REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

INTEGRATED WATER MANAGEMENT AND DEVELOPMENT PROJECT (IWMDP)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED CONSTRUCTION OF THE PIPED WATER SUPPLY AND SANITATION SYSTEM FOR KASESE RURAL GROWTH CENTRE IN KIZIBA SUB-COUNTY, RAKAI DISTRICT, UGANDA

Prepared for:

Ministry of Water and Environment,
Directorate of Water Development,
Rural Water Supply and Sanitation Department,
Headquarters, Plot 3-7, Kabalega Crescent, Luzira,
P. O. BOX 20026, Kampala, Uganda

Prepared by

Bright Technical Services Ltd
Plot 149, Kiira Road, Kamwokya
P.O Box 37629, Kampala, Uganda
http://www.brightechnical.com/

NOVEMBER 2022

TABLE OF CONTENTS

LIST OF TABLES

LIST OF PLATES

LIST OF FIGURES

ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
BOD	Biochemical Oxygen Demand
CAO	Chief Administrative Officer
CBOs	Community Based Organizations
CDO	Community Development Officer
CFP	Chance Find Procedure
CGV	Chief Government Valuer
CO	Carbon Monoxide
dBA	Decibels
DEO	District Environment Office
DLG	District Local Government
DMM	Directorate of Museums and Monuments
DNRO	District Natural Resources Office
DWD	Directorate of Water Development
DWRM	Directorate of Water Resources Management
EHS	Environment, Health and Safety
EHSGs	Environment, Health and Safety Guidelines
EIA	Environment Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESIS	Environmental and Social Impact Statement
ESMF	Environmental and Social Monitoring Framework
ESMP	Environmental and Social Management Plan
ESSs	Environment and Social Standards
E&S	Environmental and Social
FGDs	Focus Group Discussions
FIs	Financial Intermediaries
GBV	Gender Based Violence
GC	Grievance Committee
GFS	Gravity Flow Scheme
GIIP	Good International Industry Practice
GIS	Geographical Information System
GoU	Government of Uganda
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HIV	Human Immuno deficiency Virus
HWFs	Hand Washing Facilities
IEC	Information Education and Communication
IFC	International Finance Corporation
ILO	International Labour Organization
IPF	Investment Project Financing
ISRs	Implementation Status Reports
IUCN	International Union for Conservation of Nature
IWMDP	Integrated Water Management and Development Project
IWRM	Integrated Water Resources Management
KII	Key Informant Interview

Km	Kilometre
LAeq	Average Noise Level
LA_{MIN}	Lowest Noise Level
LA_{MAX}	Highest Noise Level
LC	Local Council
MoGLSD	Ministry of Gender, Labour and Social Development
MoLHUD	Ministry of Lands, Housing and Urban Development
MWE	Ministry of Water and Environment
NDP III	Third National Development Plan
NEA	National Environment Act
NEMA	National Environment Management Authority
NGOs	Non-Government Organizations
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPHC	National Population and Housing Census
NSSF	National Social Security Fund
NWSC	National Water and Sewerage Corporation
OPs	Operational Procedures
OSH	Occupational Safety and Health
O&M	Operation and Maintenance
PAHs	Project Affected Households
PAPs	Project Affected Persons
PAYE	Pay As You Earn
PCDP	Public Consultation and Disclosure Plan
PCRs	Physical Cultural Resources
PMT	Project Management Team
PPE	Personal Protective Equipment
PWDs	Person With Disabilities
RAP	Resettlement Action Plan
RGC	Rural Growth Centre
RFP	Resettlement Framework Policy
RWSRCs	Rural Water and Sanitation Regional Centres
SDGs	Sustainable Development Goals
STDs	Sexually Transmitted Diseases
STIs	Sexually Transmitted Infections
S/C	Sub-County
SOx	Sulphur Oxides
ToR	Terms of Reference
UAs	Umbrella Authorities
UBOS	Uganda Bureau of Statistics
UGX	Uganda Shillings
UNBS	Uganda National Bureau of Standards
UWSD	Urban Water and Sewerage Department
UTM	Universal Transverse Mercator
VES	Visual Encounter Survey
VIP	Ventilated Improved Pit latrines
WB	World Bank
WHO	World Health Organization

WMD	Wetland Management Department
WMZ	Water Management Zone
WSS	Water Supply System

ESIA TEAM COMPOSITION

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

Table 1:ESIA Team Composition

Name of Key Specialists	Assigned Position	Signature
Mr. Pius Kahangirwe, MSc. *NEMA Certified Environmental Practitioner* ***(CC/EIA/159/22) – Team Leader***	Team Leader / Environmental and Natural Resources Management Specialist	
Dr. Denis Byamukama, PhD. *NEMA Certified Environmental Practitioner* ***(CC/EIA/073/22) – Team Leader/Member***	Water Quality and Waste Management Specialist	
Mr. Andrew Nkambo, BSc. *NEMA Certified Environmental Practitioner* ***(CC/EIA/273/22) – Team Member***	Plant Ecologist	
Contributing Specialists		
Dr. Eng. Alex Katukiza	Overall Team Leader for Project Coordination	
Eng. Kenneth Musabe	Water and Wastewater Expert	
Ms. Esther Nassonko	Sociologist	
Dr. Philip Nyenje	Hydrologist	
Mr. Samuel Kasozi	Hydro geologist	
Ms. Sheila Akatukunda	Faunal Studies	
Ms. Hamidah Namatovu	Occupational Health and Safety	
Mr. Kibirango Moses	GIS Expert	
Ms. Natasha Atukunda	Environmentalist	

