) The Contractor shall develop and Implement a traffic management plan b) To minimize interference with traffic, digging trenches and piping across roads and highways shall be conducted in hours with less traffic or on weekends. c) 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. d) The contractor will have to notify traffic police in advance and work with it during trenching	Contractor	Traffic Management Plan  Road traffic signages	MWE, NEMA, MoLGSD, UNRA, DLGs, NWSC	3000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>across highways and other major roads.</p> <p>e) All company vehicles used in the transportation of construction workers, material and equipment to and away from the site shall be in sound mechanical conditions. Evidence shall always be provided by recording the status of the vehicle in the Daily Vehicle Inspection Form (Annex 4) before usage.</p> <p>f) All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits.</p> <p>g) 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 Municipality administration.</p> <p>h) 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 24 hours in advance.</p> <p>i) 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.</p> <p>j) The vehicle speed shall be limited to a maximum of 30km/hr areas near sensitive facilities.</p> <p>k) Works near sensitive facilities shall only be limited to day time (7am to 6pm).</p>				
11.	Impact on Education (schools and learning process)	Excavations and pipe laying Construction of the booster station	Construction	Within or near schools	<p>a) Schools shall be sensitized on the need to keep off construction sites.</p> <p>b) Working schedule shall be consulted with the school administrator to avoid critical quiet hours. The working schedule shall be designed considering the school schedule and any potential adjustments needed to minimize any disturbances to student education and learning performance.</p> <p>c) Workers to be instructed to observe silence while working across sections of the project and transmission line which are considered nearby schools.</p> <p>d) The contractor shall not employ any person below 18 years and any pupil or student above 18 shall not be employed during school time. Students above 18 years can be employed only during holidays.</p> <p>e) Workers shall be required to strictly adhere to the code of conduct designed for the project</p> <p>f) For Wairaka College, the construction areas shall be hoarded off and a new gate created near the main gate to avoid construction activities from interfering with school activities.</p> <p>g) The workers shall not be allowed to interface with the students of the affected schools. The Code of conduct that shall be signed by all workers and will have a requirement of workers not interacting with school children.</p>	Contractor	<p>Schools engagement plans and reports</p> <p>Code of conduct developed and signed</p> <p>Construction site at Wairaka hoarded off</p> <p>Child protection policy developed and implemented</p>	MWE, NEMA, MoLGSD, DLGs	Costs of hoarding of construction site already incorporated in civil works BoQs
12.	Potential child abuse	Employment Interactions of workers with communities	Construction	At all project sites	<p>a) A child protection plan will be developed by MWE and provided to all the contractors and school management to discourage the</p>	Contractor	Child Protection Policy and Plan	MWE, NEMA, MoLGSD, DLGs	-

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>contractors from using children as laborers. They will also be required to keep records that show the ages of their workers.</p> <p>b) Ensure that the community and local leadership have access to and know of and report abuse using the national child abuse hotline 611. The existence of the hotline can be displayed throughout near the construction site and in the community at large.</p> <p>c) The contractor shall ensure that mechanisms for close monitoring of worker's behaviour/conduct are in place e.g. contractor could discreetly engage the police to identify anonymous informers from among the workers to monitor and report any negative behaviour by the workers including child abuse related misconduct, display a call line or suggestion box where the community can provide feedback on workers behaviour.</p> <p>d) MWE and the contractor shall ensure that all local leaders and women/child representatives are fully oriented to the labour force related risks for children engaging in construction related activities.</p> <p>e) Talks with the contractor and his workforce by relevant guests (including the police) on child protection shall be encouraged and appropriately scheduled, including continuous popularization of the child help line 611. Parents/guardians shall be sensitized and held accountable for children leaving and arriving home before dark.</p> <p>f) Any person involved in child abuse shall be dealt with in accordance with the law.</p> <p>g) The contractor will ensure that children and minors are not employed directly or indirectly on the project.</p>		<p>Report on orientations about labour rights</p> <p>Employment records</p>		
13.	Impacts on Physical Cultural Resources	During excavations	Construction	At all project sites	<p>a) Structures like shrines and graves if encountered (if any) will be relocated in accordance with the existing rituals and norms of the society. Loss of incomes shall also be compensated for since the owners may take some time without any income from them especially if it's deemed necessary to relocate them far from their original site due to cultural rituals involved. Details of compensation shall be contained in the RAP.</p> <p>b) On discovering evidence of possible scientific, Paleontological, historical, prehistoric, or archaeological remains, the contractor shall notify the Department of Museums and Monuments giving the location and nature of the finds.</p> <p>c) The Contractor shall cease work in the vicinity of the site and request the responsible officer from the Department of Museums and Monuments to inspect the site and make recommendation on possible salvage within 72 hours.</p> <p>d) The Contractor shall exercise care so as not to damage artefacts or fossils uncovered during excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings.</p> <p>e) The department of Museums and Monuments is located in Kampala, Kamwokya just before Uganda Wild Life Authority on the road to Ntinda (Kira road). The Commissioner Uganda</p>	Contractor	<p>Chance Finds Procedure displayed</p> <p>Training records on CFP</p> <p>PCR avoidance procedures</p>	MWE, NEMA, MoLGSD, DLGs, DMM	1000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>Museum can be contacted on +256 772485624. A detailed chance find procedure has been presented in this report.</p> <p>f) To mitigate damage to archaeological resources, it is proposed that the construction foremen will inform construction crew to be aware of the possibility of discovering fossils or archaeological remains, what form these would take (bones, fossils in rock, shards or pottery, arrow heads etc.) and the procedure to be followed shall be as stated above.</p> <p>g) The contractor shall develop and implement avoidance procedures. In the event of human remains, there shall be no further excavations or disturbance of the site until the responsible police authorities have been informed.</p>				
14.	Impact on topography (Aesthetics pollution)	Excavations Heaping of excavated soils Erection of structures	Construction	At all the project sites	<p>a) Excavated soil shall be heaped for a short time (1-5 days) and re-used for backfilling. In case the soil is not required for backfilling, it shall be ferried to designated waste disposal sites in the districts of Iganga, Kaliro and Jinja.</p> <p>b) The affected area shall be restored through landscaping and leaving it to undergo natural colonisation by plants.</p> <p>c) The materials shall be stored in a way that the height does not cause visual intrusion. Preferably the height should not be more than 2 metres.</p>	Contractor	Restoration Plan and closure reports	MWE, NEMA, MoLGSD, DLGs	10,000
15.	susceptibility to soil erosion	Excavations Storage of construction materials	Construction	All excavated areas  Materials storage areas	<p>a) The construction sites for storage tanks, booster station and clarifier will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water. The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation.</p> <p>b) No spoil soil shall be temporarily placed in water ways.</p> <p>c) The top soil shall be kept separately so that it is used last in backfilling of the excavated areas. This is to ensure that the living soil (top soil) is available for plant growth in disturbed areas.</p> <p>d) MWE will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. Native vegetation must be used for re-seeding the excavated site.</p> <p>e) The excess soil shall be spread along the trench by the Contractor but in liaison with the local people; special attention would be made not to dispose of such construction wastes in swamps on any sensitive ecosystem.</p> <p>f) The excavated soil from the pit for the clarifier shall be removed from the site every end of the day and disposed off in accordance with the National Environment (Waste) Management Regulations, 2020.</p>	Contractor	Hoarded off sites  Restoration plans and closure reports	MWE, NEMA, DLGs,	15,000
16.	Impacts on Sources of Raw Materials	Sourcing and excavations	Construction	Sourcing sites	<p>a) Raw material extraction be carried out at NEMA approved sites to be identified by the Contractor during project implementation;</p> <p>b) NEMA approved site management plan be prepared by contractors for each raw material extraction site;</p> <p>c) Cover extracted loose raw materials with tarpaulin during transportation; do not overload</p>	Contractor	Legal approvals for the raw materials sites  Secured raw materials sites  Sites within the project area	MWE, NEMA, MoLGSD, DLGs	20,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>vehicles to avoid accidents.</p> <p>d) Active borrow pits shall be fenced off with clear markings to avoid accidents etc.</p> <p>e) Any new borrow pits established by the project and would not be used later, shall be restored to as close to pre-project conditions as possible immediately after use. Native vegetation must be used for re-seeding the excavated site.</p> <p>f) Materials will be preferentially sourced locally to minimize transport distances. For the existing material sources, the Contractor will be required to undertake due diligence to establish operational compliance status of these sites before procuring the material.</p> <p>g) In case the Contractor identifies a new site, S/he shall subject the site to environmental and social impact assessment and acquire all the necessary approvals as required by the National and World Bank requirements.</p>				
17.	Exposure to high noise levels	Excavations Machinery operations Vehicular movements	Construction	On all project sites	<p>a) 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;</p> <p>b) Workers be provided with the necessary personal protective equipment (PPE) such as ear muffs as found appropriate;</p> <p>c) The use of hearing protection by all the workers should be mandatory. The mandatory use of hearing protection equipment (earmuffs) should be enforced by the management of the Water Treatment Plant.</p> <p>d) Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.</p> <p>e) Periodic medical hearing checks should be performed on workers exposed to high noise levels.</p> <p>f) Sites must be hoarded to curb noise impacts to neighboring communities.</p> <p>g) Works should be undertaken during day time i.e. from 8am to 6pm.</p> <p>h) Works near schools should be done in periods like weekends in order not to interfere with learning environment.</p> <p>i) For Wairaka college, the site should be hoarded off, materials should be brought it during non-learning hours i.e. during weekends, in the evening after classes or in the morning before classes to reduce on vehicular noise.</p>	Contractor	Noise monitoring records  PPE issuance records Medical check up reports	MWE, NEMA, MoLGSD, DLGs	8,000
18.	Impact on Flora (Vegetation and crops)	Clearance for the right and other project sites	Construction	All project sites	<p>a) Before carrying out valuation of the affected crops, adequate sensitization meetings shall be conducted among all the affected persons to prepare them psychologically and to address any concerns at hand.</p> <p>b) A RAP shall be developed and implemented by MWE to ensure that affected property is compensated.</p> <p>c) As part of the RAP, a comprehensive property impact survey shall be conducted which shall indicate all affected properties within the water</p>	Contractor	Community engagement reports  RAP report and its implementation report  CSR activities on tree planting  Restoration plan and	MWE, NEMA, DLGs	50,000



No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>transmission corridor/way leave, their owners and the replacement costs. Valuation of such property shall be conducted by experienced valuers in association with the district land board and local leaders.</p> <p>d) Prior to compensating the affected persons, adequate community sensitization meetings shall be carried out to ensure that the PAPs are aware of the entire program including visitation schedule per village, parish and or sub-county and how each PAP will be contacted and approached for payment.</p> <p>e) Prior to the compensation process, the Project Affected Persons (PAPs) shall be individually notified about the compensation amount to be paid. The PAPs may accept or refuse the compensation proposed depending on their expectations, market rates and damages incurred.</p> <p>f) The construction of the proposed water infrastructure shall only commence when all the affected farmers have been fully sensitized of the pending activities. Prior to the construction phase, farmers shall be sensitized on the pending project at least 6 months in advance such that cultivation under the line and within the water pipe corridor is stopped or reduced. This will give affected farmers ample time to plan in advance so as to avoid going into several negotiations with The Developer at later stage when the contractors have come in to implement the project.</p> <p>g) The Developer shall set aside funds to contribute towards local environmental programs like biodiversity offset programs if any. The Developer may remit funds towards district and sub-county afforestation projects to compensate for biomass lost during corridor clearing. The compensation shall be done after RAP and property and offset valuation studies done by the developer. The biodiversity off-set program is unlikely as the proposed project area is highly modified and no critical biodiversity was found in the area. In case the destruction is due to contractor's negligence, it will be the responsibility of the contractor to make compensation. MWE shall take the overall responsibility however, the contractor takes liability of those plants/trees destroyed either knowingly or unknowingly and which are outside the Corridor</p> <p>h) Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to vegetation.</p> <p>i) When invasive species are encountered, they will be removed and destroyed, for example, by burning. The equipment and cars shall be cleaned to ensure that the construction activities do not contribute to the spread of the invasive species.</p> <p>j) The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been reoved before pitting the trenches for the pipeline should be put back to cover the trenches so that the crops can regrow in a natural environment. Excess soil, stones and boulders should be</p>		restoration closure reports		



No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					dumped in an area that has been approved by the District Environment Officer				
19.	Disturbance and degeneration of wetlands and aquatic ecosystems	Excavations and pipe laying	Construction	In wetland areas	<ul style="list-style-type: none"> <li>g) Construction works across wetlands will use existing road corridors for construction and operational access wherever possible.</li> <li>h) Where the route requires the suspension points for the water pipes to be located in the swamp and in areas which cannot easily be accessed from existing roads or causeways, temporary access ways built from Terramats or similar structures will be used and removed after.</li> <li>i) Obtain wetland user permits from NEMA before constructing across or along wetlands and follow all guidelines given.</li> <li>j) All project workers should be sensitized to minimize damage to flora and fauna.</li> <li>k) Close monitoring and supervision of the construction operations to ensure compliance to the NEMA permit conditions and avoid causing further damage to undesignated project areas.</li> <li>l) The water transmission pipes shall be built over the already degraded wetland and the artificial streams therein to prevent abnormal flow during the rainy seasons.</li> </ul>	Contractor	<p>Wetland user permit</p> <p>Monitoring reports</p>	MWE, NEMA, WMD, DWRM, DLGs, NWSC	3000
20.	Impacts on water quality	Excavations Waste management	Construction	Water sources	<ul style="list-style-type: none"> <li>a) The Contractor shall construct a drainage system with silt traps to reduce impacts of storm water from the construction site.</li> <li>b) The contractor shall implement waste management according to good practice to ensure waste does not pollute the surface water resources</li> <li>c) 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.</li> <li>d) 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;</li> <li>e) 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.</li> <li>f) 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 centers (garages) away from the water transmission and distribution corridor.</li> <li>g) All other forms of hazardous waste regardless of their hazardous properties such as plastics, polythene and others shall be collected out of the project site and disposed in gazetted NEMA waste disposal sites.</li> <li>h) All hazardous wastes including material soiled with hazardous wastes and empty containers of hazardous materials shall be stored in a</li> </ul>	Contractor	<p>Silt traps installed in the drainage channel</p> <p>Spill kit on site</p> <p>Embarkments around the raw materias</p>	MWE, NEMA, DWRM, DLGs, NWSC	7000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					designated area on site for regular removal and disposal by a registered contractor in accordance with the National Environment (Waste Management) Regulations, 1999. 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. i) A Spill kit will be maintained onsite to clean-up any accidental spills.				
21.	Impacts on fauna	Excavations Clearance of the right of way Movement of equipment	Construction	Habitats areas	a) 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. b) The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been reeved before pitting the trenches for the pipeline should be put back to cover the trenches so that the mobile fauna is not affected. c) If wild animals are encountered, the Contractor shall notify UWA so that it is picked and taken to a secure place. d) Trenching, pipework laying as well as well as backfilling will be done concurrently. For pits like at the clarifier and the booster pump, the contractor shall ensure that every evening, the pits are covered with timber while being secured with a warning tape.	Contractor	Restoration plan and closure reports  Notifications to UWA	MWE, NEMA, DLGs,	4000
22.	Solid waste generation	Laying of pipes Cooking Sanitary activities	Construction		a) All sorts of waste generated during construction such as HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and delivered to recycling facilities. Other forms of waste which are inert or ceramic in nature (construction wastes - waste generated by demolition of the building to pave way for construction of a clarifier) must be collected by NEMA gazetted waste handlers and taken to a NEMA gazetted waste disposal facilities for disposal. b) All organic waste generated at eating places during construction such as food stuffs shall be collected and transported by the contractor to designated Municipal and/or Town Council landfills for disposal in Kaliro, Iganga and Jinja c) 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 Iganga Kaliro and Jinja for onward transmission to Plastic Recycling Industries Ltd in Kampala and other plastic recycling facilities in Kampala and Jinja. d) Human excreta shall be managed using a mobile toilet and then disposed at the National Water and Sewerage Treatment Plants in Kaliro, Iganga and Jinja. e) The Contractor shall develop and implement a Waste Management Plan	Contractor	Waste Management plan and records	MWE, NEMA, DLGs, NWSC	7000
		Maintenance activities Office activities Sanitation activities at both the office and public toilets	Operation	Office/materials storage atea  Public toilet	a) Waste collection bins will be provided at strategic positions at the water offices/reservoirs for temporary waste storage. The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes.	Operator	Waste Management plan and records  Contract with a registered waste handler	MWE, NEMA, DLGs, NWSC	10000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>b) The facility operator will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA.</p> <p>c) Waste management plan will be developed and implemented</p>				
23.	Impacts from damages of the distribution network	Excavation activities by third parties	Operation	Along the distribution and operation corridor	<p>a) 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;</p> <p>b) Design and implementing a leak detection and repair program;</p> <p>c) Prevent introduction of contamination from the distribution system itself, for example by:</p> <ul style="list-style-type: none"> <li>- Minimizing microbial growth and biofilm development (e.g. by ensuring adequate residual disinfection levels). 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;</li> <li>- Choosing residual disinfectant (e.g. chlorine or chloramines) to balance control of pathogens and formation of potentially hazardous disinfection by products;</li> <li>- Using construction materials that do not contribute to release undesirable metals and other substance or interact with residual disinfectants.</li> </ul>	Operator	<p>Marked right of way</p> <p>Leak detection and repair plan</p>	MWE, NWSC	40,000
24.	Wastewater and septage collection	Emptying and disposal	Operation	Public toilet	<p>a) Promotion of collection services, or ensuring that collection services are available, is of primary concern.</p> <p>b) Timely collection of sewage should be undertaken to prevent sewage over flows.</p> <p>c) There should be a system among the communities, their leaders and the health workers to monitor, detect and alert the responsible authorities to call for emptying of any septic tank that poses danger to the community.</p>	Operator	Records on emptying activities	MWE, NEMA, DWRM, DLGs, NWSC	-
25.	Fire outbreak	Electrical shocks	Operation	Offices	<p>a) The project proponent and the contractor will put in place a comprehensive fire plan to guide the occupants and users of the offices incase of fire outbreak.</p> <p>b) The buildings shall be fitted with fire alarms to alert the occupants of any potential fire outbreak</p> <p>c) All electrical wiring will be carried out by certified electricians.</p> <p>d) There will be installation and proper maintenance of firefighting equipment (fire extinguishers and fire fighting water horse pipes).</p> <p>e) Management will carry out annual drills to ensure evacuation plans are effective and are understood by all facility occupants.</p> <p>f) The premises should also have permanently stationed security guards and lighting to ensure security against arson-associated fires.</p>	Operator	<p>Fire prevention and management plan</p> <p>Fire alarms installed</p>	MWE, NEMA, MoLGSD, DLGs,	12000
26.	Decommissioning phase impacts (Noise and vibration, Solid waste generation and Dust )	Demolition of structures and levelling	Decommissioning	At sites where decommissioning is taking place	<p>a) Workers shall be provided with adequate protective wear (Ear muffs and dust masks)</p> <p>b) Solid waste shall be managed in accordance with the National laws. A licensed waste handler shall be contracted to transport and dispose wastes at a gazette waste disposal</p>	Contractor	<p>Approved decommissioning plan</p> <p>Contract with licensed waste handler and records of</p>	MWE, NEMA, MoLGSD, DLGs	40000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					<p>facility</p> <p>c) Communities shall be informed of the plan to decommission and shall be sensitized on potential impacts</p>		<p>demolition wastes in place</p> <p>Community engagement reports</p> <p>PPE issuance record</p>		
27.	Occupational health and safety of workers	Lifting, working at heights, transportation etc	Construction and Operation	All project sites	<p>a) The contractor should have in place a Health and Safety Policy and Action Plan, addressing workers' occupational health and safety issues, workers' welfare and working conditions in line with the Occupational Health and Safety Act of 2006, and World Bank Group EHS general Guidelines, and the EHS guidelines for water projects</p> <p>b) The Contractor should have HSE induction for all workers, and undertake daily tool box meetings prior to works, including work at heights</p> <p>c) Ensure adequate provision of PPEs (gloves, safety shoes, safety belts, overalls and goggles), as well as continuous awareness on the need for use of PPEs and enforcement of usage</p> <p>d) Ensure good housekeeping practices on site (have all equipment, materials, containers well stacked or stored) to avoid trips and falls on site</p> <p>e) The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground</p> <p>f) All workers on sites should be well trained on the risks and their tasks</p> <p>g) Workers should regularly be taken through safety drills and emergency preparedness training allowing for quick and efficient responses to accidents that could result in human injury or damage to the environment.</p> <p>h) First aid facilities should be provided on site and accessible to all personnel. It should among others contain rubber gloves, bandages, pain killers and cotton wool to cater for minor accident victim.</p> <p>i) Fence off equipment storage areas and camp sites to discourage idlers to the sites</p> <p>j) The contractor and Operator to have in place a traffic management plan, and guidelines for drivers to avoid accidents.</p>	Contractor and Operator	<p>HSE Policy and Plan</p> <p>Safety Induction records</p> <p>PPE issuance records</p> <p>Traffic Management Plan</p>	MWE, NEMA, MoLGSD, DLGs	30,000
28.	Labour issues and employee conduct	Employment Interactions among workers and communities	Construction and Operation	All project sites	<p>a) Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism</p> <p>b) All workers to have contracts</p> <p>c) Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</p> <p>d) To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly.</p> <p>e) Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination</p>	Contractor and Operator	<p>Labour force management plan</p> <p>Workers contracts</p> <p>Workers code of conduct</p> <p>Workers Grievance Management System</p>	MWE, NEMA, MoLGSD, DLGs	20,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for monitoring	Annual Cost <sup>1</sup> (USD)
					among staff. f) Contractor to have in place a workers' code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour.				
	<b>TOTAL</b>								<b>391,000</b>

### 8.3 ESMP monitoring programme

#### Overview

The general approach to effective monitoring is to compare the pre- and post- project situations, measuring relevant environmental impacts against baseline conditions. Baseline data establish a reference basis for managing environmental impacts throughout the life of the project. A monitoring process will therefore be introduced to check progress and the resultant effects on the environment as the implementation of the Kaliro-Iganga water and sanitation project proceeds.

MWE will undertake the necessary monitoring measures for short- and long-term monitoring programme respectively. However, during monitoring close links shall be maintained with other relevant lead agencies. The key lead agencies that shall be kept in the loop will include Kaliro, Iganga and Jinja Local Governments, NEMA and DWRM. It is the role of the Developer to ensure that the Contractor implements the proposed mitigation measures presented in this ESIA report. The planned mitigation measures indicated in chapter 7 (Project Impacts) and chapter 8 (ESMP) shall be the starting point. These shall be planned and checked against their effectiveness in reducing the negative impacts/or enhancing the benefits identified in this report.

The process shall also include regular reviews of the impacts that cannot be contemplated at the time of doing this Environment Impact Assessment. Action shall be taken in response to the unforeseen changes and subsequently scale up the mitigation and monitoring measures. Monitoring shall undertake appropriate new actions to mitigate any negative effects.

The issues to monitor may include the following:

- Monitoring the clearing of the water transmission and distribution corridors including all forms of compensations and or resettlements made in respect of the displaced families or persons.
- Monitoring and supervision of the excavations for the water pipes and subsequent laying and burying of pipes.
- Monitoring the occupational health and safety of workers and the community among others.
- Monitoring the fate of solid waste/debris disposal and other wastes after it has reached and has left the site.
- Monitoring behavioural changes among the community and Contractors staff
- Monitoring Water Quality
- Monitoring Noise and dust pollution
- Monitoring Biodiversity changes

The Developer will monitor the actual environmental impacts of the proposed water and sanitation project to ensure that mitigation measures are implemented and standards adhered to. To be able to fulfill this requirement, it will be necessary to work with indicators of environmental change outlined in the ESMP. The indicators will be monitored as indicated in the ESMP and for some impacts, it may be weekly, monthly, quarterly, annually and at project decommissioning. Capacity to conduct monitoring will be built through training. The major objectives of the monitoring plan shall be;

- To assess compliance with the National Environment Management Authority (NEMA) EIA approval certificate conditions;
- Measure and improve the effectiveness of the Environment Management Plan (EMP);
- Assess the chemical, physical, and biological impacts of the project to the general environment.

A monitoring program will check on progress of the project and the resulting impact on the environment. It will also include regular reviews of the impacts that could not be adequately assessed before the project started, or which may arise unexpectedly. In such cases, appropriate new actions to mitigate any adverse effects will be undertaken. Furthermore, an environmental audit report will be prepared annually and submitted to NEMA for review and approval.

### **8.3.1 Monitoring Team**

While the Developer will do his own internal monitoring; a monitoring team headed by the District Environment Officer of Kaliro, Iganga and Jinja districts and composed of the local environmental authorities, representatives from the District and NEMA and any other lead agencies may also carry out monitoring. The Contractor shall undertake monitoring of key environmental parameters like water quality, noise and air pollution etc and make monthly reports to the Developer.

### **8.3.2 Stakeholders to be involved in the implementation**

The management and supervision of the ESMP is strictly the responsibility of the Ministry of Water and Environment as the Developer. During construction, the Contractor will be responsible for the day-to-day implementation of the ESMP. During the operation phase, the National Water and Sewerage Corporation (NWSC), who will take over management of the project, will be responsible for the implementation of the ESMP. The Developer, the Contractor and the Operator should employ an Environmentalist with relevant academic qualification and work experience. At the local level Jinja, Iganga and Kaliro will be responsible for the day-to-day monitoring of the ESMP in their areas of jurisdiction.

At the National level, two institutions i.e. the National Environment Management Authority (NEMA) and the Department of Occupational Safety and Health (DOSHS) of the Ministry of Gender, Labour and Social



Development will be involved. The role of NEMA is to monitor the project as per the Environment Act No.5 of 2019 and to approve external environmental compliance audits as per the Environmental Audit Regulations (1999). The role of DOSH is to issue permits and periodically inspect the project site. DOSH will issue workplace Certificates every year if the project meets working conditions as set out in the Occupational Safety and Health Act 2006. The District and town councils will approve construction permits in their area of jurisdiction.

As a means of impartiality, local NGO's or CBOs will be involved in the implementation of ESMP. Their role is to be neutral observers. They should have experience in environmental management and skills in conflict resolution.