Client's Reviewers

Name	Title
Cate Namyalo	Senior Environmental Health Officer
Maurice Madra Edema	Environmental Safeguards Specialist IWMDP
Jonan Kayima	Social Safeguards Specialist IWMDP

EXECUTIVE SUMMARY

Kasese RGC Piped Water System is being proposed by the Ministry of Water and Environment (MWE)/Directorate of Water Development (DWD) in Kiziba Sub County (currently Mweruka Town Council), Rakai District. Kiziba RGC is located in Kiziba Sub County (currently Mweruka Town Council); Rakai district which is located in south western region of Uganda, west of Lake Victoria about 65.5 km by road to the south west of Masaka Municipality, the largest metropolis in the central sub region and about 192 km to the south west of Kampala, the capital city of Uganda. The investment cost for the Water Supply and Sanitation System is approximated at **UGX 5,312,976,135 (Five Billion, Three Hundred Twelve Million, Nine Hundred Seventy-Six Thousand, One Hundred Thirty-Five Hundred Shillings Only)**. Adequate safe water is a pre-requisite for a healthy society, which in turn, among other factors, makes it feasible for the majority of the population to engage in meaningful socio-economic activities that would increase household income and thereby reduce poverty. In Uganda, most of the rural growth areas and upcoming small towns access water from point water sources like boreholes, protected springs and shallow wells. These point water sources are in many cases characterized by low level of service, poor functionality and poor water quality in addition to diminishing water resources.

Kasese RGC is one of the potable water stressed rural growth centres in Rakai district within the region. Currently, the water service level for Kasese RGC is low and mostly from boreholes within the rural area. These boreholes are prone to contamination due to the urbanization and related pit latrine sinking. The situation is expected to become worse if no intervention is made.

This report presents the findings of an Environmental and Social Impact Assessment (ESIA) that has been undertaken at the proposed project sites and surrounding areas of Kasese RGC Piped Water sources and other water infrastructures. Two (2) boreholes were sited, drilled and test pumped as a potential water source of water for the proposed Water Supply System in Rakai District.

The project components of Rakai Kasese Piped water supply system include: Two (2) Production wells (Boreholes), approximately 50 m apart. Two pump stations for the two boreholes i.e. Magabirano and Kasese boreholes both in Kasese RGC estimated to yield 5.1m^3/h and 17.5 m^3/h respectively, One elevated cold pressed steel water tank, with an effective capacity 162m^3, Water offices, disinfection facility, Pump power and energy, Transmission Network, Distribution Network.

In compliance with the National Environment Act 2019, the Environmental and Social Monitoring Framework (ESMF) and the National Environment (Environmental and Social Assessment) Regulations 2020, MWE undertook an ESIA at the proposed subproject sites and this report presents the findings. The ESIA study was conducted in consideration of the policies, legal and institutional frameworks relevant to this proposed project. Various policies and laws were reviewed in relation to the proposed project activities e.g. construction and operational requirements, environmental quality, land use, public health, occupational safety, labour standards and other legal obligations. World Bank Safeguard Policies were also reviewed during this detailed ESIA study to ensure that the proposed development meets the E&S requirements and some of the clauses that are likely to be triggered were identified and the corresponding mitigation and enhancement measures proposed. The total population of Rakai District as per the 2015 Rakai District Planning Unit was **237,889** composed of **115,975** males and **121,914** females. When the 2014 population census was compared to the 2002 population census results, the population in the district grew by 2.06 % over a period of 12 years. In addition, the 2014 Census indicated that the National total fertility rate was 6.2 % and the total average Household size being 4.4 persons for Rakai District. Rakai District can be categorized as an ethnically rich district. The dominant tribe is the Baganda followed by the Banyankole. There is also a large number of people of the Rwandese origin and a

significant number of other tribes like Barundi, Baziba and Banyambo people. Notwithstanding the heterogeneity, most of the people in the district can communicate in Luganda making packaging of development messages easier, less costly and more effective. About 96% of the population is rural, a situation which reflects the basically agricultural nature of the district economy. In this rural environment, settlement pattern varies, depending on a number of factors such as climate, vegetation, water supply, terrain, soil fertility, disease agents etc.