### **8.3.3 Institutional and Implementation Arrangements (Adopted From IWMDP-ESMF, March 2018)**

The Project will be implemented by MoWE through its regional entities (WMZs, WSDFs) in close collaboration with Iganga, Kaliro and Jinja District local governments and their partners (e.g. private sector operators). To facilitate integration within the sector, MOU/MOUs outlining joint responsibilities will be signed between the MWE, respective district local governments and entities responsible for specific activities (e.g. Districts).

The Project's primary stakeholders are the: a) MoWE through which the project will be implemented in coordination with its relevant departments (e.g. DWRM, DWD, DEA); ii) Iganga, Jinja and Kaliro local governments iii) and local communities and consumers who will participate in project planning, and benefit from the outputs and outcomes of the project.

The MWE currently has adequate Environmental and Social Safeguards staffing, Respective A District Local Governments of Iganga, Kaliro and Jinja have Environment Officers and Community Development Officers who will be involved in project monitoring and supervision.

### **8.3.4 Roles and Responsibilities in the ESMP Implementation**

Ministry of Water and Environment will coordinate with NEMA on ensuring that environmental and social issues are addressed effectively throughout the lifecycle of the Project. Implementation of the different environmental issues is done through the relevant government institutions (Lead Agencies) within whose mandate the respective issues lie. The role of NEMA is to coordinate the input by all the different lead agencies and ensure compliance with the National Environmental Policy and Law. The monitoring team/ institutions shall be required to report on a quarterly basis. The reporting

metrics shall include among others accident and incidents, compliance with ESMPs, challenges and how to address the challenges

Implementation of the ESMP will involve multiple institutions at all levels as detailed out below in Table below.

Table 8-1 : Institutions involved in safeguards management of the project

<b>Ministries and Departments</b>	<b>Mandates/Responsibilities</b>
The Ministry of Water and Environment (MoWE)	The Ministry of Water and Environment (MoWE) has the overall mission: to promote and ensure the rational and sustainable utilization, development and effective management of water and environment resources for socio-economic development of the country. The ministry has three directorates: Directorate of Water Resources Management (DWRM), Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA). MoWE shall take lead on implementation of the project and shall ensure all recommendations contained in the mitigation plan are implemented.
Ministry of Local Government -MoLG	The Ministry is mandated to carry out a number of responsibilities in the Local Government Act as follows: to inspect, monitor, and where necessary offer technical advice/assistance, support supervision and training to all Local Governments; to coordinate and advise Local Governments for purposes of harmonization and advocacy; to act a Liaison/Linkage Ministry with respect to other Central Government Ministries and Departments, Parastatals, Private Sector, Regional and International Organizations; and to research, analyze, develop and formulate national policies on all taxes, fees, levies, rates for Local Governments. Iganga, Jinja and Kaliro DLGs fall under this Ministry and will be supervised and supported by MoLG.
<b>STATUTORY AGENCIES</b>	
National Environment Management Authority (NEMA)	NEMA retains its mandatory role of coordination, supervision and monitoring environmental issues. As for the implementation of the ESIA process, NEMA's role will involve coordinating the review of the ESIA's of the planned interventions with relevant line agencies. Other lead agencies that would participate in the review are the Ministry of Local Government and local governments.

	Specifically, the Environmental Monitoring and Compliance Department of NEMA is responsible for the review and approval of ESIA's, post-implementation audits and monitoring of approved projects. Although project sponsors have a responsibility for monitoring their own activities, NEMA carries out its own monitoring largely through District Environmental Officers and environmental inspectors at NEMA's head office/ Lead Agencies.
<b>DIRECTORATES</b>	
Directorate of Environmental Affairs (DEA)	The DEA is responsible for environmental policy, regulation, coordination, inspection, supervision and monitoring of the environment and natural resources as well as the restoration of degraded ecosystems and mitigating and adapting to climate change.
Directorate of Water Development (DWD)	The DWD is responsible for providing overall technical oversight for the planning, implementation and supervision of the delivery of urban and rural water and sanitation services across the country, including water for production. DWD is responsible for regulation of provision of water supply and sanitation and the provision of capacity development and other support services to Local Governments, Private Operators and other service providers.
Directorate of Water Resources Management (DWRM)	The DWRM is responsible for developing and maintaining national water laws, policies and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction and wastewater discharge permits; Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of transboundary waters resources and peaceful cooperation with Nile Basin riparian countries.
<b>DISTRICT</b>	
District Environment Officer (DEO)	The functions of the District Environment Officer is amongst others, advice the district Environment committee on all matters relating to the environment amongst others.
District Environmental Committees	The functions of the District Environment Committees include: to act as a forum for community members to discuss and recommend environmental policies and bye laws to the District Council and advice the District Technical Planning Committee, the District Council and NEMA on environmental management issues in the district.
NGOs	The NGOs working in the sector are coordinated at the national level through UWASNET, Uganda Water and Sanitation NGO Network an umbrella organization, which has been largely funded by sector development partners

	through MoWE.
Water Management at District Level	They receive funding from the center in the form of a conditional grant and can also mobilize additional local resources for water and sanitation programs. Local Governments, in consultation with MoWE appoint and manage private operators for urban piped water schemes that are outside the jurisdiction of NWSC.
<b>COMMUNITY</b>	
Beneficiary Communities	The Communities are responsible for demanding, planning, contributing a cash contribution to capital cost, and operating and maintaining rural water supply and sanitation facilities. A water user committee (WUC), which is sometimes referred to as a Water and Sanitation Committee (WSC) should ideally be established at each water point. Being the primary beneficiaries of the project, the community will be made to participate fully in all aspects of the program including project identification, preparation, implementation, operation and maintenance.

The goal of the IWMDP is to the maximum extent possible utilize existing institutional structures and capacity within the MOWE and NWSC to implement the Project. In order to successfully implement the ESMP, it is important to ensure that target groups and stakeholders who play a role in implementing it are provided with the appropriate and continuous Environmental and Social Safeguards capacity development.

The key institutions/group of people whose capacity needs to be enhanced to effectively implement and monitor the ESMP of this project are:

- **Beneficiary Communities:** There is a need to carry out training and awareness trainings for the key community members on the safeguard's aspects of the project. Further, they need to be facilitated to enable them effectively monitor the ESMP implementation process.
- **Staff of the respective District Local Governments:** The staff at the district level needs to be trained on key aspects of the project. They also need to be facilitated to enable them effectively monitor the ESMP implementation process.

There is a need for the project to foster inter institutional monitoring of the implementation of the project's ESMP. An interinstitutional monitoring committee should be formed, trained and their activities facilitated. A capacity building plan should be developed after instituting an inter institutional monitoring committee.

### **8.3.5 Roles of the Contractors during Project Implementation**

All contractors hired to undertake project civil works shall be required to develop a Contractor's ESMP which will include among others the following aspects: the initial sub-project ESIA approved by both NEMA and World Bank, Health and Safety Management Plan, Traffic Management Plan, Waste Management Plan, Equipment Yard Management Plan, Labour Influx Management Plan which shall also include Code of Conduct for Workers, Construction Materials Acquisition Due Diligence Procedure, etc. The Contractors shall hire the following key staff to undertake project implementation: Project Manager, Environmental Specialist, Sociologist and a Health and Safety Officer. The contractor shall be required to submit a monthly safeguards report. The reporting metrics shall include among others accident and incidents, compliance with ESMPs, challenges and how to address the challenges

## 8.4 Water source protection

The project will tap water from the existing water transmission network. The catchment of the sources of water for the project already has a source protection and catchment management plan that is already under implementation. The summary of the interventions by the plan are presented in the table below.

Table 8-2: Summary of interventions in the source protection and catchment management plan

Water Source protection	Underlying Cause	Intervention/control
Sustaining water quality at Abstraction point	Loss/degradation of wetland belt (due to agricultural encroachment) thus undermining capacity to filter sedimentation and or stabilize the lake shore bank.	<ul style="list-style-type: none"> <li>• Enforce wetland policy to protect or regulate wetland use.</li> <li>• Enforce Environmental Regulations (Lake Shore and Wetlands).</li> <li>• Promote wise use practices of wetland resources. Demarcate and protect Wetland/lake shore protection zone. You will supervise the Contractor during installation of concrete pillars along the boundary of the protection zone and planting of trees in the zone.</li> </ul>
	Use of agro pesticides that find their way into water at abstraction point	<ul style="list-style-type: none"> <li>• Improve capacity for safe handling and disposal of agro-pesticides</li> <li>• Promote soils erosion control measures so as to reduce surface runoff</li> <li>• Supervise the Contractor during construction of diversion trenches to trap and divert storm water or Soil wash from uptake point</li> </ul>
	Soil erosion/surface erosion from gardens and along the access road resulting in sedimentation/silting and pollution.	<ul style="list-style-type: none"> <li>• Promote soils erosion control measures so as to reduce surface run off</li> <li>• Supervise the Contractor during construction of road drainage to divert stormwater away from abstraction point.</li> </ul>
	Poor human and livestock waste disposal leading to contamination of water at the abstraction point	<ul style="list-style-type: none"> <li>• Restrict human and livestock access to abstraction and water treatment point through implementation of fencing.</li> <li>• Ensure safe disposal of human waste by implementation of Public, Communal and</li> </ul>

<b>Water Source protection</b>	<b>Underlying Cause</b>	<b>Intervention/control</b>
		Institutional toilets.
	Sand mining in the upstream drainage system	<ul style="list-style-type: none"> <li>• Regulate sand mining</li> </ul>
Sustaining water quantity	Poor agricultural land uses in the catchment that affect the hydrological system (underground water) e.g., through increased surface runoff, exposing high water table	<ul style="list-style-type: none"> <li>• Promote Sustainable land management /agricultural practices in the catchment.</li> <li>• Regulate sand mining in upstream drainage</li> </ul>
Maintenance of Water Supply Infrastructure	Insecurity of water supply infrastructure due to vandalism and thefts	<ul style="list-style-type: none"> <li>• Implement fencing of water supply infrastructure and provide for security of major infrastructure.</li> <li>• Develop and apply conflict mitigation/ management strategies.</li> </ul>
Ensuring adequate and equitable access to piped water	Population growth or concentration along supply routes resulting into increasing water demand	<ul style="list-style-type: none"> <li>• Implement water supply system that serves all the current and future population within the Project area.</li> <li>• Promote alternative water supply /water harvesting /water storage technologies.</li> </ul>
	Conflicts related to access to piped water among current and potential water users	<ul style="list-style-type: none"> <li>• Engage all Stakeholders during implementation of the water supply system.</li> <li>• Develop and apply conflict mitigation/ management strategies.</li> </ul>
Sustaining livelihoods	Declining soil fertility and overall land productivity	<ul style="list-style-type: none"> <li>• Promote Sustainable Land Management practices (soil fertility management, control of soil loss, etc.)</li> <li>• Promote technologies for enhancing land productivity (e.g., improved varieties of crops, disease and pest control, etc.)</li> </ul>
	Conflicting or competing land uses (e.g., cultivate wetland edge) and water uses (e.g., fishing near/around the abstraction point)	<ul style="list-style-type: none"> <li>• Zoning protection areas of the wetland, lake and infrastructure</li> <li>• Empowering stakeholders to plan for and manage their water sources (provision of incentives for protecting water source e.g., fishing gear and boats that enables fishing</li> </ul>



Water Source protection	Underlying Cause	Intervention/control
		activity in deep waters) <ul style="list-style-type: none"> <li>• Increase awareness on the relationship between land/water use and water quality and water availability at Mbiko landing site</li> </ul>

For sustainability, the project may augment the current measures as presented in the table above by supporting some of the interventions.



## 9 CONCLUSIONS AND RECOMMENDATIONS

Generally, the purpose of this project is to increase sustainable access to safe water and basic sanitation in Iganga & Kaliro towns and all the benefiting trading centres along the transmission route. From the assessment, the positive impacts outweigh the negative impacts. Further, the negative impacts of the project are identifiable and mitigatable. The report presents specific mitigation measures for each impact identified. The mitigation measures are aimed at either eliminating the impact or reducing its magnitude and or severity or both. Therefore, ESIA team recommends that the project should proceed but with the recommendation measures highlighted in this section. The recommendations made are based on this assessment and provide information for the National Environment Management Authority (NEMA) to consider the approval of the environmental and social aspects of the proposed water and sanitation project. Recommendation is made for the approval of the project, based on condition that the proposed mitigation measures in the ESMP are effectively implemented; proof of which must be made available regularly to relevant authorities and stakeholders. The following specific recommendations are made:

1. The mitigation measures proposed Chapter 7 and 8 are implemented
2. The proposed route be more closely aligned with the road reserve;
3. The final location of the proposed route and specific placement the water pipeline and other infrastructure, be specifically designed during the final design stage, to avoid the identified environmental and social impacts, as far as is possible;
4. Social protection - Penalties and fines should be put in place to deal with ESMP non-compliance issues. Potential sexual harassment of women and children by construction workers, must be addressed as a priority issue. MWE is therefore requested to ensure that this issue is very well managed to avoid such significant negative social impacts during the implementation of the project. In this regard, attention is drawn to the IFC Good Practice Note: Managing Contractor's Environmental and Social Performance, October 2017<sup>2</sup>
5. Labour and recruitment - MWE should give priority consideration to recruitment of unskilled local labour on the project. Gender considerations should also be given due attention during project implementation;
6. MWE should endeavour to include sociologists in the final design and construction teams to overcome the biases and gaps that are often overlooked by teams that are predominantly engineering professionals;

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<sup>2</sup> This document will be useful for MWE when compiling bidding documents and considering tenders from contractors. This document is easily accessible at the URL:

[http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/sustainability-at-ifc/publications/publications\\_gpn\\_escontractormanagement](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_escontractormanagement)

7. Communication and feedback - MWE is requested to ensure that reports or outcomes of the on-going assessment are shared with the relevant District, as soon as they are available – in the interest of *transparency* and *accountability*;
8. Necessary training regarding safety aspects to the personnel working at the line will be provided by the Contractor. Personal protective equipment, like safety gloves, helmet, mufflers etc., should be provided during the construction period and during the maintenance work and according to national and international Occupational Health and Safety good practice standards;
9. Strict Contractor adherence from the work force regarding zero tolerance to disturbances on the local community and environment to be maintained at all times;
10. MWE ensure that the appointed Contractor put in place and effectively implement an Alien Invasive Species Eradication Plan, as part of implementing the ESMP. Action towards the eradication of such exotic species and weeds can be done in consultation with the relevant officials at NARO;
11. Selection of approved locations for the camp and material storage yards away from wetland and low-lying areas, as well as away from other sensitive social and environmental areas, must be ensured;
12. Continued sensitisation of the affected community must be done, together with planning with local political and civil authorities and involving District Environment Officers and Community Development Offices;
13. The project should at all times ensure health and safety for both workers and the public, during all stages of the project; and;

MWE will need to work extensively and more regularly with local leaders, to help sensitise the general public to better manage local community expectations regarding compensation for loss of crops. The environmental management and monitoring plan shall be attached as a condition for the project construction contract so as to make the contractor aware of his environmental obligation before securing the contract and enhance the implementation of the ESMP. Overall; this will enhance environmental standards in the whole project.

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## ANNEX 1: DETAILS OF STAKEHOLDER CONSULTATION

### Meeting held with Kaliro District officials

Meeting held with	Name	Designation
	Mr. Yusuf Akubonabona	Principal Assistant Secretary
	M. Dyogo Paul	Natural Resources Officer
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water and Sanitation Project.	
Date held &	6 <sup>th</sup> /09/2018	
Place:	Office of the PAS Kaliro District	
Present:	Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd) Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd) Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)	
<b>Key issues raised</b>		
<ul style="list-style-type: none"> <li>▪ They stated that since the project would follow the road reserve and Iganag-Kaliro road is already demarcated, they did not expect a lot of compensation related complaints.</li> <li>▪ They said that the fact that the project would follow the road reserve should be stressed during all community meetings.</li> <li>▪ District officials said Nabitende town which is one of the targeted small towns was earlier offered a water scheme which they rejected on grounds that it would lead to permanent land take.</li> <li>▪ They indicated that Kaliro TC and Namungalwe which is underway for gazettement as a town council have plans which should be considered before the proposed works are undertaken.</li> <li>▪ In regard to access to safe water they said this stands at 62%.</li> <li>▪ They mentioned that public stands should be distributed strategically based on population to be served.</li> <li>▪ In terms of sanitation, they indicated that the Town council had 3 public toilets.</li> <li>▪ Lastly the district officials said during community consultations, the risk of conmen should be highlighted so that people are not cheated.</li> <li>▪ The meeting was concluded by officials stating that given the extent of the proposed works, community disturbance will be minimal.</li> </ul>		

### Meeting held with Chief Accounting Officer (CAO) Iganga District

<b>Meeting held with</b>	<b>Name</b>	<b>Designation</b>
	Mr.	Chief Accounting Officer Iganga
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water and Sanitation Project.	
Date held &	7 <sup>th</sup> /09/2018	
Place:	Office of the CAO Iganga District	
Present:	Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd) Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd) Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)	
<b>Key issues raised</b>		
<ul style="list-style-type: none"> <li>▪ The CAO said that water is life because people need it in their day to day operations.</li> <li>▪ According to the CAO, community concern is always about acquisition of the ROW for the water pipe.</li> <li>▪ He added that since Iganga-Kaliro road reserve was clearly marked, it would be a matter of informing and sensitizing the community about the proposed water project so that they relocate any activities they could be undertaking in the road reserve.</li> <li>▪ In regard to laying the pipes, the CAO noted that communities would be interested in knowing which side of the road would be trenched.</li> <li>▪ He noted that community members would be interested in knowing whether they would be considered for employment given the high levels of unemployment in the project area.</li> <li>▪ Lastly the CAO noted that this being government project communities could expect free services therefore this should be clarified during community meetings.</li> </ul>		

### Meeting held with the District Natural resources Officer

<b>Meeting held with</b>	<b>Name</b>	<b>Designation</b>
	Mr. Samanya Abdul	District Natural Resources Officer Iganga
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water and Sanitation Project.	
Date held &	7 <sup>th</sup> /09/2018	
Place:	Office of the District Natural Resources Office Iganga District	

Present:	Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd) Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd) Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)
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<b>Key issues raised</b>	
<ul style="list-style-type: none"> <li>▪ He said the ESIA team should involve area local leaders during the sensitisation meeting.</li> <li>▪ He wanted to know whether the project would involve ferrying of construction materials. He was informed that this was unlikely because the project would basically involve trenching and laying of pipes.</li> <li>▪ The DNRO noted that compensation as a social issue was likely to be raised because communities are always expectant. On this note he stressed that this should be clearly articulated during all community meetings.</li> <li>▪ He advised that in wetlands, the water pipe should be raised on pillars to minimise disturbance on ecosystem.</li> <li>▪ He recommended that whenever practicable mature or major trees should be avoided</li> <li>▪ On a positive note the DNRO said rural growth centres would benefit. He said Namungalwe in particular was water stressed therefore the proposed project would be beneficial to the entire community.</li> </ul>	

#### Meeting held with the Assistant Water Officer

<b>Meeting held with</b>	<b>Name</b>	<b>Designation</b>
	Mr. Yatesa Samuel	Assistant Water Officer Iganga
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water and Sanitation Project.	
Date held &	7 <sup>th</sup> /09/2018	
Place:	Office of the CAO Iganga District	
Present:	Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd) Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd) Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)	
<b>Key issues raised</b>		
<ul style="list-style-type: none"> <li>▪ He said the district safe water coverage is at 64% which is still lower than the national target of 76% by 2020.</li> </ul>		

- As the district water office their mandate is mainly in regard to point water sources such as boreholes.
- He noted that after identification and siting of a water source water quality tests are undertaken to ascertain quality before it is handed over to the community. Routine test are undertaken on all water sources as a quality monitoring mechanism.

### Meeting held at Kigulu primary school

Meeting held with	Name of village	Designation
	Silver, Bugumba, Kigulu and Bukaye	Project Affected Persons
Number of participants	Males: 26 Women: 17	
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water Supply and Sanitation Project.	
Date held & Place: coordinates	7 <sup>th</sup> /09/2018 Kigulu Primary School	
Present:	Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd) Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd) Mr. Moses Kato, GIS Specialist (Ecoserv Ltd) Full list of community members is appended.	

Introductory remarks	The team leader gave a brief over view of the proposed Kaliro-Namungalwe water and sanitation program which will be tapped from the Iganga Main. The water system will mainly run along the Iganga-Kaliro road reserve therefore minimal interference with private property is expected. He informed stakeholders that the ESIA is being conducted in accordance with Ugandan laws and regulation and also as a part fulfillment of the requirements by the world bank which is the funding agency. The purpose of this meeting is to capture expectations, fears concerns and suggestions from stakeholders. Therefore, ask questions and seek clarification about the proposed project in regard to environment and social issue.
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**Key issues raised**

A member raised a concern to the effect that government injects money when making the project yet thereafter people are charged, how do we benefit as citizens?

They were informed that after a project has been put in place, it requires resources for maintenance. Therefore, the services cannot be free of charge because then there would be no plan for operation and maintenance to sustain the project.

Another member wanted to know if the water would be managed by nWSC or some other company

For small rural growth centres private companies are usually engaged to oversee the system. The esia team stated that they could not tell with certainty who the operators would be.

In case there is damage to property because some houses are not on plan hence could be within the road reserve, will the owners be compensated?

The rap team will survey, map and value and advise on how to handle compensation for affected property.

Is this a new project or it will build on what national water has in place?

This is a new project which is targeting safe water extension to areas that currently may not be having piped water.

There are some temporary structures used as stalls for business, will they be compensated for?

The community was informed that the rap team would advice on this when they conducte their study.

Concern from the community was that there are shallow wells that nwsc is trying to close yet they help the community.

They were informed that the esia team was not aware of this but nwsc would be consulted to clarify

How will people who are at a distance from the road access water?

This phase will follow the layout plan and extension to areas will be in subsequent phases.

Will you consider the area youth during recruitment or the contractor will come with his own people?

Yes, willing and qualified local youth will be given priority during recruitment.

Projects come in disguise of being pro-people but end up being so expensive for ordinary members to afford. Won't this be the case?

Water at public stands will be relatively cheaper than that extended to individual households. Therefore, this is expected to be affordable.

How will the public stands be distributed?

All major trading centres will have public stands and the number of stands will depend on the population to be served.

Where will the application letters be sent to?



They were informed that the contractor will have a liaison office when the project is commissioned.

They reported that water supplied by nWSC fluctuates in pressure and wanted to know how this would be managed.

The feasibility study made all these considerations and these have been factored into the design. Therefore, this is not expected.

Will the domestic water be paid for?

Yes. It will be metered and the cost will be according to the amount used.

When will the project start?

The community was informed that the esia is one of the studies conducted before such projects are implemented. The project is most likely to be implemented next year.

### Meeting held with Kaliro Town Council

<b>Meeting held with</b>	<b>Name</b>	<b>Designation</b>
	Kaliro Town Council	Project Affected Persons
Number of participants	Males: 25 Women: 7	
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water Supply and Sanitation Project.	
Date held & Place:	7 <sup>th</sup> /09/2018 Dairy Grounds, Kaliro Town Council	
coordinates	X 556125 Y 99519.5	

Present:	<p>Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd)</p> <p>Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd)</p> <p>Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)</p> <p>Full list of community members is appended.</p>
Introductory remarks	<p>The team leader gave a brief over view of the proposed Kaliro-Namungalwe water and sanitation program which will be tapped from the Iganga Main. The water system will mainly run along the Iganga-Kaliro road reserve therefore minimal interference with private property is expected. He informed stakeholders that the ESIA is being conducted in accordance with Ugandan laws and regulation and also as a part fulfillment of the requirements by the world bank which is the funding agency. The purpose of this meeting is to capture expectations, fears concerns and suggestions from stakeholders. Therefore, ask questions and seek clarification about the proposed project in regard to environment and social issue.</p>
<p><b>Key issues raised</b></p> <p>Member expressed gratitude about the project but stressed the fact that people had property and crops within the proposed corridor.</p> <p>Fear was expressed about the high cost of water adding that the intended increased access to clean water may not be achieved because of this.</p> <p>Is the water only for Kaliro Town Council or are there plans to expand the service to surrounding communities?</p> <p>The first phase will follow the laid-out plan.</p> <p>Will the water be free of charge or it will be at a cost?</p> <p>Yes, the water will be paid for so as to run and maintain the system.</p> <p>How shall we access this water at household level?</p> <p>Extension to households will be at a later stage and will be done by the service provider. For now, government wants to ensure to boost the existing water supply.</p>	

If property is damaged due to the fact that some houses were unplanned, will such owners be compensated?

The RAP team will handle compensation issues.

They stated that Kaliro already had a piped water scheme and they wanted to know how these two would be synchronized.

The planned project will boost the existing one so that more people are able to access clean water.

They wanted to know whether the contractor would engage local people during the implementation phase. The contractor is often advised to engage local people who are willing to and able to work.

When projects are being initiated only anticipated benefits are articulated yet some times communities don't benefit.

That is why the ESIA team is conducting consultative meetings so that identified or anticipated fears and challenges are addressed before project implementation.

Fear was expressed about the fact that sometimes contractor engage local labourers whom they don't pay for their services.

They were told to involve their local leaders when being recruited and also request for contracts or formal letters of appointment as these could be used to claim for such money.

They wanted to know how information about the project would be conveyed to community members who had not attended the meeting.

This project is particularly targeting the town council which is represented at the meeting so we hope members who are present will inform others about the project.

Will there be a liaison office in the area?

Yes, an office will be established in Kaliro.

Where will the water come from?

They were informed that the water will be tapped from the Iganga town main.

There is a borehole within the road reserve in case it is damaged what will happen?

The RAP team will make an inventory of all resources within the proposed water corridor and necessary measures will be taken including relocation if possible.

They requested that information about the project be shared so that they are always in the know.

They wanted to know how safe the water is.

To this effect they were informed that the source (Iganga main) is where water distributed to Iganga towns comes from and it is treated.

Concerning PCR, they said there was an Indian cemetery and Ziribondho's palace.

### Meeting held in Bugogo A

Meeting held with	Name	Designation
	Nawandyo, Bunyiro, Nabikote, Bubogo A and Bubogo B	Project Affected Persons
Number of participants	Males: 36 Women: 16	
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water Supply and Sanitation Project.	
Date held & Place:	7 <sup>th</sup> /09/2018 Bugogo A	
coordinates	X: 552925.2 Y:75087.4	
Present:	Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd)  Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd)  Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)  Full list of community members is appended.	

Introductory remarks	<p>The team leader gave a brief over view of the proposed Kaliro-Namungalwe water and sanitation program which will be tapped from the Iganga Main. The water system will mainly run along the Iganga-Kaliro road reserve therefore minimal interference with private property is expected. He informed stakeholders that the ESIA is being conducted in accordance with Ugandan laws and regulation and also as a part fulfillment of the requirements by the world bank which is the funding agency. The purpose of this meeting is to capture expectations, fears concerns and suggestions from stakeholders. Therefore, ask questions and seek clarification about the proposed project in regard to environment and social issue.</p>
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**Key issues raised**

A member asked that if he had land and the project ran through such land, would they be compensated  
A response was to the effect that the pipes will be within the road reserve. A corridor of about 4m will be used during trenching and the depth will be 1.5m.

Another concern raised was that if one had a house near the line, what was required of them to be connected to get water/ If property/crops are damaged, do I get compensated?

Stand points will be given in main trading centers; after which the operator will take over management of the piped water and this will be charged with extension of water to households and told the residents not to pay money since this was a government project which was free for the communities.

How much will it cost to extend water to households and how much will the water cost per month?

The monthly cost would depend on usage.

If I am off the road, will I get water?

The meeting was informed that the cost of extending water could not be determined later and would be determined by the service provider.

Will they compensate for where facilities are placed?

To this a response was that where the reservoir would be places shall be paid for

The community members asked if they would be employed

To this a response was given in affirmation because contractors are encouraged to engage local people.

This depends on the interest and diligence of the job seekers

Those who came before gave receipts to all land owners but I did not get, will I get mine today?  
 The team refuted the allegation saying that it must have been another project since the RAP team was not yet on the ground.

Another member expressed concern as to where the water would come from  
 The community was informed that the water would be tapped from the Iganga Main distribution line.

In regard to physical cultural resources, the ESIA team was also informed that James Jogo owned shrines that he had inherited from his brother

**Meeting held at Namungalwe Trading centre.**

<b>Meeting held with</b>	<b>Name</b>	<b>Designation</b>
	Namungalwe A, Namungalwe B, Namungalwe Rural and Kawete.	Project Affected Persons
Number of participants	Males: 37 Women: 14	
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water Supply and Sanitation Project.	
Date held & Place: coordinates	8 <sup>th</sup> /09/2018 Namungalwe Trading Centre	
Present:	Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd) Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd) Mr. Moses Kato, GIS Specialist (Ecoserv Ltd) Full list of community members is appended.	

Introductory remarks	The team leader gave a brief over view of the proposed Kaliro-Namungalwe water and sanitation program which will be tapped from the Iganga Main. The water system will mainly run along the Iganga-Kaliro road reserve therefore minimal interference with private property is expected. He informed stakeholders that the ESIA is being conducted in accordance with Ugandan laws and regulation and also as a part fulfillment of the requirements by the world bank which is the funding agency. The purpose of this meeting is to capture expectations, fears concerns and suggestions from stakeholders. Therefore, ask questions and seek clarification about the proposed project in regard to environment and social issue.
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**Key issues raised**

The ESIA team was informed by the community that California and Busano roads were not catered for under the project.

The roads that are not catered for will be reported but in case they are still not covered under this phase they will be considered in subsequent phases.

They also said that they had moved with the feasibility team who were charged with the responsibility of noting every member whose property had been affected and a list to this effect was compiled.

Shall people be compensated?

Will the line be running in the road reserve and how far from the road reserve?

The water line will be within the road reserve and the RAP team will survey and mark this corridor.

Will the water be free of charge?

The water system requires maintenance so a small fee will be charged for to cater for these costs.

What will the distribution to households require?

Water kiosks will be place in tradind centres and populated area for the public to accesss water. After the project is commissioned, a service provider will be identified and charged with extension of water to household. Extension of water to households will be at individual cost.

Do people who filled consent forms get free water?

They were informed that a RAP would iron out all compensation issues. It will document all property in



the water corridor with respective owners.

Is there a criterion for connecting to water? What are the requirements?

The distribution will be according to the layout plan. subsequent extensions including that to households will be at later stages.

Will free extension of water to households be given to those who embrace the project?

No. whoever requires water will follow the same procedure although this will be later.

Residents indicated that there was a public toilet but it needs to be emptied

PCR- no central building place, only worship centers i.e. Churches and mosques

In his closing remarks he informed and emphasized that residents shouldn't pay for water extension services before commissioning of the project.

Residents stressed that lack of water had a gender implication because of the long hours girls and women take at boreholes which has increased prevalence in pregnancy and HIV infections.

He said that Namungale was one of the areas with low water coverage in the entire district

He told the team to intensify sensitizations much as all residents are interested in getting water.

### Meeting held at Nasuti trading centre

Meeting held with	Name	Designation
	Busimba, Nasuti North and Nasuti South	Project Affected Persons
Number of participants	Males: 26 Women:5	
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water Supply and Sanitation Project.	

<p>Date held &amp; Place: coordinates</p>	<p>8<sup>th</sup>/09/2018 Nasuti Trading Centre X: 556379.3 Y: 830548</p>
<p>Present:</p>	<p>Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd)  Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd)  Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)  Full list of community members is appended.</p>
<p>Introductory remarks</p>	<p>The team leader gave a brief over view of the proposed Kaliro-Namungalwe water and sanitation program which will be tapped from the Iganga Main. The water system will mainly run along the Iganga-Kaliro road reserve therefore minimal interference with private property is expected. He informed stakeholders that the ESIA is being conducted in accordance with Ugandan laws and regulation and also as a part fulfillment of the requirements by the world bank which is the funding agency. The purpose of this meeting is to capture expectations, fears concerns and suggestions from stakeholders. Therefore, ask questions and seek clarification about the proposed project in regard to environment and social issue.</p>
<p><b>Key issues raised</b></p> <p>Will there be payment for where the pipes are laid It was clarified that the line would go through the road reserve however the RAP team would clearly establish.</p> <p>If I want to extend water to my property that is located off the road, is It me to pay or the government what are the requirements/qualifications or criteria for one to get water? They were informed that water was for the community and the criteria is to ensure equal access. However, this project doesn't have provision for extension to household level.</p> <p>Is the water free of charge or will they have to pay for it? The water will be paid for to cater for maintenance costs.</p> <p>Is the payment only for connection fee or there will be regular bills?</p>	

Community taps will be provided but extending to households will be at individual costs. The water will be metered and payment will depend on usage.

Is the water only along the road or even if one stays off the road, they can connect to it?

The residents were told that the existing layout is what would be followed initially. Community taps will be established within trading centers and later an operator will be engaged for people to request from such operator for extension.

Is it possible to extend water beyond the road reserve?

This will be in phases. The current design is what will be followed. The arrangement is to provide water but

Will there be a reserve tank or it will be extended to households?

Each town has a reserve tank but as an individual you could have your own small reserve tank.

How will water be paid for, will it be in litters, Jerri cans or what?

At the community tap, the cost of water will be per jerri can while that extended to households will be metered at that level and payment would depend on amount used.

When will the project start?

They were told that the project was likely that next year because these reports go through approval processes.

Some people request for money for employment opportunities, will this be the case?

No, the contractor usually has a supervisor to whom such irregularities can be reported.

### Meeting held in Nambale trading centre

Meeting held with	Name	Designation
	Nambale	Project Affected Persons
Number of participants	Males: 35 Women:8	

Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water Supply and Sanitation Project.
Date held & Place: coordinates	7 <sup>th</sup> /09/2018 Nambale Trading Centre X:556076.7 Y:86225.9
Present:	Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd)  Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd)  Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)  Full list of community members is appended.
Introductory remarks	The team leader gave a brief over view of the proposed Kaliro-Namungalwe water and sanitation program which will be tapped from the Iganga Main. The water system will mainly run along the Iganga-Kaliro road reserve therefore minimal interference with private property is expected. He informed stakeholders that the ESIA is being conducted in accordance with Ugandan laws and regulation and also as a part fulfillment of the requirements by the world bank which is the funding agency. The purpose of this meeting is to capture expectations, fears concerns and suggestions from stakeholders. Therefore, ask questions and seek clarification about the proposed project in regard to environment and social issue.
<b>Key issues raised</b>	
Is this a government project? Yes, it's a government project. It is a project under Ministry of Water and Environment which entails extending piped water and providing kiosks for public water access.	
How shall we get water? This phase will only follow the existing layout. Distribution at household level will be at a later stage but now government wants to ensure that the water is available.	
Will I be compensated, if the line goes through my land?	

The roads reserve will be used and this belongs to government. However, the RAP team will clearly mark the corridor and in case private property is affected it will be valued and compensated for.

How far will the line be from the road?

It will follow the laid-out supply network.

How wide is the road reserve?

The reserve along Iganag-Kaliro road has been marked and the project is expedted to follow that.

Shall the project pay for whatever is destroyed?

Yes. Whatever is on land because the pipes will be place underground and activities on top can continue.

The RAP team follows systematic steps until all compensation issues are settled.

Will local people be considered during recruitment?

Yes, but it will depend on the vigilance of those who want to get employment. The contractor is always advised to consider local people.

What is the difference between the existing and the planned water scheme?

This will be piped, treated and reliable water

Will there be requirement for academic qualification before getting employment?

No. For as long as you have the necessary skills and apply of time.

What will be the cost of water?

The ESIA team cannot determine the cost precisely but it will be affordable especially at the public stands.

Some people request for money before employing local people will this be the case?

No and the contractor usually has a supervisor to whom such irregularities could be reported.

How far will the network go from the road because there are trading centres off the road that have not been covered?

Some are covered under T-offs because the project doesn't entirely follow the main road. There will be subsequent phases to further distribute the water.

How sure are we that this water will flow continuously because some schemes have been established elsewhere but function for a short while and die off?

The community was informed that this is a major project funded by world bank. Sustainability issues were considered during the feasibility study.

The community said there was one public toilet although it required some renovation.

Concerning physical cultural resources, the community reported that there is a tree (bush) where people worship their gods, appease them and ask for blessings and protection against bad omen.

### Minutes of a meeting held in Naibiri Trading Centre

<b>Meeting held with</b>	<b>Name of village</b>	<b>Designation</b>
	Naibiri	Project Affected Persons
Number of participants	Males: 24 Women: 7	
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water Supply and Sanitation Project.	
Date held & Place:	7 <sup>th</sup> /09/2018 Naibiri Trading Centre	
coordinates	X: 555488.5 Y:89371.3	
Present:	Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd)  Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd)  Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)  Full list of community members is appended.	

Introductory remarks	The team leader gave a brief over view of the proposed Kaliro-Namungalwe water and sanitation program which will be tapped from the Iganga Main. The water system will mainly run along the Iganga-Kaliro road reserve therefore minimal interference with private property is expected. He informed stakeholders that the ESIA is being conducted in accordance with Ugandan laws and regulation and also as a part fulfillment of the requirements by the world bank which is the funding agency. The purpose of this meeting is to capture expectations, fears concerns and suggestions from stakeholders. Therefore, ask questions and seek clarification about the proposed project in regard to environment and social issue.
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**Key issues raised**

What will it take to extend to the household? Shall we use our government or one has to buy their own pipes?

Government will extend water and establish public stand. However, after that an operator will be contracted to distribute to household level and the costs will be covered by individual owners. This will be in the next phase.

Will it be free of charge or people have to pay?

No, it will be at minimal cost because there will be maintenance costs that will have to be covered regularly.

There are plants such as coffee, mangoes and bananas. Will these be compensated for?

There will be a RAP team that will cost and compensation for any losses.

Is the water scheme in particular parishes or it interconnects all of them?

The distribution will be to all trading centers along the Iganga-Kaliro road.

Where will this water come from?

The water will be tapped from the Iganga main.

How far will the public stalls be from each other?

The designs we have are not detailed, however there will be consent between its users and the distributors as to where to place the public stands.



Will there be extension to worship centers?

The water has been brought for the people of Naibiri, if these institutions are along the planned network, they will be served

What will be compensated for Permanent or temporary houses?

The line will be in the reserve so compensation will be minimal. However, in the event that a private property is affected the RAP team will ascertain this an advice accordingly.

They reported to have a public toilet have a public toilet with 4 stances

There were no known PCR in the area.

#### Meeting held at Nabitende Catholic church

Meeting held with	Name	Designation
	Nabitende A, Nabitende B, Buyale, Bukose and Busabi	Project Affected Persons
Number of participants	Males: 45 Women:41	
Purpose of meeting:	To obtain technical and social economic input into the Environmental and Social Impact Assessment process for the proposed Kaliro-Namungalwe Water Supply and Sanitation Project.	
Date held & Place:	7 <sup>th</sup> /09/2018 Nabitende Catholic Church	
coordinates	X-556134.6      Y-93356.7	

Present:	<p>Mr. Tumusiime Alfred, Team Leader (Ecoserv Ltd)</p> <p>Ms. Olivia Namutosi, Sociologist (Ecoserv Ltd)</p> <p>Mr. Moses Kato, GIS Specialist (Ecoserv Ltd)</p> <p>Full list of community members is appended.</p>
Introductory remarks	<p>The team leader gave a brief over view of the proposed Kaliro-Namungalwe water and sanitation program which will be tapped from the Iganga Main. The water system will mainly run along the Iganga-Kaliro road reserve therefore minimal interference with private property is expected. He informed stakeholders that the ESIA is being conducted in accordance with Ugandan laws and regulation and also as a part fulfillment of the requirements by the world bank which is the funding agency. The purpose of this meeting is to capture expectations, fears concerns and suggestions from stakeholders. Therefore, ask questions and seek clarification about the proposed project in regard to environment and social issue.</p>
<p><b>Key issues raised</b></p> <p>Is there possibility of getting water on both sides? Water is on each side of the road</p> <p>Will water extension to properties be under this project? This project is for the people and community, kiosks will be setup in the centers. Extension to individual households will be after this phase. A contractor/distributor will be identified to run the project.</p> <p>Will it be for paying for or free of charge? It cannot be free of charge because of associated maintenance costs. Therefore, it will be at a cost.</p> <p>How far will the line be from the road and if my plot is affected will I be compensated? The water pipes will be within the road reserve. But if private property is affected, it will be paid for. The RAP team will further enlighten on compensation.</p> <p>If my house is affected what happens? If property is affected, it will be compensated at replacement cost. However, such considerations were put in mind during designing.</p>	

If I cannot afford to take water to my house, will there be public stands?

Those who cannot afford, to extend water into their households will use public stands.

Will the right of way be permanently acquired or not?

The water project is permanent, so it will be around forever

Is there a plan to extend the network closer to communities who may be far from the proposed network?

This project is in line with government target to extend safe water to communities but this will be in phases.

Sometimes compensation is swindled by those who are supposed to give it to the community, where can such people get help?

The RAP team will expressly talk about compensation issues

Will the workers be locally sourced or not?

Local people will be given priority if they express interest.

Will people who offer land for the project be considered during the extension?

All people will be treated similarly. Unfortunately, there is no provision for such.

They expressed concern about the community roads that don't have clear reserves and wanted to know what would be done in such instances.

The RAP team has a surveyor and valuer who will ably handle all compensation and water corridor issues.

Will this water be safe? What is the source?

The water will be from Iganga main which is treated therefore it will be safe.

The community reported that they have two public toilets with four stances each. They added that the population has increase very much and these two toilets are no longer enough.

Concerning physical cultural resources, the ESIA team was informed that these are owned at household

level therefore are unlikely to be affected because they are not within the reserve.

## ANNEX 2: LIST OF PEOPLE CONSULTED



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MINISTRY OF WATER AND  
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### ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 6<sup>th</sup> / 9 / 2018

X - 555 005

Location of meeting: KALIRO TOWN COUNCIL / DISTRICT.

Y - 8101572.3

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
01	LUBALE GERETHOM	P.H.I		KSC	
02	KIRO Simon	E.H.A	-	K.T.C	
03	KANBERN CHARLES	FRASER		KIC	
04	Akubonabona Yusuf	PAC	Yusufakubonabona@gmail.com	KALIRO	
05	DIOGO PAUL	ty DLRO	d-polo29@yahoo.com	KALIRO DLG	
06	SABAGABO JOHNSON	D.H	Sabagabo.johnson@fmas.com	KALIRO DLG	





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MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 7<sup>th</sup>/09/2018 ..... 11:00am.....

(Kigulu, Silver, Bugumba and Bukaya)

Location of meeting: KIGULU PRIMARY.....

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
1	Mutebe Karim	Business	0702118192	NKONO II	
2	BYEKWASO LATITU	Business	0704928460	NKONO II	
3	BUKYANAGANDI DEION	TEACHER	0758578719	NKONO II	
4	NAKAZIBA JANAINA			Bugumba A'	nakaziba Janaina
5	KILANDA BUDHALA			Bugumba A'	Kilandha budhala
6	ALUPA SALIMAH		078056251	Bugumba A'	Alupa
7	AONO EVA	Teacher	0755012862	Kigulu	Aono
8	KAWAH Itebi			Bugumba	Kawah
9	AKIMU Mutani	Roofer	0757244518	Bugumba	Akimu
10	PALWIGI TEDDY	Business	0783431277	Bugumba	BI
11	NAGANBI Shakira	Business women	0750703478	Bugumba "A"	Shakira
12	NAKAIMIA MARINA	B/W		Bugumba	
13	MULANI MUSA	B/M		Bugumba	





ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 7<sup>th</sup>/09/2018 11:00 am

Location of meeting: KIGUMU PRIMARIS

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
	Batwale MOSES	Resident	077239200	Village	
14	KITALAMBWA SAMUEL KIKOBU	"	0772-664979	Mampirica	MBatwale
15			0700467122 0789550144	New Kaliro	
16	WAISWA KENNETH	"	0789550144	SILVE	
17	MUKAMA AKISOFO	"	0757741894	SILVE	
18	MUKYALA HAWAH	"		Bugumba	
19	BYOSELO NAIMA	"		Bugumba	
20	NAKWANGA ZUKUFA	"		Bugumba 'A'	
21	KYAKULIRA WAISWA	"	0703705131 0701337424	SILVE	
22	WAISWA NILLY	"	0777631178	Bugumba 'A'	
23	MUKITA MAMUKI	"	07593616237	Bugumba	
24	Hon. NAWUBANGA SOPHIE	Resident/ Councillor	0703489125	BUGUMBA	
25	Hon. TUSALE BASHIR	Area Councillor	0706109608	Bugumba	
26	MUJANI BAKALI	CITIZEN	0755788866	"	



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MINISTRY OF WATER AND  
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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND  
SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 7th/08/2018 11:00 am

Location of meeting: KIGULU PRIMA

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
27	NAMIALO RITAH	RESIDENTE	0777068544	SILVE WARD	Rawala
28	NAMAGANDA RABIA	RESIDENT	0750779292	BUGUMBA'A	Amma
29	NAIGEMBE AISHA	"	0754164888	HKONO	Amma
30	NAMUGATA ZUKIA	"	"	NKONO	Amma
31	MBASALAKI KORAS	RESIDENT	0758931704	Bugumba	Amma
32	KASADGO SAULO	"	0758931704	Bugumba.b	Amma
33	ISABIRYE JUMUSU	"	0700176004	Bugumba	Amma
34	MILUANI ABDULLAH	"	070572378	Bugumba	Amma
35	DABANGI ISMAEL	"		Bugumba	Amma
36	KARENZI YAKUTI	"		Bugumba	Amma



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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND  
SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: KIGULU PRIMARY 7<sup>th</sup> / 09 / 2018 ..... 11:00am

Location of meeting: KIGULU PRIMARY .....

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
14	Muhammad Zidada	Businessman	0757012186	Silve ward	
15	BULHANI HUSSEIN	RTM	0703053463	Bugunba	
16	ASHIRIATY Sebiki	BIT	075898389	Bugunba	
17	MAKA Mutani	ILC	012084253	Bugunba	
18	Mugoya Hannisi	MA	0702515840	Bugunba	
19	BOGERE SWABU	BA	0704276624	Bugunba	
20	BOGERE ISSA	BA	0706289417	Bugunba	



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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND  
SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 07/09/2018

Location of meeting: 07/09/2018 - KALIRO TOWN COUNCIL

X 556125.0  
Y 99519.5

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
1	JENNIFER REBECCA MUTONO	District Women's Councilor KTC	0787357134	KALIRO TOWN COUNCIL	
2	NANANWE MARION	Councilor	0774361339	K.T.C	
3	Probye Samuels	Spokenkiundi Lead	0772511135	Kiriindi	
4	Maganda Bale E	Sex Health Educator	0774566343	K.T.C	
5	KABU ROBERT NANIYU	COUNCILOR	0752637763	K.T.C	
6	LUBALE GERESHOM	PHI - K.T.C	0772895663	K.T.C	
7	KAWUNYA JAMES	OPEN HOUSE LEAD	0782198211	K.T.C	
8	Balgeya Hamza	DEPUTY MAYOR KTC	0752579979	K.T.C	
9	MUSOBYA CONSTANT	COUNCILOR BUTEGE NAKIGONYA	0775795301 0756595300	K.T.C	
10	BAMU CIRAC	PERSON LEAD	0781815828	K.T.C	
11	KEEZI PEREZI	Engineer	0775304521	K.T.C	
12	Kyakulaga David	Nakigonyam vice chair person	0782384456	K.T.C	
13	Makiriga Sarah	-	-	K.T.C	





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MINISTRY OF WATER AND ENVIRONMENT

NAMUNGALE - KALIRO

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR KYEGEGWA-MPARA-RUYONZA TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 07<sup>th</sup>/09/2018 2:00pm

X - 556125

Location of meeting: 07<sup>th</sup>/09/2018, KALIRO TOWN COUNCIL

7 - 99519.5

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
1	NSAMBA GODFREY	C/PERSONAL BULANGIRA	0772649052	BULANGIRA	Nyas
2	TUSERYE R.	BULANGIRA	0774300412	BULANGIRA	[Signature]
3	KALIBE ALBERT	Bukindi	077957033	Bukindi	[Signature]
4	IGOLE ROGERS	Bukirindi	0784645411	KIRINDI	[Signature]
5	ISABIRYE MOSES	Mutamuka	0782728567	ZIBONDO	Isabirye moses.
6	YOGEIRE KALALI	Kilindi	0783384734	Kilindi	[Signature]
7	KATO GEORGE	Mutamuka	0756817907	Zibondo	[Signature]
8	MWESIGWA BOSCO	Citizen	0783166977	Bugoma	[Signature]
9	BAZIBU PAUL	Citizen	0701470686	Kirindi	[Signature]
10	Nalongo Kusira		0773761206	BULANGIRA	Nalongo K.
11	Ndikasani Sarah	Bulangira C/PERSON WOMEN	0785431128	Bulangira	[Signature]
12	KIMEIGERIA PAUL	MR. KALIRO	0772332028	BULANGIRA	[Signature]
13	KIBWIKA PATRICK	TRENCHING	0777136292	BULANGIRA	[Signature]



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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND  
 SANITATION SYSTEMS - CONSULTATIVE MEETING









Date of the meeting: 07/09/2018 KALIRO TOWN COUNCIL X 5561249  
 Y 995187  
 Location of meeting: .....

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
01	BAAFAKA ERUSANIA	MEDIA	baatalaerusania@gmail.com	NBS FM	Baafaka
02	Isiko Simon	R.H.A	-	K.T.C	Isiko
03	Wakabi Enot	T.A	-	K.T.C	Wakabi
04	Muyanga Jackson	T.A	-	K.T.C	Muyanga
05	YOYETA JANE	MEMBER	-	K.T.C	Yoyeta
06	MULYANSAWO BAGENYI	MEMBER	0782422118	K.T.C	Mulyansawo



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND  
SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: ..... 7/07/2018 ..... 4:00pm ..... (Nawandya, Bungiro, Nabikote)  
Location of meeting: Bubanga A Trading Centre ..... (Bubogo A and Bubogo B)

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
14	KASOHO Fahadi	Ok youth	078310966	11	
15	KABALE YAKUT		0702316122	Bubogo (A)	
16	Mutale Musa		/ /	Bubogo (A)	mutale
17	Bunyinya Ronald	Do	0785766772	Nawandya	
18	MUGAZZI SAM	-	0779562005	Bubogo	
19	KAWUZI Joseph		0735130036	Bunyiro Bubogo	
20	MAKABA DANIEL	-	0751821353	NAWANDYA	Makaba
21	BASALAINÉ PATRICK	-	0756434993	11	Basalaine
22	BASADHE BENADINT	-		BUBOGO A	Basadhe
23	NANGOBI JANE	-	075374805	NAWANDYA	Nangobi
24	Swaala K. Moses	Police	0772-688038	BUBOGA	
25	HAJ. YUSUF BACHU		0772503724	Bubogo	
26	MPAATA ALI	11	0773206895	Bubogo	





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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 27/07/2018 4:00pm

Location of meeting: Buboga A Trading centre

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION/Village	SIGNATURE
1	Nakasango Zulaika	Famer	078595 04 90	BUBOGA	Zulaika
2	MUTESI HADJIA	Famer	0703097790	Buboga	HADJIA
3	SPID LAWRENCE	Famer	0785701820	Buboga A	[Signature]
4	Bogere magid	famer	0775191527	Buboga	[Signature]
5	HABIBATE SALIMAN	Student	0773476836	Buboga	[Signature]
6	Wegla				[Signature]
7	Kasango JUSTINO	Famer	0761091636	Buboga	[Signature]
8	Beatrice Balidawa	Wasa	0786727476	Buboga A	Beatrice Balidawa
9	TAGEYA HASIFA	TEACHER	0774307125	Buboga A	Tageya
10	NANKWANGA JOY	famer	0786996550	Buboga A	Nankwanga
11	Muwolya MOHAMAD	"	0779383055	" 'A'	[Signature]
12	Hajiati SAA DA	"	0784276707	" 'A'	S. Hajiati
13	BAMUTAZE PETER	"	070286949	BUBOGA 'A'	[Signature]



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MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 7/09/2018 4:00pm

Location of meeting: Bubunga A Police Trading Centre

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
	KAYANGA FIDHA	C/women	0784344482	BUBOGO'A	<i>[Signature]</i>
	Birebwa Fezirah	Production/Gender member	073526259	Buboga A	<i>[Signature]</i>
	Habirye zita	member	-	"	<i>[Signature]</i>
	Namusiba Musyeeta	member	-	"	<i>[Signature]</i>
	Takwya Joweri	Member	"	"	<i>[Signature]</i>
	Mwandala Hassan	"	0781815813	"	<i>[Signature]</i>
	Musa ZAKAYO	Jumar	074470516	"	<i>[Signature]</i>
	SKOIK MAKASWAIBU	IMANI	0773-85680	"	<i>[Signature]</i>
	BASOBA STOVER	D	0782643116	"	<i>[Signature]</i>
	BASAM MOSES	CHURCH MEMBER	0722889680	BUBOGO'A	<i>[Signature]</i>
	Kaiswa Peter	member	0776862205	Buboga	<i>[Signature]</i>
	CHRISTOPHER R. S. MUGUWA	MEMBER	0761608000	BUBOGO'A	<i>[Signature]</i>
	KIRIBAKI ERIN	C/youth	0788-420837	BUBOGO'A	<i>[Signature]</i>



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MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 7<sup>th</sup> / 09 / 2018

X 552925-2

Location of meeting: BUNGIRO-BUBOGA-A

Y 750874

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION/Village (K.L.A.S)	SIGNATURE
01	SIMANI TENDWA WAKALIKALI	Imam mosque	0784473000	BUBOGA A	[Signature]
2	Kizito Godfrey	Iman C.I.	0772412907	Ludonga	[Signature]
03	LANDIRA NASSER ABUH	SECRETARY, BUBOGA	0774395662	BUBOGA-A	[Signature]
4	ABUD KALIFANI		078-2360652	BUBOGA-A	[Signature]
5	Ismail Wakisolo	Lk member	0702231478	Buboga	[Signature]
6	KASABA GODFREY		0773920003	BUBOGA "B"	[Signature]
7	Dyogo Jemusi		0785383975	Buboga	[Signature]
8	BUBOGA BASEYE		078541249	Buboga	[Signature]
9	Abu mayana		078541249	buboga	[Signature]
10	WAISWA SHABAT				
11	MURUGO FATHA		0779994499	Bungiro	[Signature]
12	Lyana Haminghin		0783979393	Buboga	[Signature]
13	HENRY MII		0783374208	11	[Signature]



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Tel: +256774 181912

X 5560787  
7 86225.9

THE REPUBLIC OF UGANDA



MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 08/09/2018

Location of meeting: NAMBALE Trading Centre

S/N	NAME	POSITION Occupation	Email Address/Phone number	INSTITUTION VILLAGE	SIGNATURE
1.	Boligezel Joseph	Peasant	0783434113	NAMBALE	[Signature]
2.	NDIKULWANJE HENRY	Peasant	0774117785	NAMBALE	[Signature]
3.	DIKUSOKA George	Peasant	0703911296	NAMBALE	[Signature]
4.	PA Luwano Michael	Peasant	0700190066	NAMBALE	[Signature]
5.	Iswaya Fekad	Peasant	0763128016	NAMBALE	[Signature]
6.	Kyewaganya Ismael	Radio host	0781995554	NAMBALE	[Signature]
7.	SOITA SHABAN	SELF EMPLOYED	0772843941	NAMBALE	[Signature]
8.	NABIRYE ESEZA			NAMBALE	Eseza
9.	Namuyedi madima			Nambale	Nim
10.	Namulondo Sarah		0752860503	Nambale	Noffi
11.	Nelima Sarah				
12.	ALIKOBA J. HARRIET		0779194382	Nambale	[Signature]
13.	BABIRYE DEBORAH	TEACHER	0774431431	NAMBALE	[Signature]





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THE REPUBLIC OF UGANDA



MINISTRY OF WATER AND ENVIRONMENT

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING**

Date of the meeting: 25/10/2018

Location of meeting: Nambale Village

S/N	NAME	POSITION Occupation	Email Address/Phone number	INSTITUTION/ Village	SIGNATURE
1	BALEKN ARAJABU	PEASANT	0781435627	NAMBALÉ	BA
2	CHARLES . K	TEACHER	077331982	NAMBALÉ	KIC
3	MUKWATA James	peasant	0776456726	Nambale I	M.J.
4	GABULA DANIEL		0778449070	NAMBALÉ I	gab
5	KALISWA PAUL	C/P & CI	0701985647	NAMBALÉ I	Paul
6	Igulu MOSES	Peasant	0779347340	Nambale	Igulu
7	KAGERE CHARLES	Business man	0787221007	Nambale	Charles
8	KANGE - ZUBAIRI		0772834387		Kange
9	MUKAMA STEPHEN ISABIRYE	MP/ALIAS	076552636 0779990811	NAMBALÉ	Mukama
10	MUKAMA ISAAC	Peasant	0775918744	NAMBALÉ	Isaac
11	KABWAGU YAHAYA	Business m	0773403882	Nambale	Yaha
12	Kange george	Business m	0751186008	Nambale	George
13	Mubiru Abdu Masjuma	Business m	0780351136	Nambale	Abdu



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MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 09-09-2018

Location of meeting: NAMBALWE Villages

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
14	HUSSEIN IGADI	Driver	0754464458	NAMBALWE	
15	WANDA MARIA	Peasant	—	NAMBALWE	
16	MUKALUBA JALILU	—	0772321639	NAMBALWE	
17	Mudibu mulshidi	DA	0781445554	—	
18	TULIRAGEMU Emma	PEASANT	0773354994	NAMBALWE	
19	KIREMU STEPHEN	—	—	NAMBALWE	
20	Isabirye Stepha	Member on L.C.I. Nambalwe	0752-985593	Nambalwe	
21	Munyirama Lemaharu	Peasant Nambalwe	0758103126	Nambalwe	
22	Shamungu Joshua	Peasant	0755747156	Nambalwe	
21	Lwasaano Michael	—	077183132	—	



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MINISTRY OF WATER AND  
ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND  
SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 08/09/2018

Location of meeting: NAMBALE

S/N	NAME	POSITION Occupation	Email Address/Phone number	INSTITUTION/ Villages	SIGNATURE
14.	Nirembe Esther		0785259112	Nambale	ME
15.	Babirye Hagara	-	07841-	Nambale	Bm
16.	Kaiswa Hassan	Peasant	0751580405	Nambale	ME
17.	Namasaba Miria	Peasant	0781508789	Nambale	Namasaba
18.	Kyabighe Badiro	Peasant	0755523826	Nambale	ME
19.	Tigawalana Samuel	Peasant	0787930975	Nambale	ME
20.	Nabirye Joice			Nambale	ME
21.					
22.					
23.					
24.					
25.					
26.					





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MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 8/09/2018 10:30am

Location of meeting: NAMUNGALWE TRADING CENTRE (Namungalwe A, Namungalwe B Kawete and Namungalwe Rural)

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
	Kabaale James	Bod-Bode	0783966765		
	MUNGUFU JAMES	FARM	0782249019		
	KUSIYAMA MUSAJJA	FARM	075023340		
	MUNGI LAWUFA	FARM	"		
	NGABI MUSA	FARM	0770529498		
	MUCENDO BASHIM		0782569354		
	IBODKA DHEOMU	N.B	0754110298		
	BADAZA FRANCO	B-Representative	0785908771		
	WAGOINA ASUMAN		0700009419		
	KAWUMA ZEITUNU	water supplier	0779739497		
	MBERENGE MASHIAJ	Bwano	0771613354		



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Date of the meeting: 8/09/2015 10:30am

Location of meeting: NAMUNGALWE TRADING CENTRE

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
1	NAMPALA ALACHTI W.	DRIVER	0702103622	NAMUNGALWE	[Signature]
2	Ngoyi Paul	Pastor	0787719343 0781966557 0705135191	NAMUNGALWE	[Signature]
3	Namusosa Edith Magada	Nurse	0773865886	NAMUNGALWE	[Signature]
4	Kwikkiriza Christine		0777915420	NAMUNGALWE	[Signature]
5	NAMUVULE SAMUEL		0753784173	NAMUNGALWE	[Signature]
6	Kamukungu Edward		0778677442	Kamukungu	[Signature]
7	Naiiganga Fred		0777880275	NAMUNGALWE	[Signature]
8	Deyungala Sidaigi		0778934924	NAMUNGALWE	[Signature]
9	MUKISA Fred		0772056728	NAMUNGALWE	[Signature]
10	KUAMEYI PAUL	TEACHER	0777118661	NAMUNGALWE	[Signature]
11	Basabirwa Biraah	Farmer	0772302187	NAMUNGALWE	[Signature]
12	NAIGAGA KALORI	Famer	0774116671	NAMUNGALWE	[Signature]
	NALUWUNGWE Edith	Famer	0775656974	NAMUNGALWE	[Signature]



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MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 8<sup>th</sup> 09/2018

Location of meeting: NAMUNGALWE TRADING CENTRE

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
1	MUPANTA Safiki	Namungalwe	0788599087	Namungalwe	[Signature]
2	Kyomyintona Erick	Namungalwe	0783533313	Namungalwe	[Signature]
3	KALPANA Milton	Namungalwe	0773643562	Namungalwe	[Signature]
4	ISABIRYE ISIMA				
5	ISABIRYE Jafali	Namungalwe	0973854653	Namungalwe	[Signature]
6	ISABIRYE M	Namungalwe	0776202815		[Signature]
7	MWITI God	Namungalwe	0704984105		[Signature]
8	MUGABI MOSES DANLIGI-A	NAMUNGALWE (A)	0771690591	NAMUNGALWE	[Signature]
9	KAMBI HENRY	C/PERSON LES KAWETE	0756222059	KAWETE	[Signature]
10	KIROO ADRIAN	C/PERSON	077525060	NAMUNGALWE ZONE B	[Signature]
11	KAGAYA AMINA RHINA	DI COUNCILLOR	0787815017	NAMUNGALWE SUB-COMM	[Signature]
	NAMAGANSA MERRY	"	0788327677	0783564654	
	MUHAMMAD BAGERIE	BUSINESS MAN	0784220255	BULANGA	
	MUYIBWA FLORENCE	COUNCILOR	0755739378	Namungalwe North	



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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 8<sup>th</sup> / 09 / 2018 10:30am

Location of meeting: NAMUNGALWE TRADING CENTRE

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION /	SIGNATURE
1	AMUGI / G. G.	Business	077 859 807	Village Namungalwe	
2	Obbo JAMES	Farmer	0779131756	Namungalwe	
3	Ntaro SIMON	Businessman	0778092255	Namungalwe	
4	MUWUMBA MARK	Farmer	0789446794	"	
5	KALEZI PATRICK	Business	0787841479	Namungalwe	
6	KAKUMA CHARLES	BUSINESS	0775900994	Namungalwe	
7	KICEMU PETER	BUSINESS	0773854145	NAMUNGALWE	K.P.
8	KANGE PROSSY	BUSI			<del>KANGE</del>
9	KALOGO FARIDAH	BUSINESS	0399799145	Namungalwe	K.F.
10	WAIISI GODFREY	BUSINESS	0776306001	"	<del>WAIISI</del>
11	NGOBI SWAIBU	BUSINESS	0776319664	"	NS
12	WATISWA STEPHEN	BUSINESS	0787721966	"	WATISWA
13	ISABIRYE IVAN	BUSINESS	070 6292111	"	ISABIRYE





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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 08/09/2018 x 556379.3

Location of meeting: Nasuti - Busimba Villages (Nasuti North, Nasuti South, Busimba) y 83054.8

S/N	NAME	POSITION/ OCCUPATION	Email Address/Phone number	INSTITUTION / VILLAGE	SIGNATURE
01	KABAALÉ FRANCO.	Farmer	0757742124	NASUTI	
02	NAKUYAGANA JOSHUA	Student	0701 999355	Dinja College	
03	Nakibande Irene	Farmer	0753616005	Nasuti	Irene
04	BASTALIRWA SWABIRU	FARMER	0705 989394	NASUTI	
05	SILALÉ WAISWA	m	0753561248	NASUTI	
06	DAUDI SURADI	m	0755951411	Nasuti	
07	ISCHINGA ISMAILI	m	973865934	Nasuti	
08	BRUMUNDO MUSA	m		Nasuti	
09	MAROLI BETY	m	0788624816	Nasuti	
10	MUGENZE SIRATWA	m	0759667458		
11	ENOK BIDE	E	0173 865578		
12	NKOOBE JOET	N	070240959	NASUTI	
13	Waiswa Meddy	m	0754031116	NASUTI	



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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 08/09/2015

Location of meeting: Nasuti - Busimba Villages

S/N	NAME	POSITION / Occupation	Email Address/Phone number	INSTITUTION / Village	SIGNATURE
01.	Isabirye Samuel Makwaga	Teacher	0772684675	Busimba	[Signature]
02.	BANDA ZABADI	TEACHER.	0775737480 0752372748	Busimba.	[Signature]
03.	MUWEREZA EDIRISA	PEASANT.		NASUTI SOUTH.	Edirisa
4	Baligaya James	Vacc Chairman	0787072690	Nasuti South	[Signature]
5	MUKAMGALA	Cleaner / Meter	0787015003		[Signature]
6	MUGALA AHAMADA	L.C SOUTH FERRARI	0773855015	Nasuti.s.	[Signature]
7.	MUWADHA KASULE		0779540308	Busimba	
8	NSADHA RICHARD	Teacher	0776211477	Busimba	[Signature]
9.	NAIGOBYA JAMES	PEASANT	0775158985	NASUTI /c	[Signature]
10	ABWEINEKI SARAH	PEASANT	0750610588	NASUTI /c	[Signature]
11	KIBAYA RASHID		0779489333	NASUTICS	[Signature]
12	Banda Sasi		0750637770	Busimba	[Signature]
13	Naigaga Madina	L.C / Busimba	0785785524	Busimba	[Signature]



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MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 08th 09/ 2018

X 5554 88.5  
Y 87371.3

Location of meeting: NAIBIRI T.C

S/N	NAME	POSITION OCCUPATION	Email Address/Phone number	INSTITUTION VILLAGE	SIGNATURE
1	MONICA KINTU	FARMER	0775058050	NAIBIRI	monica
2	KAWUMA ROBINA	FARMER	0773731909	NAIBIRI	Robina
3	AJOKO AISA	FARMER	"	NAIBIRI	Ajoko
4	NAPIO HANIFA	"	0783285745	NAIBIRI	NAPIO
5	TUMWEBAZE JUDITH	"	0771631123	"	T. Judith
6	KINTU SAMUEL	"	0772638193	NAIBIRI	Samuel
7	JSABI PAUL	"	077870688	NAIBIRI	Paul
8	KINANUKA ISMAIL	"	0775394112	"	Ismail
9	MPAMBIRO AMUZA	CLIMATE	0786921859	"	Amuza
10	IZIMUSA MOSES	Information	0755295241	NAIBIRI	Moses
11	KISAM MUFAS	FARMER	"	"	Mufas
12	BALIGEYA HERBERT	BUSINESS	0752787134	MUKONO	Herbert





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Y 893713

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 08/09/2018

Location of meeting: Naibiri

S/N	NAME	POSITION OCCUPATION	Email Address/Phone number	INSTITUTION VILLAGE	SIGNATURE
1.	SULI KIRAMBAIRE	PEASANT-FARMER	0981452014	Naibiri	Suli
2.	TIBITA HUMALI	PEASANT	0972160747	Naibiri	Tibita
3.	BALWANNA BAWURI	PEASANT	0782425729	Naibiri	balwana
4.	NAMPINDO FAIZO	PEASANT	0784834850 07822350	Naibiri	Faizo
5.	BALWANNO ROBERT	TRUCK DRIVER	89 -	Naibiri	robert
6.	MAHIZI AREDI	PEASANT	0788344982	Naibiri	Mahizi



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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 09/09/2018 X 556134.6

Location of meeting: NABITENDE - CATHOLIC CHURCH Y 93356.7

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
	NYONGUESA EDWARD	BUSINESS	0755555709	NABITENDE	
	Basoga gilet	Business	0729267040	Nabitende	
	KYAKAIWUKA AYUB.	Teacher	0755663742	Nabitende	
	NGOKI PAZIL	DRIVER	0781482025	Nabitende	
	ISABIRYE FRED (MAYINJA)	BUSINESS		NABITENDE	
	Bawoya mutesi	MUSICIAN	0752353460	bitende	
	WALUMA JULIUS	Businessman	0776244722	NABITENDE-B	
	MUSUKI MUSA	Business	0788599518	Nabitende	
	Weiswa ZADOKI	BUSINESS	0753688414	NABITENDE	
	TENYWA ROBERT	BUSINESS	0783393971	NABITENDE	
	KIDUNDI RICHARD	BUSINESSMAN	079747161	NABITENDE	
	Isenabwya Charles	PERSONNEL	0782732909	Nabitende B/CE	
	ISABIRYE FRED (MAYINJA)	BUSINESSMAN		NABITENDE BUKSE	



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MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 09/09/2018 X 555349

Location of meeting: Nabitende / Catholic parish Y 933563

S/N	NAME	POSITION Occupational	Email Address/Phone number	INSTITUTION Village	SIGNATURE
1	Munyaka ZAKISA	Kulinma	075906155	bugabi zone Nabitende	AAZ
2	Nangobi MONIKA	" "	078966506	Nabitende	N.M
	JENINZA Lutanya	" "	" "	Nabitende	J.L
	mirenye Fatima	Kulinma	" "	Nabitende	AAZ
	Mulisaaba Jasitina	Kulinma	" "	Nabitende	JJ
	kabirye Tamarwa	Kulinma	" "	Nabitende	BJ
	ROBINA KISIRA	Mugungu	078640019	Nabitende	K.Sira
	NYANZI SARAH	MULIMI	077265552	NABITENDE	Ng.
	Ssezalaza kabigumira	mulimi	" "	Nabitende	sezalaza
	NAMUTAMBA AIDA	MULIMI	0781481556	NABITENDE	Nam.
	Nabirye Isabirye	mulimi	" "	Nabitende	N.J
	Nangobi mbasemp	mulimi	" "	Nabinde	N.M
	basakka mace	mulimi	" "	Nabinde	b-m



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THE REPUBLIC OF UGANDA



MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 09/09/2015

X 555134.6

Location of meeting: NABITENDE T.C / CATHOLIC PARISH

Y 93356.7

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
	Mwanjira J. YAVANDA	Mulimi	11 11	Nabitende	[Signature]
	Miranba KISINRA	Mulimi	11 11	Nabitende	M.F
	Merini Ngonbi	Mulimi	079250600	Nabitende	M.N
	Muhooki GRACE	BUSINESS	0772509514	Nabitende	[Signature]
	NAIKAZI MARIET			Nabitende	
	KUKODHA JUSTINE	Mulimi	0750851945	Nabitende	M.J
	Kabisiziya Nabichye	Mulimi	11 11	Nabitende	M.N
	Namuyingo HARYETI	Mulimi	0777155057	Nabitende	M.H
	NANGABI CHRISTINE		0777214332	Nabitende	M.C
	KIKIANKA ASANANSI		0783996564	Nabitende	[Signature]
	ROSE tabingwa	Mulimi	11 11	Nabitende	R.T
	malinta bitabinwa	Mulimi	11 11	Nabitende	M.B
	BABIKABA HELLEN	TEACHER	0782367496	NABITENDE	H.Babikaba





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MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 09/09/2015 X 5551349

Location of meeting: NABITENDE - Catholic parish 7933563

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
	KYAZIKE AGNES	NABIR NURSE	0782367496	NABITENDE	A. Kyazike
	Jemi wesigore	mulimi	" "	Nabitende	J.W
	Yuru Yanna	mulimi	" "	Nabitende	Y.Y
	Nebagatara Reso	mulimi	0779982123	Nabitende	N.B
	Jwesi Nakaziaba	mulimi	" "	Nabitende	J.W
	babalanda Jorgi	mulimi	" "	Nabitende	B.J
	tomansi tigalana	mulimi	" "	Nabitende	T.T
	Sacanna Nabira	mulimi	" "	Nabitende	S.N
	Nabirye Aginensi	mulimi	" "	Nabitende	N.A
	mutensi geginensi	mulimi	" "	Nabitende	M.A
	Kalonde Ruth	Principal SE-ALBERT W.C	0703872422	Nabitende	Kalonde
	Waiswa George	Ed. Assistant	0778845660	Nabitende	Waiswa
	MPAATA PAUL	Mulimi	" "	NABITENDE	MPAATA
	Nabirye Haryeti	" "	0786398997	Nabitende	N.H



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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 09/09/2018

X 551349

Location of meeting: NABITENDE T.C / KALIRO TOWN

Y 933563

S/N	NAME	POSITION	Email Address/Phone number	INSTITUTION	SIGNATURE
	MUKISA RONARD	SELF	0772887347	NABITENDE	
	KAIWA YAKUT	BUKOLE TRADER	0752699838	BUKOLE	
	TIBIWA MADAN	PEASANT	0771859753	BUKOLE	
	Mpanda G. James	Peasant	0780010617	Bukole	
	KAYANSA JOSEPH	SELF	0781404758	BUKOLE	
	BATAMBUZE HUDSON	SELF	0782365225	NABITENDE	
	MAGANDA GRACE	BUSABI	0751550804	NABITENDE	
	BUSIGO MOSES		078627640		
	Batwally Arjabu		0779484464		
	BABIRYE JESCA		0786161807	NABITENDE	B.J.
	ALKORA JANE		0779152634	NABITENDE	A.S
	MBAHO PAUL		0755995531		
	BABALANDA SIMON		0761370900	BUSABI	

















ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING

Date of the meeting: 07/09/2018

X 5551349

Location of meeting: NABITENDE

Y 933563

S/N	NAME	POSITION OCCUPATION	Email Address/Phone number	INSTITUTION Village	SIGNATURE
1	BAHISEMYIWA STEPHEN	SELF EM	0788214678	NABITENDE A	
2	WAIBALE JACKSON	BUSINESSMAN	0777051168	BUYALE ZONE	
3	ABUDULMANI Kagaya	MUBALAZA	078768468	BUKOSE	
4	BAGAYA M	MULLINI	0779972234	NABITENDE A	
5	MALALA ENOCK	TEACHER	012040176	BUKOSE	
6	NANTUMBA DAVID	BUSINESS	0784954040	Buyale	
7	TAGULE LIVINGSTONE	BUSINESS	077703272	Buyale	
8	Mweyango Samuel		0771854230	Nabitende A	
9	Higenyi Hakeem	Tr	0774970097	Nabitende A	
10	BAMUWAMYE GARGE	BUSABI	0781296008	BUSABI	
11	KAMAMPA JUMA	Self -		Buyale zone	
12	BAMUWAMYE Stanley	-do-	0773-557545	-do-	
13	MUTYABA	NASSANI	0751970861	Buyale	
14	Babalanda Farouk	Bussiness	0782397375	Buyale	





Plot 39 – Babiha Avenue, Kololo  
P.O. Box 10950 Kampala.  
Tel: +256774 181912

THE REPUBLIC OF UGANDA



MINISTRY OF WATER AND ENVIRONMENT

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR NAMUNGALWE-KALIRO TOWN WATER SUPPLY AND SANITATION SYSTEMS - CONSULTATIVE MEETING**

Date of the meeting: 09/09/2015

X 555134.9

Location of meeting: NABITUMWE / CATHOLIC PARISH

T 93356.3

S/N	NAME	POSITION OCCUPATION	Email Address/Phone number	INSTITUTION Village	SIGNATURE
1.	BBOZA MARO		0786072885		
2.	WAMBURI EDISON	TEACHING	0752839808	BUYALE	
3.	MAGUMBA LIVINGSTONE	CARPENTRY	0779633408	BUYALE	
4.	NAKILANDA HARRIET	HI WIFE		BUYALE	Nakilanda
5.	KADHUYU MUHAMMAD	SELF	0784022784	BUYALE	
6.	KWASHWA JAHN	WATERGESSAHI	0785570878	"	
7.	WENKUMBI ROBERT	"	0783184400	BUYKOSE	
8.					
9.					

**ANNEX 3: WATER TEST RESULTS**



**NATIONAL WATER AND SEWERAGE CORPORATION  
CENTRAL LABORATORY - BUGOLOBI**

P.O BOX 7053 KAMPALA Email: waterquality@nwsco.ug

**CERTIFICATE OF ANALYSIS**

**CLIENT:** Ministry of Water & Environment (c/o Ecoserv)

**Serial No:** ES/RF/2018/1377

**Address:** Kampala

**Sampled by:** Client's Staff

**Date Sample Received:** 28/09/2018

**Date of Report:** 10/10/2018

Parameters	Units	Namungalwe Borehole Iganga district E:555770, N:79295	National Standards for Potable Water
<b>Sample Number</b>	--	<b>K4704/2018/C/B</b>	
B.O.D	mg/L	1.05	NS
Bact: Total coliforms	CFU/100mL	<b>402</b>	0
COD	mg/L	3	NS
Calcium: Ca <sup>2+</sup>	mg/L	6.4	150
Chloride	mg/L	76	250
Nitrate-N	mg/L	0.02	45
pH (Physical-Chemical)	-----	6.28	5.5-9,5
Sulphate	mg/L	5	400
Total Phosphorous (TP)	mg/L	0.04	2.2
Turbidity	NTU	0.25	25

**Remarks**

The water Sample showed complying physiochemical characteristics compared to the National Standards for Natural potable water. However, the bacteriological characteristics did not comply with the National Standards for Natural potable water

**ANALYSED BY:** Robinah Muhairwe & Kennedy Araa

**AUTHORISED BY:** Manager Central Laboratory Services : .....

**APPROVED BY:** Senior Manager - Water Quality Management Department : .....

*The NWSC certificate of analysis by no means constitutes a permit to any person or company undertaking to conduct business*



**ANNEX 4: DAILY VEHICLE INSPECTION FORM**

VEHICLE REGISTRATION NUMBER: \_\_\_\_\_ WEEK \_\_\_\_\_ ENDING  
 DATE \_\_\_\_\_

	ITEM DESCRIPTION	G= GOOD ORDER      B= BAD CONDITION						
		MON	TUE	WED	THU	FRI	SAT	SUN
1	LEAKS – WATER / FUEL							
2	OIL LEAKS – ENGINE / DIFFERENTIAL / GEARBOX / HYDRAULIC							
3	TYRES – FRONT / REAR / SPARE / PRESSURE / NUTS							
4	WINDSCREEN / WINDOWS / MIRRORS							
5	BODY WORK – DOORS / HANDLES / CHASSIS / PANALS							
6	VEHICLE LICENCE / REGISTRATION PLATES - VALIDITY							
7	EXHAUST – ENGINE SMOKE / PROPERLY SECURED							
8	LEVELS – OIL / WATER / BRAKES / CLUTCH / HYDRAULIC							
9	BATTERY – WATER LEVEL / CONNECTIONS / CABLES							
10	ABNORMAL WEAR ON STEARING							
11	BRAKES – FOOT / HAND / AIR							
12	LIGHTS – MAIN / STOP / PARK							
13	INDICATORS – FRONT / REAR							
14	REFLECTORS – FRONT / REAR AND REAR CHEVRONS							
15	JACK / WHEEL SPANNER / WARNING TRI-ANGLES							
16	HORN / WINDSCREEN WIPERS							
17	INTERIOR – SEATING / INSTRUMENTATION /							

	ITEM DESCRIPTION	G= GOOD ORDER      B= BAD CONDITION						
		MONTUE	WED	THU	FRI	SAT	SUN	
	HOUSEKEEPING							
18	FIRST AID KIT							
19	FIRE EXTINGUISHER							
20	LOADING AREA EQUIPMENT PROPERLY SECURED							
21	PROPER HOUSEKEEPING ON LOADING AREA							
20	VEHICLE ROADWORTHY							
21	<b>REMARKS:</b>							
22	NAMES OF PERSON CONDUCTING INSPECTION:							

DAILY VEHICLE LOGSHEET				
DATE	ODOMETER START TRIP READING	ODOMETER OF END OF TRIP READING	TRIP DISTANCE (KM)	TRIP DETAILS

Supervisor's Name: \_\_\_\_\_  
 Sign: \_\_\_\_\_

**ANNEX 5: LIST OF PLANT SPECIES IN THE PROJECT AREA**

			Phytosocial description of site	Degraded wetland derived from Typha-Leersia-Mimosa permanent swamp	Wetland between Iganga and Kigulu- with modified vegetation due to subsistence farming	Seasonally flooded grassland with natural vegetation replaced by crops, sugarcane and eucalyptus trees	Permanent wetland with natural vegetation replaced by Sugarcane plantation	Permanent riverine wetland degraded by Sugarcane cultivation	Permanent wetland degraded by rice cultivation	Bushland fallow	Permanent wetland, Natural vegetation replaced with rice	Permanent wetland, Natural vegetation replaced with rice	Kaliro town
			Site name	IK01	IK02	IK03	IK04	IK05	IK06	IK07	IK08	IK09	IK10
			Waypoint	946	947	949	950	951	952	954	956	958	959b
			Coordinates (36N)	553345 68356	553501 69796	553105 73099	554140 78494	554693 79022	555832 81224	556443 84904	555590 89067	555543 91471	555792 98607
Family	Species	Conservation Status IUCN/National	Life form	Locality status									
Acanthaceae	<i>Acanthus polystachus</i>	NE	Shrub	Ind			2			3			
Acanthaceae	<i>Asystasia gangetica</i>	NE	Herb	Ind	8		5	5	6			3	
Acanthaceae	<i>Barleria ventricosa</i>	NE	Herb	Ind	2		2						
Acanthaceae	<i>Dyschoriste radicans</i>	NE	Herb	Ind	3			4	4				
Acanthaceae	<i>Hygrophila auriculata</i>	NE	Herb	Ind		3			1			30	
Acanthaceae	<i>Justicia exigua</i>	NE	Herb	Ind	2							1	
Acanthaceae	<i>Thunbergia alata</i>	NE	Herb	Ind					10	8			
Alismataceae	<i>Alisma plantago</i>	NE	Herb	Ind	1								
Aloaceae	<i>Aloe sp</i>	NE	Herb	Ind		2			1			1	
Amaranthaceae	<i>Achyranthes aspera</i>	NE	Herb	Ind								2	
Amaranthaceae	<i>Alternanthera nodiflora</i>	NE	Herb	Ind				3					
Amaranthaceae	<i>Amaranthus dubius</i>	NE	Herb	Ind	4		6		10				
Amaranthaceae	<i>Amaranthus lividus</i>	NE	Herb	Ind					2			3	
Amaranthaceae	<i>Amaranthus spinosus</i>	NE	Herb	Ind	2	8							



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<b>Family</b>	<b>Species</b>	<b>Conservation Status IUCN/National</b>	<b>Life form</b>	<b>Locality status</b>										
Amaranthaceae	<i>Gomphrena celosioides</i>	NE	Herb	Ind	6		2	7	1	4			3	
Anacardiceae	<i>Anacardium occidentale</i>	NE	Tree	Ind		1					3			
Anacardiceae	<i>Mangifera indica</i>	NE	Tree	Ind	10		4		10		2			
Anacardiceae	<i>Rhus natalensis</i>	NE	Shrub	Ind								1		
Annonaceae	<i>Anona</i> sp	NE	Shrub	Ind				2						
Apiaceae	<i>Centella asiatica</i>	NE	Herb	Ind	20		2		7	3			15	
Apocynaceae	<i>Carissa spinarum</i>	NE	Shrub	Ind							3			
Arecaceae	<i>Borassus aethiopum</i>	NE	Tree	Ind			2							
Arecaceae	<i>Elaeis guineensis</i>	NE	Tree	Ind		4		3						
Arecaceae	<i>Phoenix reclinata</i>	NE	Tree	Ind	1		5	2						
Arecaceae	<i>Rouwolfia vomitoria</i>	NE	Tree	Ind				4						
Asparagaceae	<i>Sansevieria dawei</i>	NE	Herb	Ind								3		
Asparagaceae	<i>Sansevieria nilotica</i>	NE	Herb	Ind								3		
Asteraceae	<i>Acmella caulirhiza</i>	NE	Herb	Ind	7			5		2		40	35	

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Family	Species	Conservation Status IUCN/National	Life form	Locality status									
Asteraceae	<i>Ageratum conyzoides</i>	NE	Herb	Ind	20		3						
Asteraceae	<i>Aspilia africana</i>	NE	Herb	Ind			3	4		4			
Asteraceae	<i>Aspilia kotschy</i>	NE	Herb	Ind			1						
Asteraceae	<i>Bidens pilosa</i>	NE	Herb	Ind	8	5	10	4					
Asteraceae	<i>Blumea alata</i>	NE	Herb	Ind								5	
Asteraceae	<i>Chromolaena odorata</i>	NE	Herb	Inv	3		10		2				
Asteraceae	<i>Conyza floribunda</i>	NE	Herb	Ind	4					2			
Asteraceae	<i>Conyza sumatrensis</i>	NE	Herb	Ind			2						
Asteraceae	<i>Crassocephalum cecrepidioides</i>	NE	Herb	Ind	1								
Asteraceae	<i>Crassocephalum vitellinum</i>	NE	Herb	Ind	2								
Asteraceae	<i>Emilia disfolia</i>	NE	Herb	Ind	4	2							
Asteraceae	<i>Enhydra fluctuans</i>	NE	Herb	Ind				3	4	2			
Asteraceae	<i>Galinsoga parviflora</i>	NE	Herb	Ind	2								
Asteraceae	<i>Hyptis suaveolens</i>	NE	Herb	Ind	15								
Asteraceae	<i>Pluchea dioscoridis</i>	NE	Shrub	Ind							30		
Asteraceae	<i>Synedrella</i>	NE	Herb	Ind	5								



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<b>Family</b>	<b>Species</b>	<b>Conservation Status IUCN/National</b>	<b>Life form</b>	<b>Locality status</b>									
	<i>nodiflora</i>												
Asteraceae	<i>Tagetes minuta</i>	NE	Herb	Ind		1			2				
Asteraceae	<i>Tithonia diversifolia</i>	NE	Shrub	Ind	1		2	4		10		40	
Asteraceae	<i>Tridax procumbens</i>	NE	Herb	Ind	3		2						
Asteraceae	<i>Tridax</i> sp	NE	Herb	Ind		1			5				
Asteraceae	<i>Vernonia amygdalina</i>	NE	Tree	Ind	1		4			2			
Asteraceae	<i>Vernonia cinerea</i>	NE	Herb	Ind			2		5				
Asteraceae	<i>Vernonia perrottetii</i>	NE	Herb	Ind			1						
Bignoniaceae	<i>Jacaranda mimosifolia</i>	NE	Tree	Ind	3	1							
Bignoniaceae	<i>Markhamia lutea</i>	NE	Shrub	Ind	3		5		1				
Bignoniaceae	<i>Spathodea nilotica</i>	NE/LC	Shrub	Ind	1		2		3				
Bursaraceae	<i>Canarium schweinfurthii</i>	NE	Tree	Ind			4						
Cannabaceae	<i>Trema orientalis</i>	NE	Tree	Ind				2					
Casuarinaceae	<i>Casuarina cunninghamiana</i>	NE	Tree	Ind			2						
Celestraceae	<i>Maytenus heterophylla</i>	NE	Shrub	Ind						2			

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Colchicaceae	<i>Gloriosa superba</i>	NE	Herb	Ind		1			1				
Combretaceae	<i>Combretum collinum</i>	NE	Shrub	Ind		2				3			
Commelinaceae	<i>Commelina africana</i>	NE	Herb	Ind		2	1		5				
Commelinaceae	<i>Commelina benghalensis</i>	NE	Herb	Ind	15			2					
Commelinaceae	<i>Commelina latifolia</i>	NE	Herb	Ind			2			1			
Convolvulaceae	<i>Dichondra repens</i>	NE	Herb	Ind		2	1						
Convolvulaceae	<i>Ipomoea cairica</i>	NE	Climber	Ind	2								
Convolvulaceae	<i>Ipomoea sp</i>	NE	Climber	Ind	15								
Cucurbitaceae	<i>Cucurbita pepo</i>	NE	Climber	Ind	1								
Cucurbitaceae	<i>Luffa cylindrica</i>	NE	Climber	Ind			2						
Cucurbitaceae	<i>Momordica foetida</i>	NE	Climber	Ind		7		2					
Curcubitaceae	<i>Mukia madarespatana</i>	NE	Climber	Ind	2								
Cyperaceae	<i>Bulbostylis filamentosa</i>	NE	Herb	Ind	1								
Cyperaceae	<i>Bulbostylis sp</i>	NE	Herb	Ind			2						
Cyperaceae	<i>Cyperus cyperoides</i>	NE	Herb	Ind		2			1				
Cyperaceae	<i>Cyperus</i>	NE	Herb	Ind	4								

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Family	Species	Conservation Status IUCN/National	Life form	Locality status										
	<i>denudatus</i>													
Cyperaceae	<i>Cyperus difformis</i>	NE	Herb	Ind	4					20				
Cyperaceae	<i>Cyperus dives</i>	NE	Herb	Ind	15			2	2	7				
Cyperaceae	<i>Cyperus dubius</i>	NE	Herb	Ind	1									
Cyperaceae	<i>Cyperus latifolius</i>	NE	Herb	Ind		5		2					4	
Cyperaceae	<i>Cyperus papyrus</i>	NE	Herb	Ind						10				
Cyperaceae	<i>Kyllinga alba</i>	NE	Herb	Ind	2					4				
Dracaenaceae	<i>Dracaena fragrans</i>	NE	Shrub	Ind			3							
Euphorbiaceae	<i>Acalypha bipartita</i>	NE	Shrub	Ind	3			2			7			
Euphorbiaceae	<i>Acalypha ornata</i>	NE	Shrub	Ind								1		
Euphorbiaceae	<i>Euphorbia heterophylla</i>	NE	Herb	Ind	4		4							
Euphorbiaceae	<i>Euphorbia hirta</i>	NE	Herb	Ind	4		8	3		3				
Euphorbiaceae	<i>Euphorbia indica</i>	NE	Herb	Ind			1							
Euphorbiaceae	<i>Jatropha curcas</i>	NE	Shrub	Ind			3							
Euphorbiaceae	<i>Shirakiopsis elliptica</i>	NE	Tree	Ind						2				
Euphorbiaceae	<i>Ricinus communis</i>	NE	Shrub	Inv			1		3	3			2	
Euphorbiaceae	<i>Thevetia</i>	NE	Shrub	Ind		4	5							

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<b>Family</b>	<b>Species</b>	<b>Conservation Status IUCN/National</b>	<b>Life form</b>	<b>Locality status</b>									
	<i>peruviana</i>												
Fabaceae	<i>Bauhinia variegata</i>	NE	Shrub	Ind									
Fabaceae	<i>Chamaecrista kirki</i>	NE	Herb	Ind	1								
Fabaceae	<i>Chamaecrista mimosoides</i>	NE	Herb	Ind		1							
Fabaceae	<i>Clitoria ternatea</i>	NE	Climber	Ind						15			
Fabaceae	<i>Crotalaria brevidens</i>	NE	Herb	Ind		7		3					
Fabaceae	<i>Crotalaria pallida</i>	NE	Herb	Ind						4			
Fabaceae	<i>Crotalaria spinosus</i>	NE	Herb	Ind	1		1	1					
Fabaceae	<i>Desmodium canum</i>	NE	Herb	Ind								10	
Fabaceae	<i>Desmodium salicifolium</i>	NE	Herb	Ind		4		1					
Fabaceae	<i>Desmodium triflorum</i>	NE	Herb	Ind	10			2	4				
Fabaceae	<i>Desmodium tortuosum</i>	NE	Herb	Ind	1								
Fabaceae	<i>Indigofera hirsuta</i>	NE	Herb	Ind		10	2						
Fabaceae	<i>Mimosa pigra</i>	NE	Shrub	Inv	10			4	3		2		

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Family	Species	Conservation Status IUCN/National	Life form	Locality status										
Fabaceae	<i>Mimosa pudica</i>	NE	Herb	Ind	20				1	10			8	
Fabaceae	<i>Neonotonia wightei</i>	NE	Herb	Ind			3							
Fabaceae	<i>Rhynchosia viscosa</i>	NE	Climber	Ind			5							
Fabaceae	<i>Senna bicapsularis</i>	NE	Herb	Ind	5		7	2					3	
Fabaceae	<i>Senna hirsuta</i>	NE	Shrub	Ind	2	5	3	1					4	
Fabaceae	<i>Senna occidentalis</i>	NE	Shrub	Ind	1									
Fabaceae	<i>Senna siamea</i>	NE	Shrub	Inv							7			
Fabaceae	<i>Tamarindus indica</i>	NE/VU	Tree	Ind			5		2	2				
Fabaceae	<i>Tephrosia pumila</i>	NE	Herb	Ind		2								
Fabaceae	<i>Tephrosia villosa</i>	NE	Herb	Ind		2					10			
Fabaceae	<i>Tylosema fassoglensis</i>	NE	Climber	Ind			8	3	10		8			
Fabaceae	<i>Vigna parkeri</i>	NE	Climber	Ind	1					2				
Fabaceae	<i>Vigna unguiculata</i>	NE	Climber	Ind					1					
Fabaceae	<i>Acacia hockii</i>	NE	Shrub	Ind									2	
Fabaceae	<i>Acacia polyacantha</i>	NE	Tree	Ind	1	1		2		2				
Fabaceae	<i>Albizia coriaria</i>	NE/NT	Tree	Ind	5					1			2	

			Phytosocial description of site	Degraded wetland derived from Typha-Leersia-Mimosa permanent swamp	Wetland between Iganga and Kigulu- with modified vegetation due to subsistence farming	Seasonally flooded grassland with natural vegetation replaced by subsistence crops, sugarcane and eucalyptus trees	Permanent wetland with natural vegetation replaced by Sugarcane plantation	Permanent riverine wetland degraded by Sugarcane cultivation	Permanent wetland degraded by rice cultivation	Bushland fallow	Permanent wetland, Natural vegetation replaced with rice	Permanent wetland, Natural vegetation replaced with rice	Kaliro town
			Site name	IK01	IK02	IK03	IK04	IK05	IK06	IK07	IK08	IK09	IK10
			Waypoint	946	947	949	950	951	952	954	956	958	959b
			Coordinates (36N)	553345 68356	553501 69796	553105 73099	554140 78494	554693 79022	555832 81224	556443 84904	555590 89067	555543 91471	555792 98607
<b>Family</b>	<b>Species</b>	<b>Conservation Status IUCN/National</b>	<b>Life form</b>	<b>Locality status</b>									
Fabaceae	<i>Alysicarpus glumaceus</i>	NE	Herb	Ind			1						
Fabaceae	<i>Alysicarpus rugosus</i>	NE	Herb	Ind	2		4		4				
Fabaceae	<i>Indigofera spicata</i>	NE	Herb	Ind	5		4						
Fabaceae	<i>Senna spectabilis</i>	NE	Tree	Inv	10		5		2				
Fabaceae	<i>Sesbania sesban</i>	NE	Shrub	Ind						1		1	
Lamiaceae	<i>Hoslundia opposita</i>	NE	Shrub	Ind	3	5	3			3			
Lamiaceae	<i>Leonotis nepetifolia</i>	NE	Herb	Ind	4		5					2	
Lamiaceae	<i>Leucus martinicensis</i>	NE	Herb	Ind	1								
Lamiaceae	<i>Ocimum americanum</i>	NE	Herb	Ind	4	2	4					1	
Lamiaceae	<i>Ocimum gratissimum</i>	NE	Shrub	Ind	5		10						
Lamiaceae	<i>Tectona grandis</i>	NE	Tree	Ind				2					
Lauraceae	<i>Persea americana</i>	NE	Tree	Ind					3		3		
Malvaceae	<i>Abutilon mauritianum</i>	NE	Herb	Ind	3		2		2				
Malvaceae	<i>Corchorus olitorius</i>	NE	Herb	Ind				1		1			

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Family	Species	Conservation Status IUCN/National	Life form	Locality status									
Malvaceae	<i>Grewia mollis</i>	NE	Shrub	Ind		8				2			
Malvaceae	<i>Hibiscus calyphyllus</i>	NE	Herb	Ind	1			1					
Malvaceae	<i>Sida acuta</i>	NE	Herb	Ind	3		4	2					
Malvaceae	<i>Sida alba</i>	NE	Herb	Ind							5		
Malvaceae	<i>Sida ovata</i>	NE	Herb	Ind			4						
Malvaceae	<i>Sida rhombifolia</i>	NE	Herb	Ind	15		5		4			4	
Malvaceae	<i>Sida sp</i>	NE	Herb	Ind	6	12					4		
Malvaceae	<i>Urena lobata</i>	NE	Shrub	Ind	5		4						
Malvaceae	<i>Triumfetta annua</i>	NE	Shrub	Ind	4		6			5		4	
Malvaceae	<i>Triumfetta rhomboidea</i>	NE	Shrub	Ind			5						
Malvaceae	<i>Walthelia indica</i>	NE	Shrub	Ind			2						
Marsiliaceae	<i>Marsilia minuta</i>	NE	Herb	Ind				2	2	1	4	2	
Meliaceae	<i>Azadirachta indica</i>	NE	Tree	Ind			3						
Meliaceae	<i>Khaya anthotheca</i>	VU/EN	Tree	Ind		4			10				
Meliaceae	<i>Melia azedarach</i>	NE	Tree	Ind			3						
Meliaceae	<i>Milicia excelsa</i>	NT/EN	Tree	Ind			10		2				
Menispermaceae	<i>Cissampelos mucronata</i>	NE	Climber	Ind	5		3	2	1				
Molluginaceae	<i>Corbichornia</i>	NE	Herb	Ind		2							



			Phytosocial description of site	Degraded wetland derived from Typha-Leersia-Mimosa permanent swamp	Wetland between Iganga and Kigulu- with modified vegetation due to subsistence farming	Seasonally flooded grassland with natural vegetation replaced by subsistence crops, sugarcane and eucalyptus trees	Permanent wetland with natural vegetation replaced by Sugarcane plantation	Permanent riverine wetland degraded by Sugarcane cultivation	Permanent wetland degraded by rice cultivation	Bushland fallow	Permanent wetland, Natural vegetation replaced with rice	Permanent wetland, Natural vegetation replaced with rice	Kaliro town
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<b>Family</b>	<b>Species</b>	<b>Conservation Status IUCN/National</b>	<b>Life form</b>	<b>Locality status</b>									
	<i>decumbens</i>												
Moraceae	<i>Artocarpus heterophyllus</i>	NE	Tree	Ind	5		2				2		
Moraceae	<i>Brussonetia papyrifera</i>	NE	Tree	Inv			5						
Moraceae	<i>Ficus capensis</i>	NE	Tree	Ind				5					
Moraceae	<i>Ficus ingen</i>	NE	Tree	Ind									
Moraceae	<i>Ficus mucuso</i>	NE	Tree	Ind			2						
Moraceae	<i>Ficus natalensis</i>	NE	Tree	Ind		5					5		
Moraceae	<i>Ficus sycomorus</i>	NE	Tree	Ind	2								
Moraceae	<i>Ficus sp</i>	NE	Tree	Ind				2					
Moringaceae	<i>Moringa sp</i>	NE	Shrub	Ind									
Myrtaceae	<i>Callistemon citrinus</i>	NE	Tree	Ind				2			1		
Myrtaceae	<i>Psidium guajava</i>	NE	Shrub	Ind							2		
Myrtaceae	<i>Syzygium cumini</i>	NE	Tree	Ind							3		
Nyctaginaceae	<i>Boerhavia coccinea</i>	NE	Herb	Ind					1		2		
Nymphaeaceae	<i>Nymphaea lotus</i>	NE	Herb	Ind				2		5			
Oleaceae	<i>Jasminum eminii</i>	NE	Climber	Ind		2					3		
Onagoraceae	<i>Ludwigia abyssinica</i>	NE	Climber	Ind	8		1	4		2		5	

			Phytosocial description of site	Degraded wetland derived from Typha-Leersia-Mimosa permanent swamp	Wetland between Iganga and Kigulu- with modified vegetation due to subsistence farming	Seasonally flooded grassland with natural vegetation replaced by subsistence crops, sugarcane and eucalyptus trees	Permanent wetland with natural vegetation replaced by Sugarcane plantation	Permanent riverine wetland degraded by Sugarcane cultivation	Permanent wetland degraded by rice cultivation	Bushland fallow	Permanent wetland, Natural vegetation replaced with rice	Permanent wetland, Natural vegetation replaced with rice	Kaliro town
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Family	Species	Conservation Status IUCN/National	Life form	Locality status									
Onagraceae	<i>Ludwigia adscendens</i>	NE	Herb	Ind				4		5		5	
Oxallidaceae	<i>Oxalis latifolius</i>	NE	Herb	Ind	5								
Phyllanthaceae	<i>Flueggea virosa</i>	NE	Shrub	Ind	2		5			3			
Phyllanthaceae	<i>Phyllanthus amarus</i>	NE	Herb	Ind	1	1							
Phyllanthaceae	<i>Phyllanthus neumelarius</i>	NE	Shrub	Ind			1						
Phyllanthaceae	<i>Phyllanthus ovarifolias</i>	NE	Shrub	Ind	2		2						
Phytolaccaceae	<i>Phytolacca dodecandra</i>	NE	Shrub	Ind					2			1	
Poaceae	<i>Brachiaria decumbens</i>	NE	Grass	Ind	2			8	5				
Poaceae	<i>Brachiaria scalaris</i>	NE	Grass	Ind	2	7	2						
Poaceae	<i>Chloris pycnothrix</i>	NE	Grass	Ind		1				2		4	
Poaceae	<i>Cynodon dactylon</i>	NE	Grass	Ind	20	15	10	4		10	13		
Poaceae	<i>Dactyloctenium aegyptium</i>	NE	Grass	Ind	1					4			
Poaceae	<i>Digitaria longiflora</i>	NE	Grass	Ind	5	20				4			
Poaceae	<i>Digitaria velutina</i>	NE	Grass	Ind	2			3	6				

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<b>Family</b>	<b>Species</b>	<b>Conservation Status IUCN/National</b>	<b>Life form</b>	<b>Locality status</b>									
Poaceae	<i>Echinochloa haploclada</i>	NE	Grass	Ind			15						
Poaceae	<i>Echinochloa pyramidalis</i>	NE	Grass	Ind			5						
Poaceae	<i>Eleusine africana</i>	NE	Grass	Ind				1					
Poaceae	<i>Eleusine indica</i>	NE	Grass	Ind	2								
Poaceae	<i>Eragrostis exasperata</i>	NE	Grass	Ind	1		3			1			
Poaceae	<i>Hyparrhenia filipendula</i>	NE	Grass	Ind								2	
Poaceae	<i>Leersia hexandra</i>	NE	Grass	Ind	30	2	5	10		10	4	20	
Poaceae	<i>Melinis repens</i>	NE	Grass	Ind			5						3
Poaceae	<i>Oryza sativum</i>	NE	Grass	Ind	20								
Poaceae	<i>Panicum maximum</i>	NE	Grass	Ind			5		5				
Poaceae	<i>Paspalum scrobiculatum</i>	NE	Grass	Ind	2								
Poaceae	<i>Pennisetum polystachion</i>	NE	Grass	Ind		3	10						2
Poaceae	<i>Pennisetum purpureum</i>	NE	Grass	Ind	2				2				
Poaceae	<i>Phragmites mauritianum</i>	NE	Grass	Ind					2				
Poaceae	<i>Rottboellia</i>	NE	Grass	Ind						2			

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<b>Family</b>	<b>Species</b>	<b>Conservation Status IUCN/National</b>	<b>Life form</b>	<b>Locality status</b>									
	<i>cochinchinensis</i>												
Poaceae	<i>Setaria sphacelata</i>	NE	Grass	Ind	10		3						
Poaceae	<i>Sorghum arundinaceum</i>	NE	Grass	Ind	1								
Poaceae	<i>Sporobolus festivus</i>	NE	Grass	Ind	2								
Poaceae	<i>Sporobolus pyramidalis</i>	NE	Grass	Ind				2					
Polygonaceae	<i>Oxygonum sinuatum</i>	NE	Herb	Ind			1						
Polygonaceae	<i>Persicaria senegalensis</i>	NE	Herb	Ind							1	7	
Polygonaceae	<i>Persicaria setosula</i>	NE	Herb	Ind				8	2		7		
Polygonaceae	<i>Persicaria sp</i>	NE	Herb	Ind					2				
Portulaccaceae	<i>Portulacca oleraceae</i>	NE	Herb	Ind							2		
Rhamnaceae	<i>Maesopsis eminii</i>	NE	Tree	Ind	8								
Rubiaceae	<i>Spermacoce princeae</i>	NE	Herb	Ind	4		5		2				
Rubiaceae	<i>Vanguelia apiculata</i>	NE	Herb	Ind		2	4						
Rutaceae	<i>Citrus sinensis</i>	NE	Shrub	Ind					3				
Sapindaceae	<i>Allophyllus</i>	NE	Shrub	Ind	5			3					

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			Site name		IK01	IK02	IK03	IK04	IK05	IK06	IK07	IK08	IK09	IK10
			Waypoint		946	947	949	950	951	952	954	956	958	959b
			Coordinates (36N)		553345 68356	553501 69796	553105 73099	554140 78494	554693 79022	555832 81224	556443 84904	555590 89067	555543 91471	555792 98607
<b>Family</b>	<b>Species</b>	<b>Conservation Status IUCN/National</b>	<b>Life form</b>	<b>Locality status</b>										
	<i>africanus</i>													
Sapindaceae	<i>Blighia unijugata</i>	NE	Tree	Ind		2							1	
Solanaceae	<i>Datura stramonium</i>	NE	Herb	Ind	8								10	
Solanaceae	<i>Physalis minima</i>	NE	Herb	Ind					1					
Solanaceae	<i>Solanum anguivi</i>	NE	Herb	Ind	1	1								
Solanaceae	<i>Solanum incanum</i>	NE	Shrub	Ind	4							5		
Typhaceae	<i>Typha capensis</i>	NE	Herb	Ind	10									
Verbanaceae	<i>Lantana camara</i>	NE	Shrub	Inv			20	5		5	25		4	
Verbanaceae	<i>Lantana trifolia</i>	NE	Shrub	Ind			10							
Verbenaceae	<i>Stachytarpheta urticifolia</i>	NE	Herb	Ind	1					1				
Verbenaceae	<i>Vitex doniana</i>	NE	Tree	Ind		1					2			
Vitaceae	<i>Cyphostemma adenocaula</i>	NE	climber	Ind					4					
Vitaceae	<i>Cyphostemma serpens</i>	NE	Climber	Ind			4							

**ANNEX 6: LIST OF BIRD'S SPECIES IN THE PROJECT AREA**

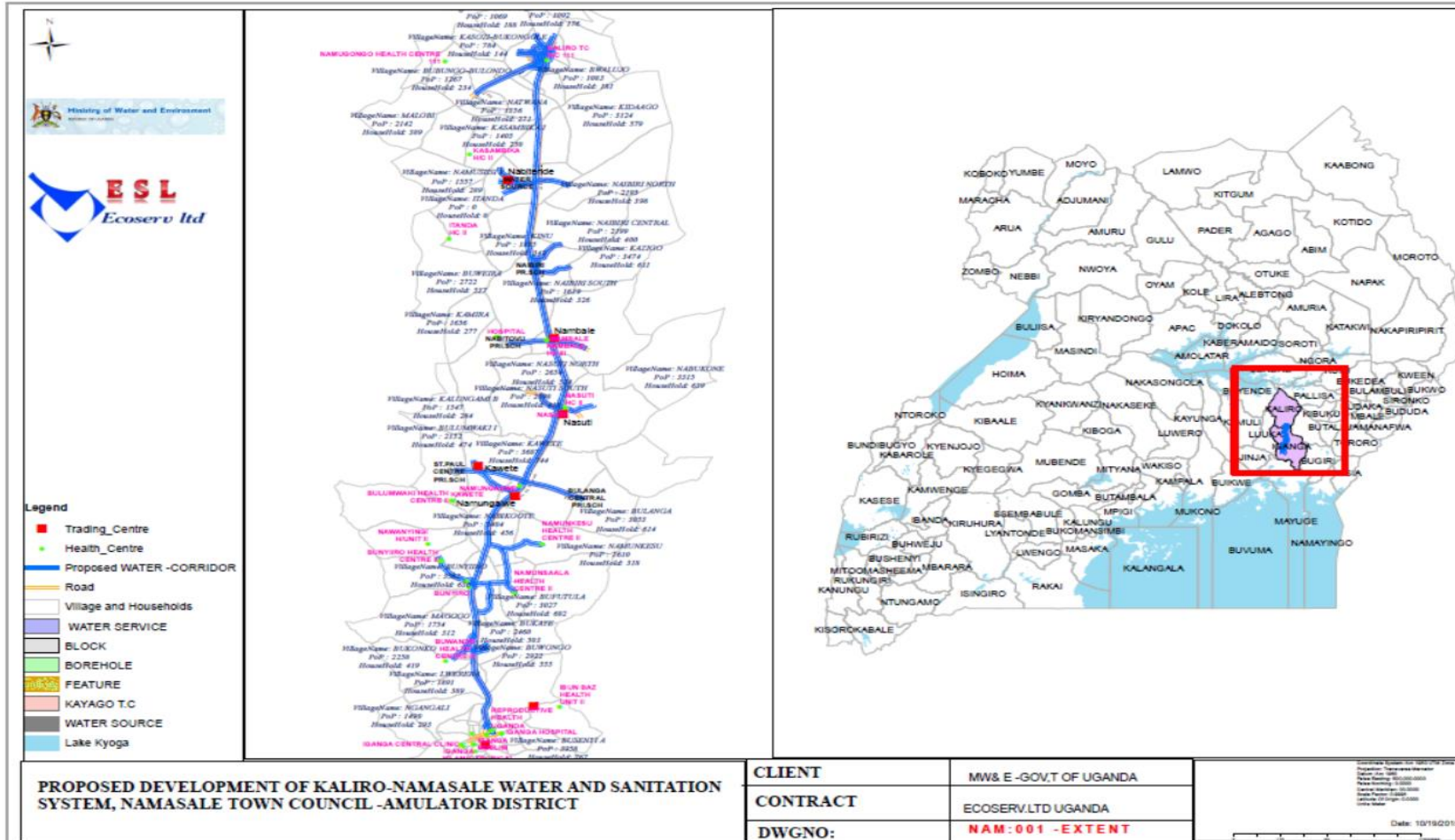
Scientific name	Habitat preference	Conservation Status	Kigulu 1	Kigulu 2	Bukaye	Nabikoote-Namungalwe	Namungalwe-Nalukandwa	Nasuti	Naibiri	Itanda-kinu	Kofi-A	Abundance
<i>Ciconiaabdimii</i>	G	LC	0	0	0	2	0	0	0	1	0	3
<i>Anastomuslamelligerus</i>	W	LC	0	3	1	0	2	0	2	0	2	10
<i>Motacillaaguimp</i>	w	LC	2	0	0	2	0	0	0	0	2	6
<i>Acrocephalusbaeticatus</i>	w	LC	0	0	0	1	2	1	0	1	0	5
<i>Turduspelios</i>	G	LC	1	1	0	0	0	2	2	0	2	8
<i>Hirundoangolensis</i>	G	LC	0	5	0	0	0	7	0	0	3	15
<i>Euplecteshordeaceus</i>	G	LC	0	0	3	0	0	0	0	0	0	3
<i>Eurystomusglaucus</i>	Af,f	LC	0	0	1	0	0	0	0	0	0	1
<i>LonchuraCuculata</i>	Gen	LC	6	0	5	0	0	5	0	0	3	19
<i>Phyllolaispulchella</i>	G	LC	0	0	2	0	0	0	0	1	0	3
<i>Bubulcus ibis</i>	G	LC	0	0	9	0	0	0	2	0	0	11
<i>Pynonotusbarbatus</i>	Gen	LC	3	0	0	0	2	3	0	1	0	9
<i>Estrildaastrild</i>	Gen	LC	0	3	5	3	0	0	0	0	0	11
<i>Euplectesaxillaris</i>	w, G	LC	0	0	3	0	2	0	0	0	0	5
<i>Dicrurusadsimilis</i>	f, Af	LC	1	0	0	0	0	0	0	0	0	1
<i>Sylvia borin</i>	f,G	LC	0	1	0	0	0	0	0	0	0	1
<i>Acrocephalusrufescens</i>	w	LC	0	0	0	1	1	2	0	2	0	6
<i>Balearicaregulorum</i>	w	R-NT/EN	0	0	0	4	0	0	0	0	0	4
<i>Halcyon Leucocephala</i>	Af	LC	0	0	1	0	0	0	2	0	0	3
<i>Passer griseus</i>	Gen	LC	7	0	0	0	0	3	0	0	2	12
<i>PlegadisFalcinellus</i>	W,G	LC	0	0	2	3	0	0	1	0	1	7
<i>Scopus umbretta</i>	w	LC	0	0	1	2	1	0	0	0	0	4

Scientific name	Habitat preference	Conservation Status				Nabikoote-Namungalwe	Namungalwe-Nalukandwa		Itanda-kinu		Abundance	
			Kigulu 1	Kigulu 2	Bukaye		Nasuti	Naibiri	Kofi-A			
<i>CharadriusPecuarius</i>	w	LC	0	0	0	1	2	0	1	0	0	4
<i>Streptopeliasenegalensis</i>	Gen	LC	0	2	0	0	0	0	0	0	0	2
<i>Egrettaazarzetta</i>	w	LC	0	0	5	0	3	0	0	0	0	8
<i>Lophaetusoccipitalis</i>	f, Af	LC	0	1	0	0	0	0	0	1	0	2
<i>Ploceuscastanops</i>	w	LC	0	0	0	2	0	0	2	0	1	5
<i>Euplectesfranciscanus</i>	G	LC	0	0	2	0	0	0	0	0	0	2
<i>Ptilostomusafer</i>	G	LC	0	0	7	0	0	0	0	0	0	7
<i>Corvusalbus</i>	Gen	LC	3	0	0	0	0	0	0	0	0	3
<i>Cerylerudis</i>	W	LC	0	0	0	0	2	0	2	1	1	6
<i>Cinnyrisbifasciata</i>	G	LC	0	0	1	0	0	0	0	0	0	1
<i>Lagonostictasenegala</i>	Gen	LC	0	5	0	0	0	0	0	0	0	5
<i>Uraeginthusbengalus</i>	Gen	LC	0	0	0	0	0	0	0	0	0	0
<i>Cinnyriserythrocerca</i>	w	R-RR	1	0	1	0	0	2	0	0	1	5
<i>Streptopeliasemitorquata</i>	f, Af	LC	3	0	0	0	0	0	0	0	0	3
<i>Hirundodaurica</i>	G,w	LC	0	0	11	0	0	0	0	0	0	11
<i>Lamprotornispurpuropterus</i>	G, Af	LC	0	0	3	0	0	0	0	0	0	3
<i>Cisticolacantans</i>	f, G	LC	0	2	0	0	0	0	0	0	0	2
<i>Coliusstriatus</i>	f, Af	LC	0	0	3	0	0	0	0	3	0	6
<i>CisticolaWoosnami</i>	G	LC	0	3	1	0	0	0	1	0	2	7
<i>Laniariusaeiopicus</i>	G, Af	LC	0	1	0	0	0	0	0	0	0	1
<i>Centropussuperciliosus</i>	G	LC	0	0	1	0	0	0	0	0	0	1
<i>Cisticolagalactotes</i>	w	LC	0	0	3	2	1	0	0	2	1	9
<i>Euplectesmacrourus</i>	G	LC	0	0	6	0	0	0	0	0	0	6



Scientific name	Habitat preference	Conservation Status				Nabikoote-Namungalwe	Namungalwe-Nalukandwa			Itanda-kinu	Kofi-A	Abundance
			Kigulu 1	Kigulu 2	Bukaye			Nasuti	Naibiri			
<i>Ardeacinerea</i>	w	LC	0	0	0	0	0	1	0	0	0	1
<b>DIVERSITY</b>			1.97	2.23	2.85	2.31	2.24	2.01	2.15	2.1	2.4	

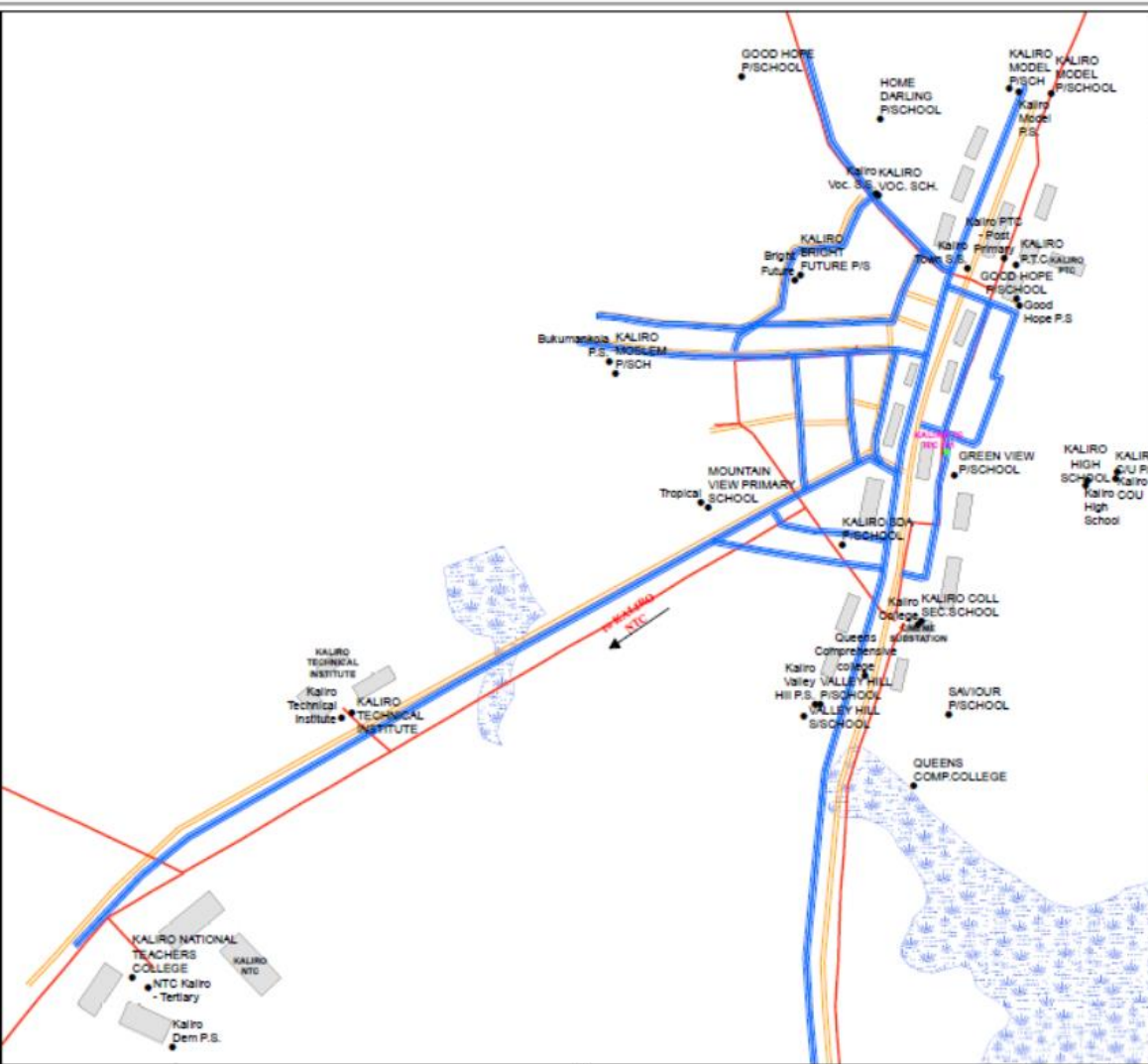
# ANNEX 7: PROJECT DRAWINGS





**Legend**

- Trading\_Centre
- Health\_Centre
- Schools
- Proposed WATER -CORRIDOR
- Existing Umeme MvLine
- Road
- WETLAND-KALIRO
- WATER SERVICE
- BLOCK
- BOREHOLE
- FEATURE
- KAYAGO T.C
- WATER SOURCE
- Lake Kyoga



**PROPOSED DEVELOPMENT OF KALIRO-NAMUNGELWA WATER AND LAND MARK FEATURES AND CORE INSTITUTIONS**

<b>CLIENT</b>	MW & E -GOV.T OF UGANDA
<b>CONTRACT</b>	ECOSERV.LTD UGANDA
<b>DWGNO:</b>	<b>NAM:001 -EXTENT</b>

**PAGE 1**

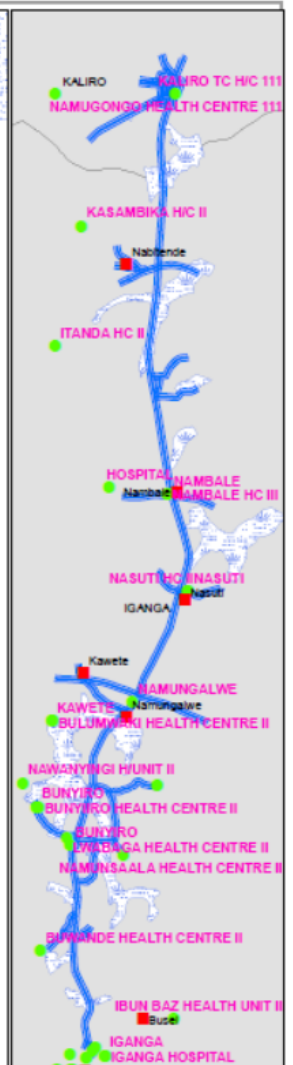
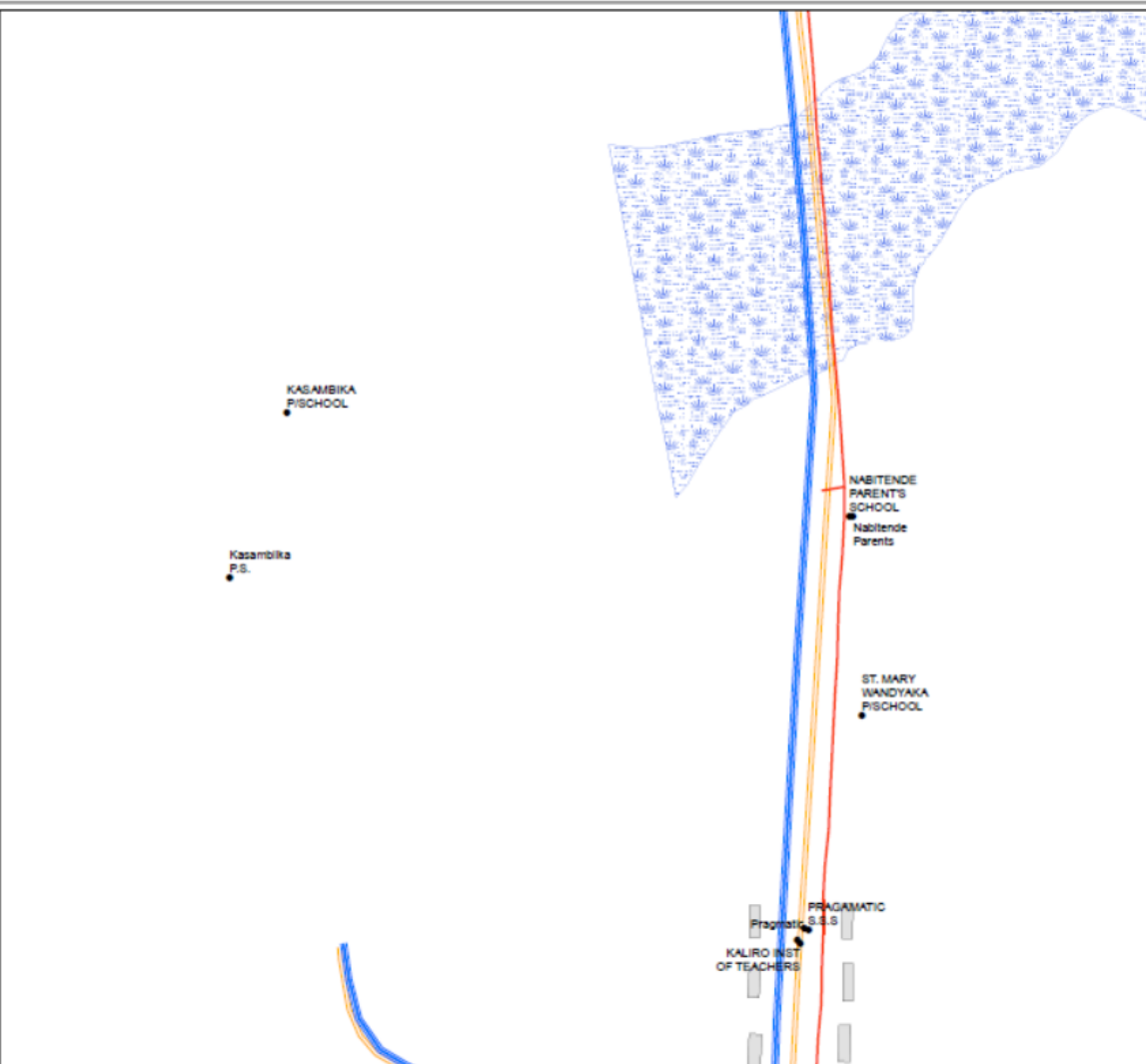
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 False Easting: 500000.0000  
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 Scale Factor: 0.9996  
 False Northing: 0.0000  
 Units: Meter

Date: 10/19/2015



**Legend**

- Trading\_Centre
- Health\_Centre
- Schools
- Proposed WATER -CORRIDOR
- Existing Umeme MvLine
- Road
- WETLAND-KALIRO
- WATER SERVICE
- BLOCK
- BOREHOLE
- FEATURE
- KAYAGO T.C
- WATER SOURCE
- Lake Kyoga



**PROPOSED DEVELOPMENT OF KALIRO-NAMUNGELWA WATER AND LAND MARK FEATURES AND CORE INSTITUTIONS**

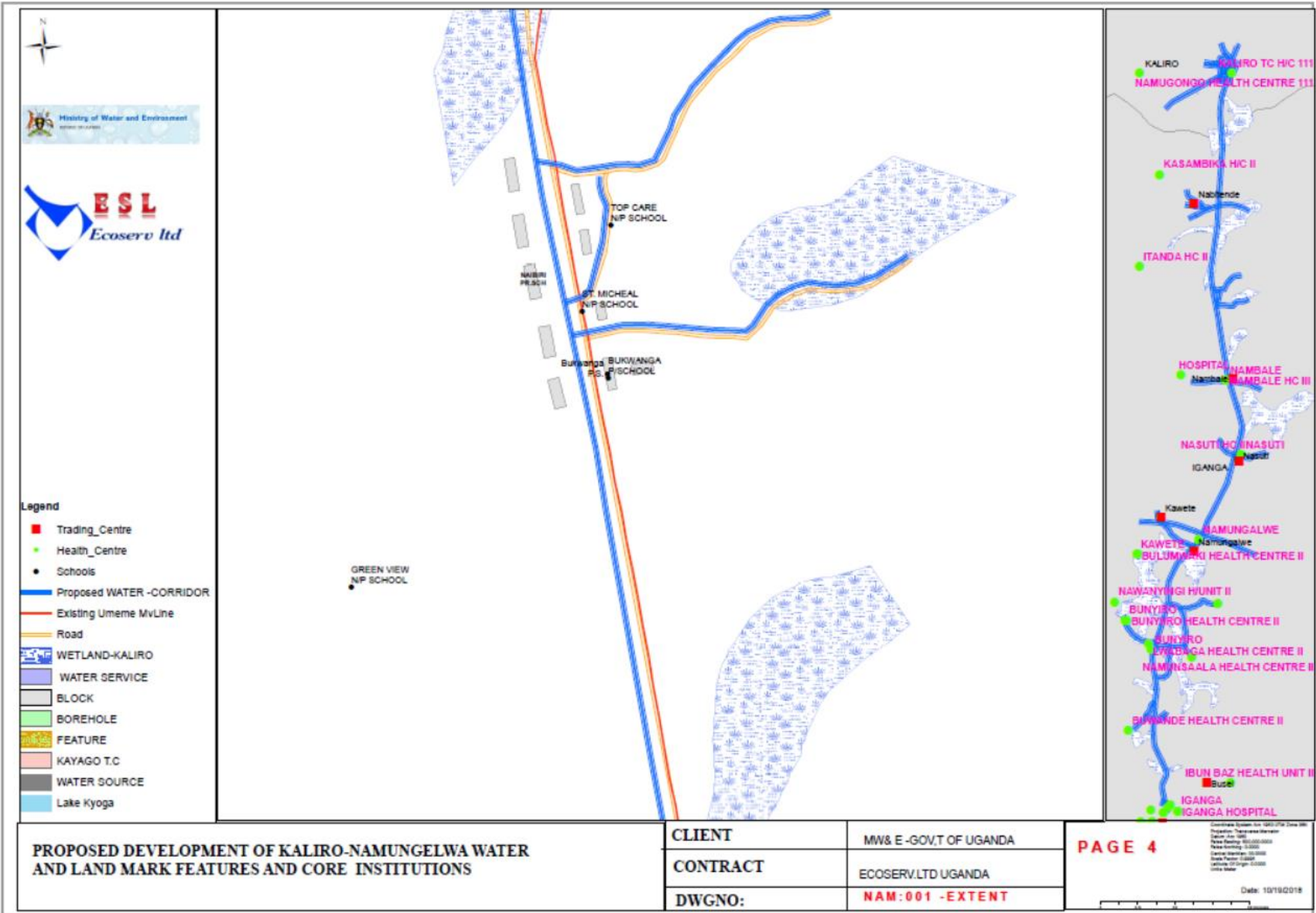
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<b>CONTRACT</b>	ECOSERV.LTD UGANDA
<b>DWGNO:</b>	<b>NAM:001 -EXTENT</b>

**PAGE 2**

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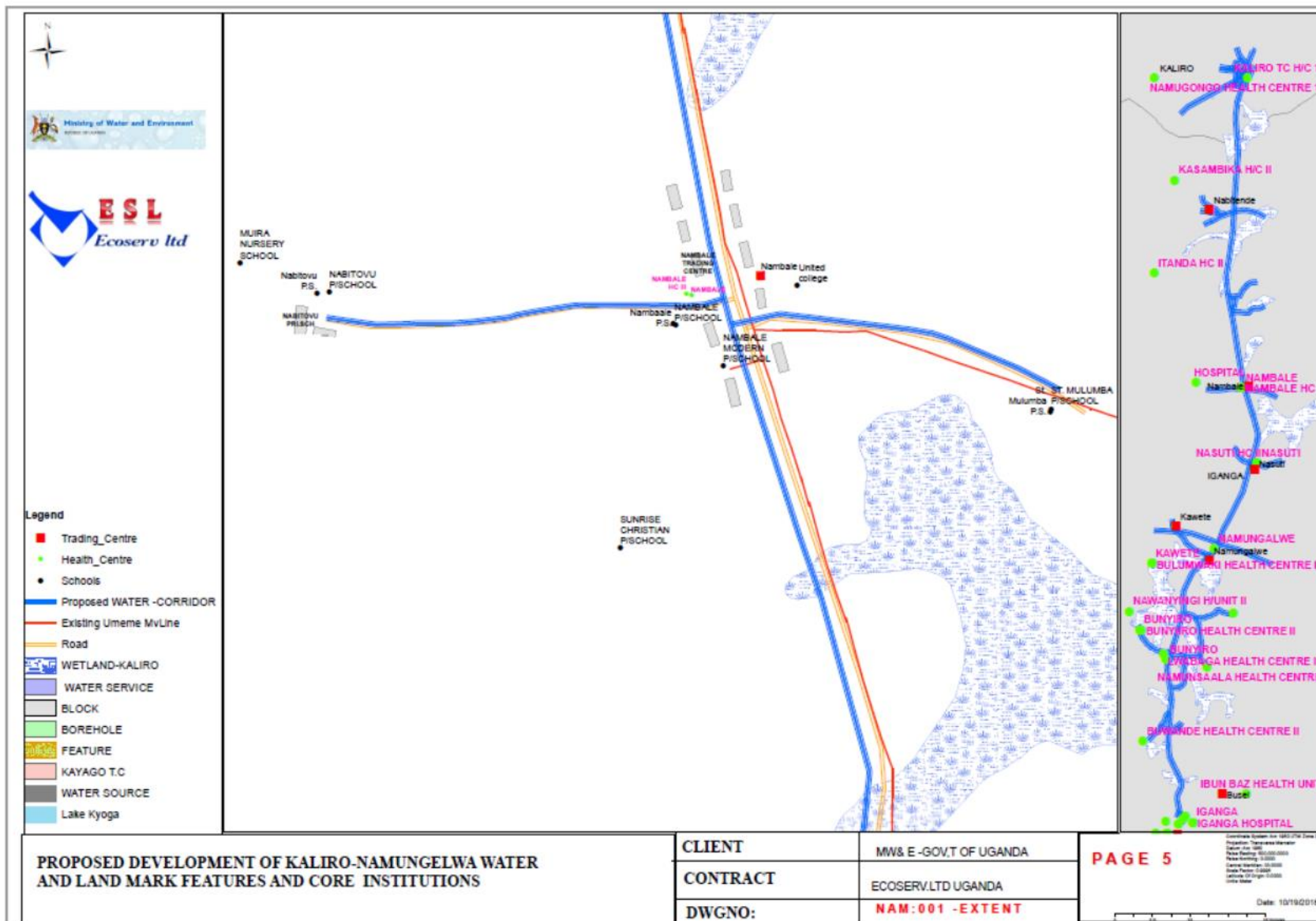


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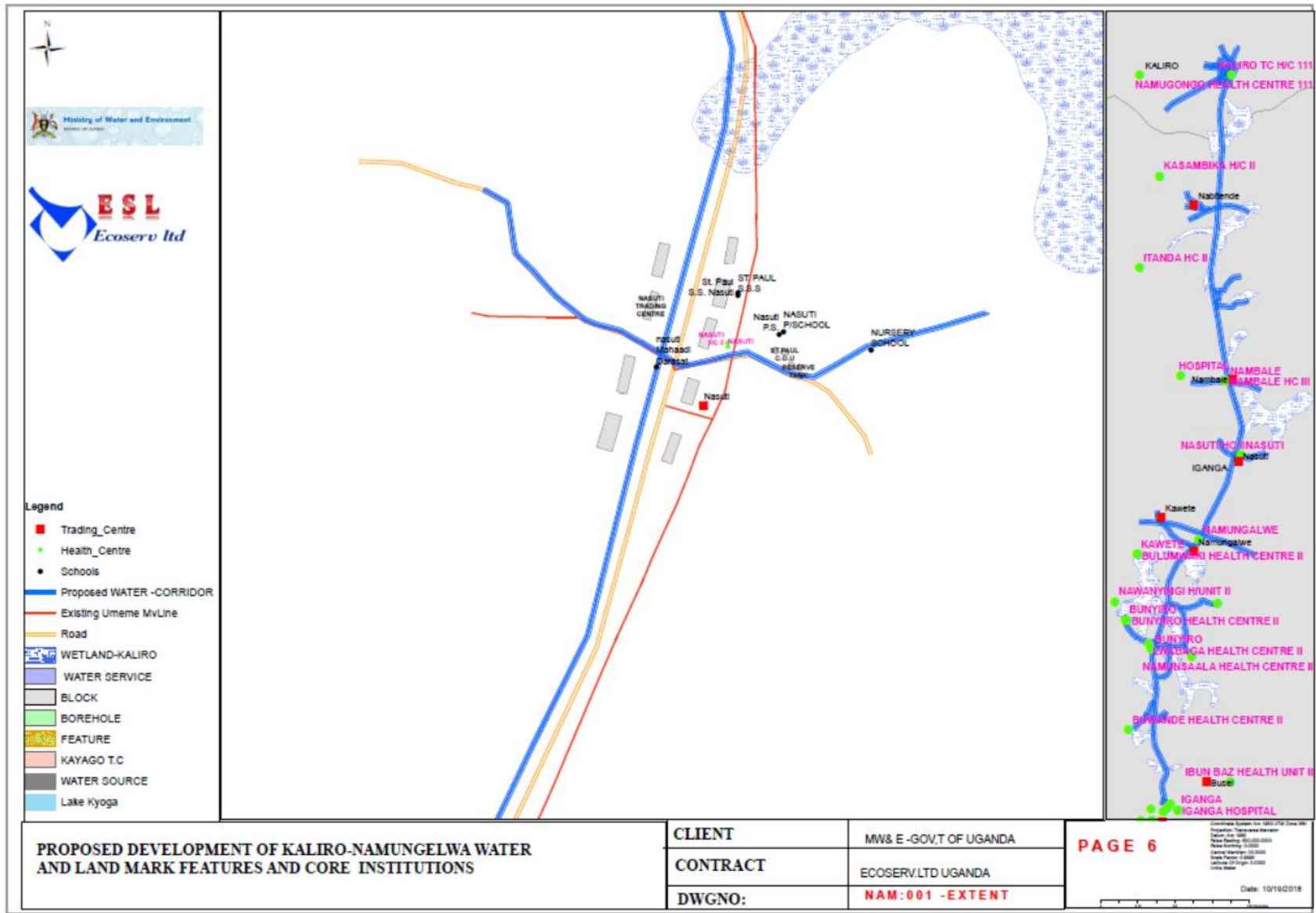
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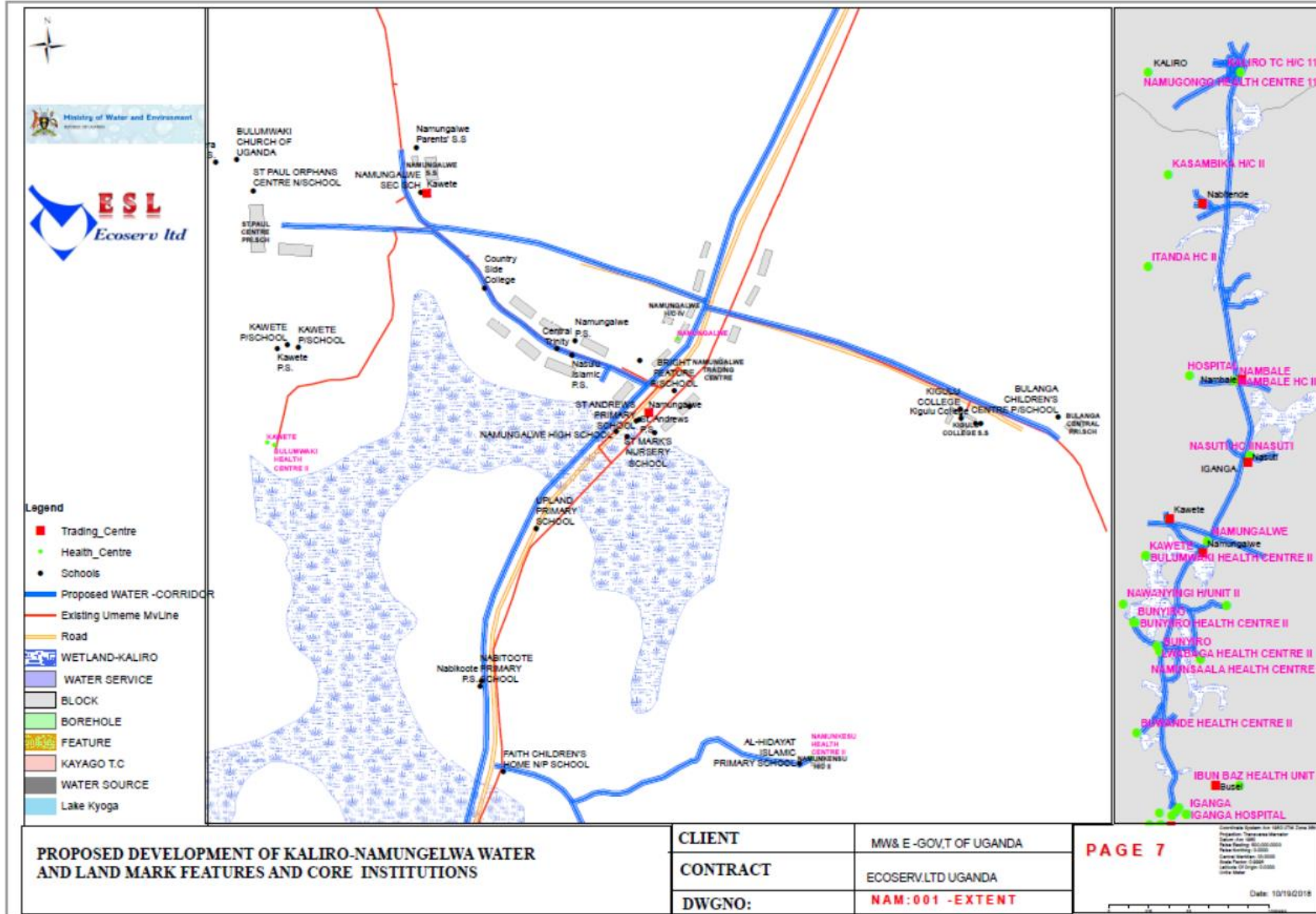
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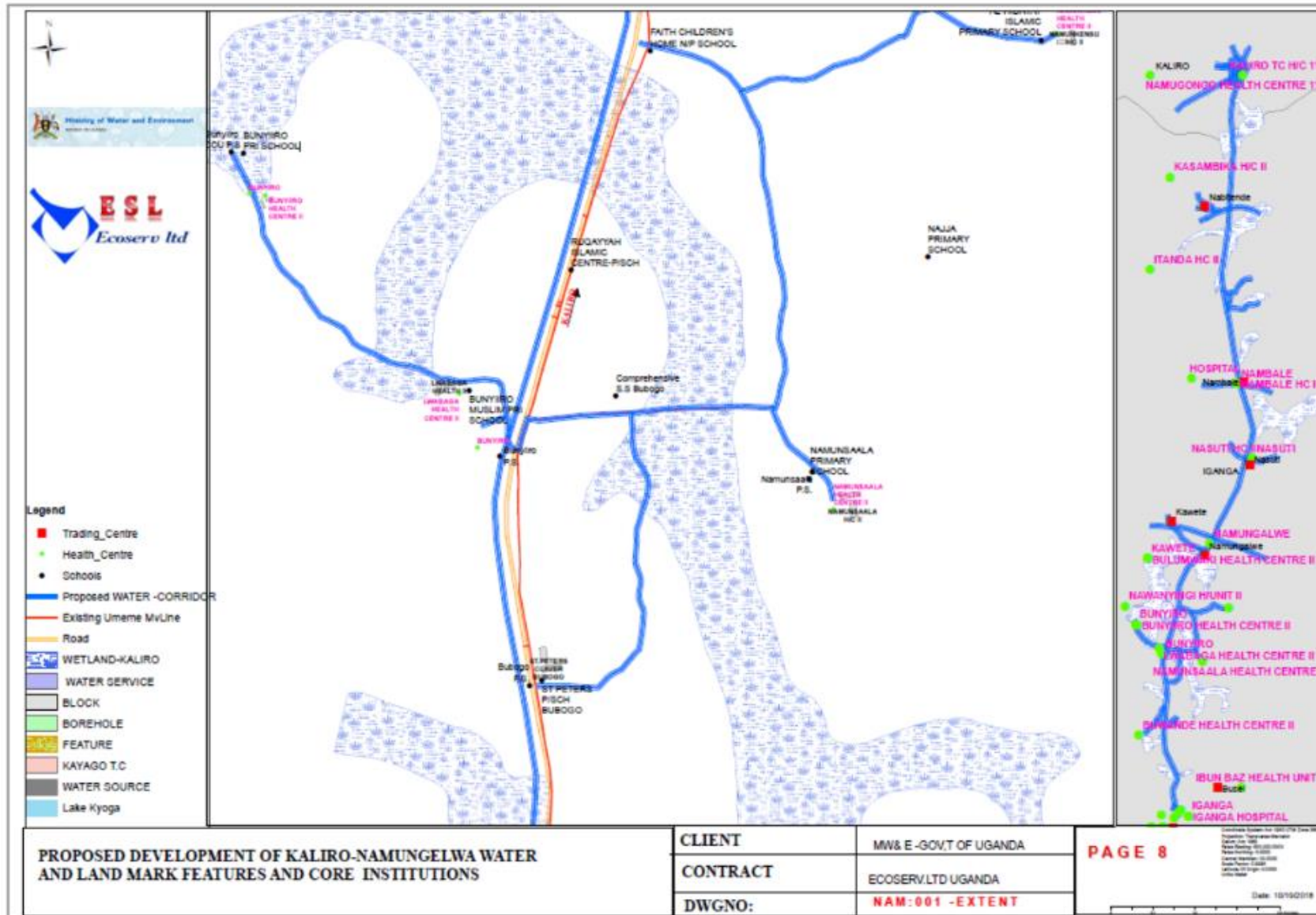
**PROPOSED DEVELOPMENT OF KALIRO-NAMUNGELWA WATER AND LAND MARK FEATURES AND CORE INSTITUTIONS**

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<b>CONTRACT</b>	ECOSERV.LTD UGANDA
<b>DWGNO:</b>	<b>NAM:001 -EXTENT</b>

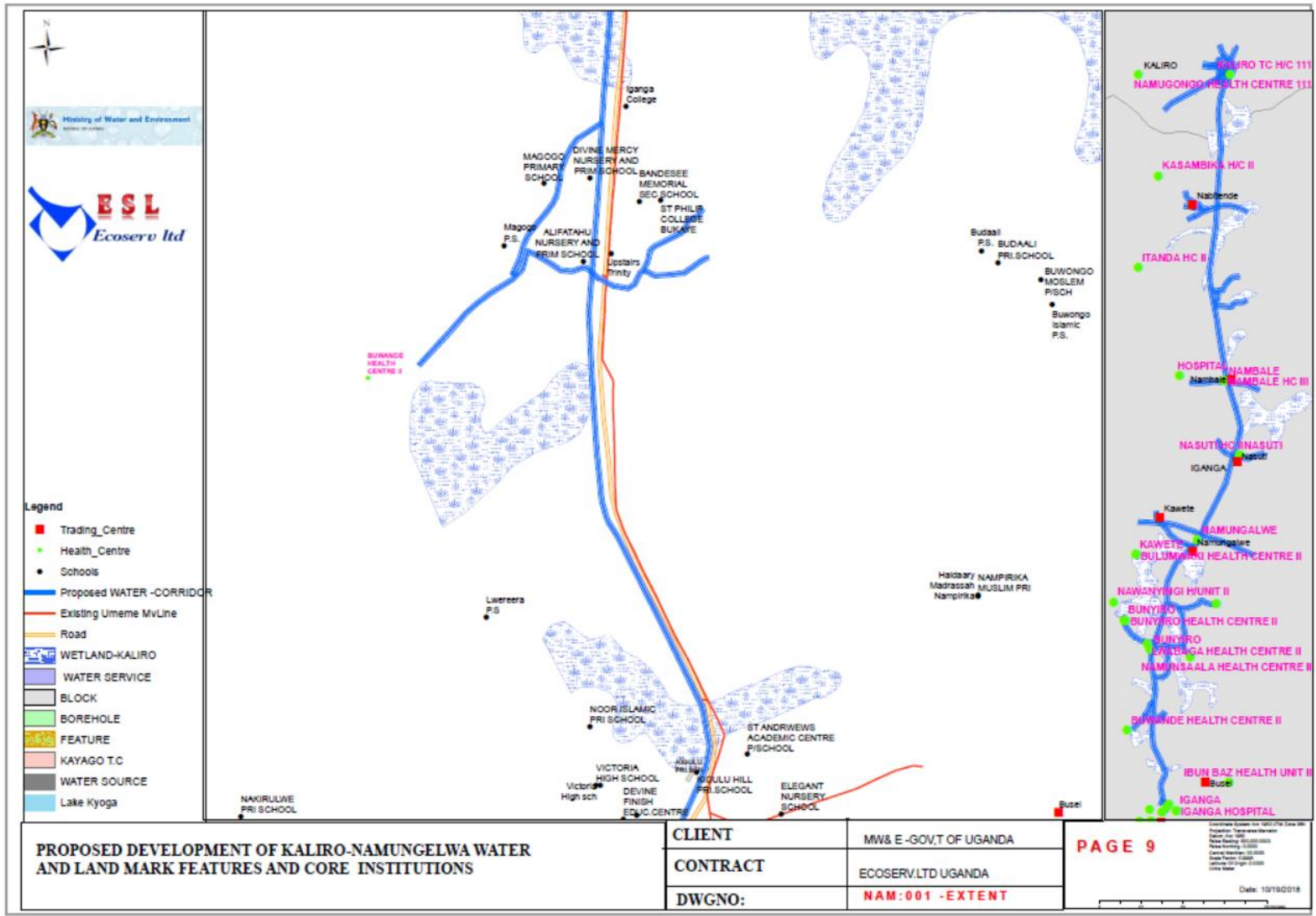
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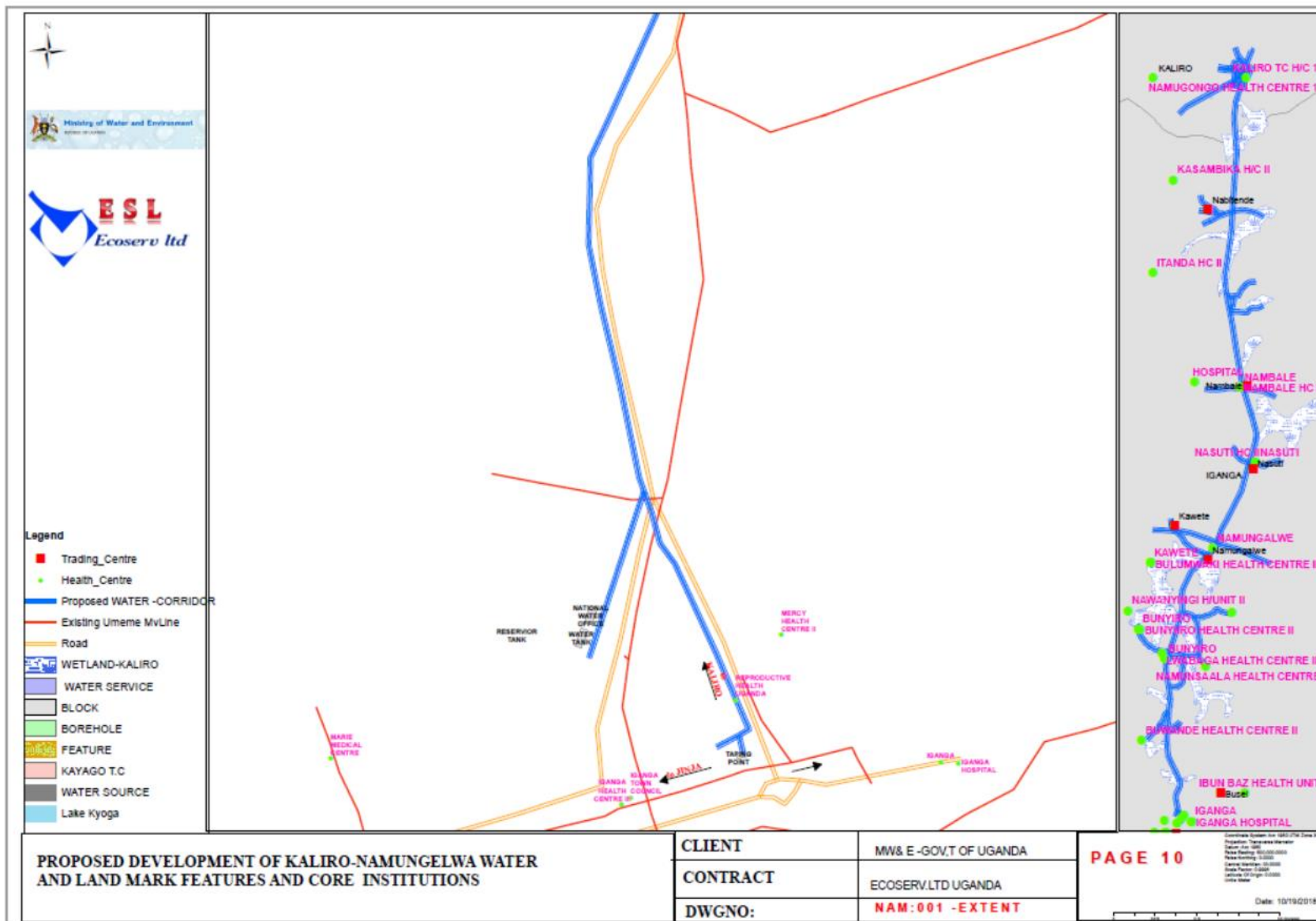
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Date: 10/19/2018



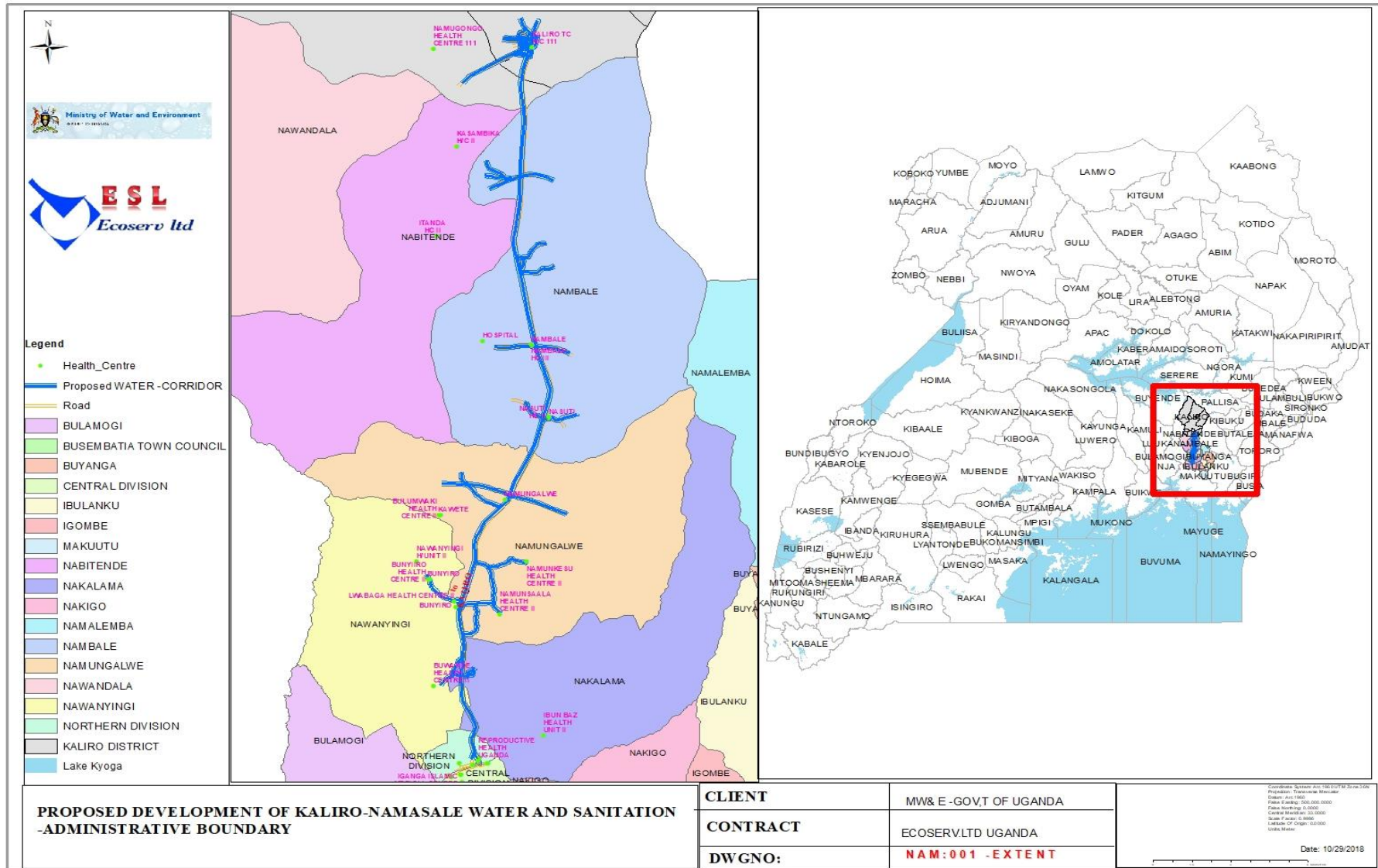






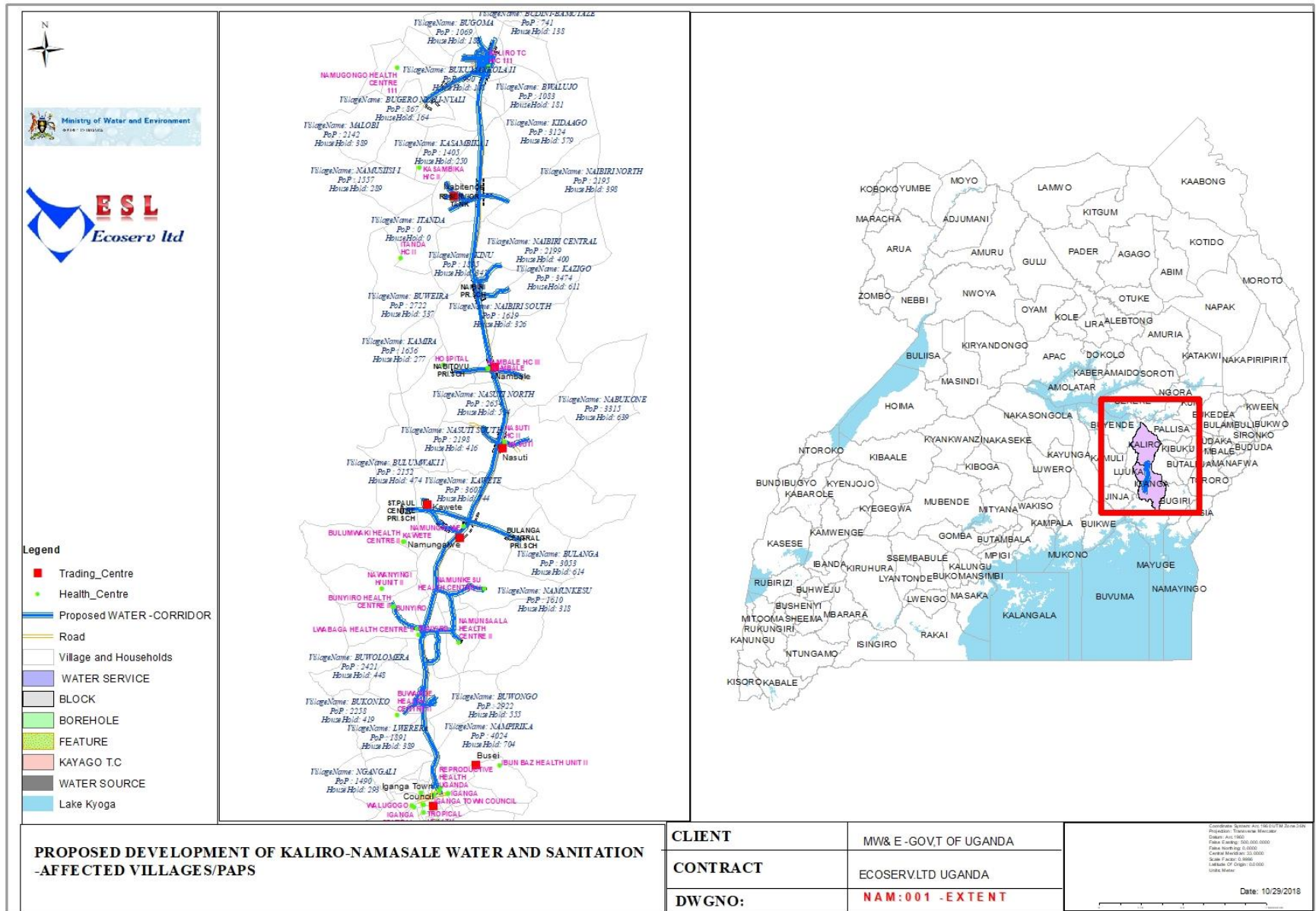
# ANNEX 8: PROJECT AREA MAPS

## Project area (Administration)

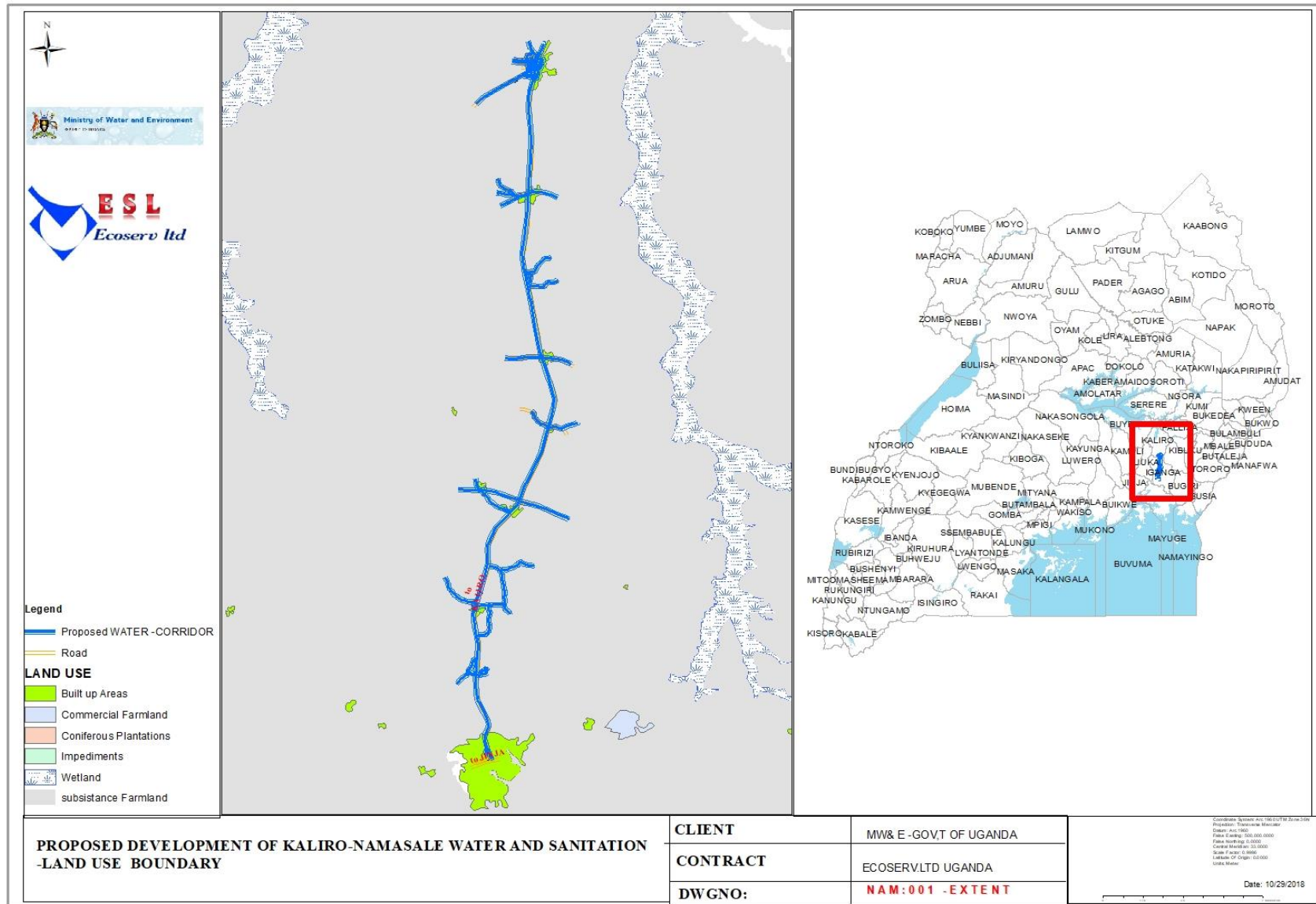




Project area (Major trading centres along the water transmission corridor)



Project area (Land use)



## Appendix 9: NEMA TOR approval



### NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA House  
Plot 17,19 & 21, Jinja Road.  
P.O.Box 22255, Kampala, UGANDA.

Tel: 256-414- 251064, 251065, 2510  
342758, 342759, 3427

Fax: 256-414-257521 / 232680

E-mail: [info@nemaug.org](mailto:info@nemaug.org)

Website: [www.nemaug.org](http://www.nemaug.org)

**NEMA/4.5**

12<sup>th</sup> June 2019

The Permanent Secretary,  
Ministry of Water and Environment,  
P.O. Box 20026,  
**KAMPALA.**

**Tel No: +256 414 505942/ +256 414 450945**

**RE: REVIEW OF TERMS OF REFERENCE FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED NAMUNGALWE-KALIRO, KYEGWEGWA-MPARA-RUYONZA AND NAMASALE TOWN WATER SUPPLY AND SANITATION SYSTEMS PROJECT IN IGANGA, KALIRO, KYEGEGWA AND AMOLATAR DISTRICTS**

This is in reference to the Terms of Reference for carrying out an Environment and Social Impact Assessment (ESIA) for the proposed Namungalwe-Kaliro, Kyegwegwa-Mpara-Ruyonza and Namasale Town Water Supply and Sanitation Systems Project in Iganga, Kaliro, Kyegegwa and Amolatar Districts that was submitted to this Authority on 17<sup>th</sup> January, 2019 for consideration. This Authority has finalised the review and grants formal **APPROVAL** of the said TOR.

**Please, note that approval of the TOR DOES NOT CONSTITUTE PERMISSION to start implementing any of the proposed project activities.** In addition, you are advised to consider certain key aspects during the conduct of the EIA and preparation of the EIA report, as per the guidance below.

- (i) Carry out comprehensive consultations involving among others; the local communities, Iganga, Kaliro, Kyegegwa and Amolatar Districts Local Governments, Uganda National Bureau of Standards (UNBS) and Department of Occupational Safety and Health (Ministry of Gender, Labour and Social Development), and ensure that the stakeholder views/ concerns are well documented and included in the EIA report. In addition, consult with Department of Physical Planning at the Districts Local Governments in regard to the suitability of the site for the proposed activity.
- (ii) Provide concise baseline information/data relating to the project area, and sets of clear coloured photographs showing the current state of the said project area taken from within the proposed project site and clearly showing the neighborhood.
- (iii) Provide **coloured location / google maps** that are clear, and well-labelled (*preferably each covering A-4 or larger paper size*), and sets of **GPS coordinates** for the proposed project area showing actual boundaries/ extent the project area.

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- (iv) Carry out analyses of soil, water, and air quality taking into account key parameters relevant to the nature of the project, as well as level of noise relating to the project-affected area, and **append the results of baseline soil, water, and air quality and noise levels analyses** to the EIA report.
- (v) Provide **comprehensive narratives on proposed project components and activities**, support structures/facilities and size of the workforce both men and women.
- (vi) Provide comprehensive narrative on **potential pollution sources**, the methods of handling, containing and disposing of the different kinds of waste.
- (vii) Provide **comprehensive analyses of alternatives/options**, in terms of project design, project location, and the proposed technology, among other aspects.
- (viii) Provide detailed **mitigation and environmental management and monitoring plans** (*preferably in table matrix format*) in the EIA report, to cater for the environmental impacts associated with the proposed project activities.
- (ix) Consider any other critical environmental aspects/concerns which may have not been initially foreseen during the preparation of the Scoping Report/ToR, and **include an evaluation of such concerns in the EIA report**.
- (x) **Carry out separate EIA reports for each of the above mentioned projects.**
- (xi) Append to the EIA report **authentic copies of land acquisition and ownership documents** that are clear and legible.
- (xii) Append to the EIA report **well-labelled copies of the proposed site layout plan** (*preferably covering A-3 or larger paper size*) that shows the layout and placement of the different project components.
- (xii) Indicate the actual project (investment) cost **including a copy of the investment licence issued by Uganda Investment Authority and/or certificate of valuation** issued by a qualified and certified valuer /quantity surveyor.
- (xiii) Note that only registered EIA Practitioners including the team leader should be contracted to carry out the EIA for the proposed project.

This is, therefore, to recommend that you proceed with carrying out the EIA for the proposed project.

We look forward to your cooperation and the receipt of a comprehensive EIA report, for our further action.

Nancy Allimadi  
**FOR: EXECUTIVE DIRECTOR**

## **Annex 10: Chance Find Procedure**

The 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.

### **Purpose of the CFP**

This CFP will serve the following purposes:

- a) Translate commitments in the ESIA into implementation procedures that will protect physical cultural resources 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.

This CFP provides: -

- Responsibilities for implementation of the procedure;
- Impact management measures to be implemented;
- Verification, and
- Records and reporting requirements.

The Objective of CFP Through its Contractor, MWE seeks 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 implementations

### **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 Water pipelines and sanitary facilities.

The following procedural guidelines shall be considered in the event that previously unknown heritage resources are exposed or found during the life of the project.

**(i) 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;
- The supervisor must ensure that the site is secured and access is controlled; and response time/scheduling of the Field Assessment is to be decided in consultation with MWE and the environmental consultant.

The Field Assessment could have the following outcomes:

- If a human burial, the appropriate authority is to be contacted. The find must be evaluated by a human burial specialist to decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in an archaeological context, an archaeologist must be contacted to evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in a palaeontological context, the palaeontologist must evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.

**(ii) Rescue Excavation**

Rescue Excavation refers to the removal of the material from the “design” excavation. This would apply if the amount or significance of the exposed material appears to be relatively circumscribed and it is feasible to remove it without compromising contextual data. The time span for Rescue Excavation shall be reasonable rapid to avoid any undue delays, e.g. one to three days and definitely less than one week. In principle, the strategy during the mitigation is to “rescue” the fossil material as quickly as possible. The strategy to be adopted depends on the nature of the occurrence, particularly the density of the fossils. The methods of collection would depend on the preservation or fragility of the fossil and whether in loose or in lithified sediment. These could include:

- On-site selection and sieving in the case of robust material in sand; and
- Fragile material in loose sediment would be encased in blocks using Plaster-of-Paris or reinforced mortar.

If the fossil occurrence is dense and is assessed to be a “Major Find”, a carefully controlled excavation is required.

**(iii) 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.

**(iv) Management options for major finds**

In consultation with MWE and the environmental consultant, the following options shall be considered when deciding on how to proceed in the event of a Major Find.

**Option 1: Avoidance**

Avoidance of the Major Find through project redesign or relocation. This ensures minimal impact to the site and is the preferred option from a heritage resource management perspective. When feasible, it can also be the least expensive option from a construction perspective. The find site will require site protection measures, such as erecting fencing or barricades. Alternatively, the exposed finds can be stabilised and the site refilled or capped. The latter is preferred if excavation of the find will be delayed substantially or indefinitely. Appropriate protection measures 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.

**Option 2: Emergency Excavation**

Emergency excavation refers to the “no option” situation where avoidance is not feasible due to design, financial and time constraints. It can delay construction and emergency excavation itself will take place under tight time constraints, with the potential for irrevocable compromise of scientific quality. It could involve the removal of a large, disturbed sample by an excavator and conveying this by truck from the immediate site to a suitable place for “stockpiling”. This material could then be processed later. Consequently, the emergency excavation is not the preferred option for a Major Find.

**(v) Exposure of Fossil Shell Beds**

**Response of personnel**

The following responses shall be undertaken by personnel in the event of intersection with fossil shell beds:



**Action 1:** The site foreman and Environment Consultant (EC) in charge must be informed;

**Action 2:** The responsible field person (site foreman or EC) must record the following information:

- Position (excavation position);
- Depth of find in hole;
- Digital image of the hole showing the vertical section (side); and
- Digital images of the fossiliferous material.

**Action 3:** A generous quantity of the excavated material containing the fossils shall be stockpiled near the site, for later examination and sampling;

**Action 4:** The Environmental Consultant is to inform MWE who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The Environmental Consultant is to describe the occurrence and provide images via email.

#### **Response by Palaeontologist**

The palaeontologist will assess the information and liaise with MWE and the Environmental Consultant and a suitable response will be established. This will most likely be a site visit to document and sample the exposure in detail, before it is covered up.

#### **(vi) Exposure of Fossil Wood and Peats**

#### **Response of personnel**

The following responses shall be undertaken by personnel in the event of exposure of fossil wood and peats:

**Action 1:** The site foreman and Environmental Consultant must be informed;

**Action 2:** The responsible field person (site foreman or Environmental Consultant) must record the following information:

- Position (excavation position);
- Depth of find in hole;
- Digital image of the hole showing the vertical section (side); and
- Digital images of the fossiliferous material.

**Action 3:** A generous quantity of the excavated material containing the fossils shall be stockpiled near the site, for later examination and sampling;

**Action 4:** The Environmental Consultant is to inform the developer who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The Environmental Consultant is to describe the occurrence and provide images via email.

### **Response by Palaeontologist**

The palaeontologist will assess the information and liaise with the developer and the Environmental Consultant and a suitable response will be established. This will most likely be a site visit to document and sample the exposure in detail, before it is covered up.

#### **(vii) Monitoring for Fossils**

A regular monitoring presence over the period during which excavations are made, by either an archaeologist or palaeontologist, is generally not practical. The field supervisor or foreman and workers involved in digging excavations must be encouraged and informed of the need to watch for potential fossil and buried archaeological material. Workers seeing potential objects are to report to the field supervisor who, in turn, will report to the Environmental Consultant. The Environmental Consultant will inform the archaeologist and/or palaeontologist contracted to be on standby in the case of fossil finds.

To this end, responsible persons must be designated. This will include hierarchically:

- The field supervisor or foreman who is going to be most often in the field;
- The EC for the project;
- The Project Manager

Shall the monitoring of excavations be stipulated in the Archaeological Impact Assessment and/or the Heritage Impact Assessment, the contracted Monitoring Archaeologist (MA) can also monitor for the presence of fossils and make field assessment of any material brought to attention. The monitoring for fossils is usually sufficiently informed to identify fossil material and this avoids additional monitoring by a palaeontologist. In shallow coastal excavations, the fossils encountered are usually in an archaeological context. The monitoring for fossils then becomes the responsible field person and fulfils the role of liaison with the palaeontologist and coordinates with the developer and the Environmental Consultant. If fossils are exposed in non-archaeological contexts, the palaeontologist shall be summoned to document and sample/collect them.

#### **(viii) Chance Find Procedures (Burial Ground and Grave-BGG)**

In the event that previously unidentified BGG are identified and/or exposed during construction or operation of the proposed MWE project, the following steps must be implemented subsequent to those outlined under “Initial Identification and or Exposure” above.

1. The Project Manager (MWE) and/or the HRM Unit must immediately be notified of the discovery in order to take the required further steps:
  - i. The Uganda Police will be notified on behalf of MWE;
  - ii. MWE in association with the Environmental Consultant will deploy a suitably qualified specialist to inspect the exposed burial and determine in consultation with Uganda police;
    - The temporal context of the remains, i.e.:
      - forensic,
      - authentic burial grave,
      - archaeological (older than 100 years); and
      - If any additional graves may exist in the vicinity.
2. Shall the specialist conclude that the find is a heritage resource, MWE shall notify Uganda Museum who may require that an identification of interested parties be done through adequate consultations in order to relocate the graves.

**(ix) Major institutions to contact while dealing with Chance Finds**

Commissioner Uganda Museum  
The Department of Museums and Monuments  
Kira road, Kamwokya, Kampala  
+256 772485624

Ministry of Water and Environment  
P.O Box 20026, Kampala, Uganda  
Tel +256414505942/+2564144505945  
Email [mwe@mwe.go.ug](mailto:mwe@mwe.go.ug) or [ps@mwe.go.ug](mailto:ps@mwe.go.ug)

## **Annex 11: Grievance Redress Mechanism**

### **Stage I: Grievance Resolution Committee**

#### ***GRC Composition***

The grievance Resolution/Redress Committees (GRC) shall be established at Sub-county level and will include representatives from sub-county and village administrative levels as well as community representatives. There are 6 Sub-counties/administrative centers affected by the proposed water and sanitation project thus 6 grievance committees will be instituted. These sub-counties include Iganga Municipal Council, Kaliro Town Council, Nakalama, Namungalwe, Nambale and Nabitende sub-counties. The committees will comprise of the following members: LCIII Chairperson/a representative;

- Sub-county Chief (Town Clerk)/ a representative;
- Chairperson Area Land Committee / a representative;
- LCI Chairpersons for all the affected villages in the 6 sub counties
- 5-10 Project Affected Persons (5 Males and 5 Females) as recommended by the PAPs in the sub-county;
- Any other person(s) recommended by the PAPs;

Presence of female members on the GRCs is crucial in order to ensure better consideration of gender issues for conflict resolution. The PAP representatives will be democratically chosen by the PAPs with the help of their leaders. The same committee shall also participate in the verification of PAPs during disclosure. Therefore, this committee will be set up before disclosure of compensation packages.

#### **Accessibility and On-The-Spot Resolution**

Village / LC1 members of the grievance committee will act as GRC focal persons at the village level in order to handle/receive complaints in order to enable access to GRC by any person at level of proximity. This will make the mechanism more functional, as well as allowing for on-the-spot clarification of issues that may only need clarification and guidance. Such on-the-spot clarifications can avoid formal sitting of a GRC for such minor issues. At this level, issues lodged, registered and retired/cleared would not need investigation. The possibility for the LC3 chairperson to appoint a representative for complaints management guarantees accessibility of LC3-level persons in the GRM process.

### ***Complaints Lodging and Recording***

The GRC will record and handle all complaints including those that are not related to compensation. Such grievances may relate to other aspects of the working environment such as labour, noise, dust, unsafe excavations, unsocial behaviour of the contractor or subcontractors, sexual harassment, defilement, elopement with people's wives and others. Complaints of PAPs on any aspect of compensation or addressed losses shall first be lodged in writing to the LC1 Committee representatives. If the PAP is illiterate, the complaint will be made verbally to the LC1 Committee representative who will put it on paper. Complaints could also be made anonymously in petition collection boxes that will be put in accessible places, with an intake form for complaints. However, communities must be aware of the consequences of filing an anonymous complaint because no personal response can be provided and it will be difficult to evaluate if insufficient information is provided. Complaints originating from vulnerable households (minor-headed households, elderly, terminally ill, physically handicapped) will be treated with priority. Experience has also shown that GRCs receive issues beyond the project. In such cases, GRCs shall seek the help of MWE to redirect concerns to relevant agencies and units that are not project related. Additionally, consistent documentation for the system and its process is recommended - I.e. all complaints are registered and all resolutions reached at all stages are documented.

### ***Investigation and Resolution of Complaints by GRC***

Any complaint that cannot be resolved on-the-spot through clarification and guidance by the LC1 members of the grievance committee will require investigation by the GRC, including the relevant LC3 Chairperson or its representative. These complaints will be resolved by use of customary rules.

After receiving a complaint, the Grievance Resolution Committee will work hand in hand with the members of the project implementation team i.e. the Project Liaison Officer, Sociologist / RAP Specialist, Valuer, Surveyor and a Legal Officer. The project implementers (Project Implementation Unit) will also verify claims on the ground with the assistance of the grievance committee. If unresolved then the PAP can seek legal redress through the courts of law. Constant communication will be maintained throughout the negotiation process between the Committee and the concerned PAP(s), in order to allow for efficient negotiations. The grievance mechanism will ensure that all project affected persons including vulnerable groups – the elderly, women, the disabled can easily access help at no cost.

GRCs will have to pay special attention and consider emerging land and property issues especially in Namungalwe, Nabitende and Kaliro town due congestion and some unplanned developments in the area. Recommended solutions to both conflict-related and “regular” land conflicts during resettlement converge

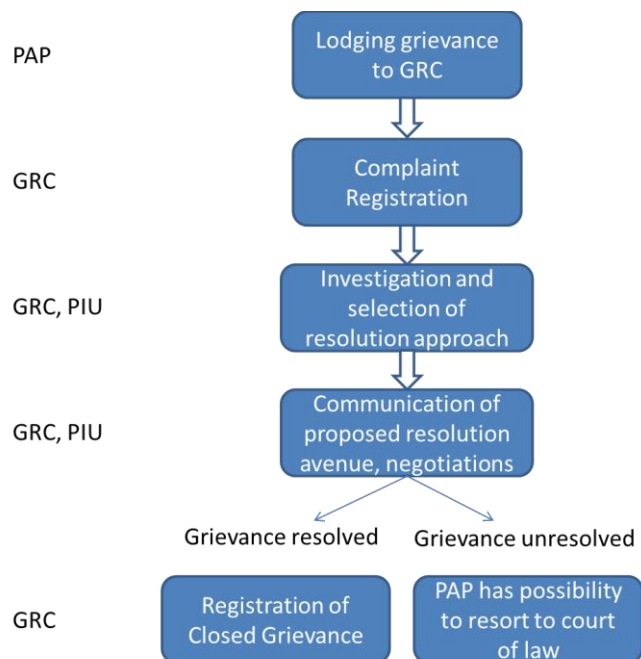
towards proper communication of compensation rules and procedures to all interested parties and implementation of mechanisms involving all parties to the conflict with as well as local representatives in discussions aiming towards mediation and peaceful conflict resolution. Such negative impacts can be mitigated by ensuring the collaboration of legitimate leaders and proper communication of compensation rules and procedures to all interested parties. Therefore, the grievance redress mechanism to be implemented during and after RAP implementation, as well as during the whole construction phase will enable to address conflicts that may arise.

**Stage II: Courts of Law**

**Overview**

The constitution allows a right of access to the courts of law by any person who has an interest or right over property. If the grievance procedure fails to provide a settlement, complainants can still seek legal redress in courts of law as a last resort. The grievance system will operate up until one year after the completion of the project.

**Grievance Resolution Process**



The PAPs will be informed of the different grievance mechanisms in place for them to lodge their complaints and dissatisfactions through sensitization meetings. The grievance procedure will be simple and administered as far as possible at the local levels to facilitate access, flexibility and ensure transparency. All the grievances will be channelled through the Grievance Resolution Committees. Complaints will be filed in a Grievance Resolution Form. After registration of the complaint, an investigation will be carried out by the committee members to verify its authenticity thereafter a resolution approach will be selected based on the findings. The decisions of the action to be taken will be communicated to all involved parties mainly in written form.

The project implementing team responsible for grievance resolution will include a Project Liaison Officer, a Sociologist / RAP Specialist, a Surveyor, a Valuer and a Legal Officer. These will work together with the grievance resolution committee to solve grievances and to ensure that grievances and clear solutions are properly recorded. Thus, all grievances received by the Grievance Resolution Committees will be forwarded to the implementing team. A way forward or grievance approach for each grievance will be selected together by the committee and project team or in close consultation.

All measures will be undertaken to ensure that the grievance is solved amicably between the concerned parties and the courts will be the last resort. Efficiency in solving the grievances will be of paramount importance. Grievances shall be resolved within a maximum period of 60 days after the date of registration. A grievance database clearly showing the date when the grievance was registered, the selected approach to resolve it and the status of the grievance shall be maintained by the project team. All the selected grievance resolution committee members shall undergo a capacity building training about their roles and requirements of the RAP before commencement of grievance resolution.

### ***Monitoring Complaints***

In addition to the Grievance Resolution Form, a Grievance Log will be kept by the project implementers, indicating the date the complaint was lodged, a brief description of the grievance, actions to be taken, status of the resolution etc. The Project Liaison Officer or RAP Specialist will monitor and document the progress of all complaints through monthly grievance resolution reports.

There is a high probability of complaints arising within and outside the construction sites. Site Disciplinary Committees (SDCs) shall be established to receive and resolve such complaints. Any complaints that may be handled by the SDCs shall be referred to the mainstream government institutions such as Uganda Police with the guidance of the area Local Council (LC) leadership. The LCs shall be represented in each SDC committee