The key policies and legislations applicable to the project included among others:

i. The National Environmental Management Policy, 1994.
ii. National Policy on HIV/AIDS and the World of Work, 2007.
iii. Gender Policy, 2007.
iv. The Uganda National Land Policy, 2013.
v. National Policy on Elimination of Gender Based Violence, 2016.
vi. The Uganda Forestry Policy, 2001.
vii. The Constitution of the Republic of Uganda, 1995.
viii. Uganda Vision 2040.
ix. The National Environment Act, 2019.
x. The Occupational Safety and Health Act, 2006.
xi. The Land Act, Cap 227, of 1998.
xii. The Local Governments Act, 1997.
xiii. Public Health Act, Cap 281.
xiv. The Water Act Cap, 152 1997.
xv. The Employment Act, 2006.
xvi. The Workers' Compensation Act, Cap. 225.
xvii. The Road Act, Cap 358.
xviii. The National Forestry and Tree Planting Act, 2003.
xix. The Uganda Wildlife Act, Cap 200, 2000.
xx. Labour Disputes (Arbitration and settlement) Act, 2006.
xxi. Children Act Cap 59.
xxii. The Environmental Impact Assessment Regulations, 1998.
xxiii. The National Environment (Wetlands, Riverbanks and Lakeshores Management) Regulations 2000.
xxiv. The National Environment (Waste Management) Regulations, 1999.
xxv. National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999.
xxvi. The National Environment (Noise Standards and Control) Regulations, 2003.

During IWMDP Project Preparation, an ESMF and RPF were prepared that are guiding the preparation of this ESIA., The IWMDP project was prepared and approved under the World Bank Safeguards Operational Policies (OP) and its implementation is guided by the following policies: OP/BP 4.01: Environmental Assessment, 4.04: Natural Habitats, 4.11: Physical Cultural Resources and 4.12: Involuntary Resettlement and World Bank Policy on Access to Information (2015) are triggered.

World Bank Environmental and Social safeguard policies, namely; EHS Guidelines - Water and Sanitation, EHS Guidelines - Air Emissions and ambient air quality, EHS Guidelines - Waste Management, EHS Guidelines - Hazardous Materials Management, and EHS Guidelines - Construction and decommissioning.

The relevant institutions include the Ministry of Water and Environment, Ministry of Gender, Labour and Social Development, Uganda Police Force, National Environmental Management Authority (NEMA) and the District Local Administration Structures.

In preparation of this ESIA, the following methodology was applied;

a. Review of existing secondary information relevant to the project and this included national policies, laws, regulations as well as the World Bank Safeguard Policies to key out requirements for project implementation. The review process also established the institutional framework under which the project would be implemented.

b. Field visits within the different project components' sites were undertaken to document existing baseline environmental and socio-economic aspects; and

Socio-economic survey was conducted through a combination of approaches, and these included: review of literature, use of household survey questionnaires, stakeholder consultations, Focus Group Discussions and Key Informant Interviews. The socio-economic assessment covered household and individual characteristics, livelihood activities, socio-gender risks, and administrative set-ups near the different project sites. The views of several officials/persons that might be affected directly or indirectly by the proposed project were captured using a stakeholder consultation tool.

A comprehensive stakeholder engagement was carried out during ESIA specifically with Rakai District Local Government Officials, Sub-County Officials and Local Community Representatives and Community members among others. Kasese RGC Piped Water System is envisaged to bring an end to water stress and overreliance on a few low yielding boreholes within Kiziba Sub County (currently Mweruka Town Council) and neighbouring community. Further still, the project will also address the focal area of access to clean water as stipulated under the Uganda Vision 2040 and the NDP III. The project also contributes towards achieving SDG *(specifically SDG 6 on clean water and sanitation)*. Several beneficial impacts envisaged will include: Improved quality of water supplied to communities; Improved quality of water supplied to communities; Provision of employment opportunities during construction and operation phases; Improved health and sanitation due to improved water quality and quantity; Improved local economies and induced development especially sourcing of raw materials for construction activities; An increase in revenue for the sub county from water project collections. The project will further, initiate the move away from the status quo of rural women and children's perpetual carrying of water on their heads from unprotected and distant point water source and allow them to engage in income generating activities and to improve the image of the women and children.

However, the ESIA findings indicate that the anticipated negative impacts will be mitigated and are limited to the project sites where construction works will be undertaken. These negative impacts are summarized below and discussed in detail under Section 8.4 of this ESIA report and these include:

Environmental and Social Component	Potential Negative Impacts	Potential Mitigation Measures
Design Phase		
Groundwater Resources	Local lowering of water table levels, due to abstraction of groundwater for the water supply system.	▪ Undertake a hydrological study of boreholes to determine water table depths, borehole yields and local use of groundwater.
Groundwater Quality	The groundwater could become polluted as a result of pit latrines and indiscriminate waste disposal practices.	▪ Avoid prospecting in areas that are prone to flooding, waste disposal sites and pit latrines.
Soils	Soil erosion/damage due to survey activities and vehicle tracks. Soil contamination from oil and diesel spills.	▪ Minimize number of tracks. ▪ Use right angle intersections & use bunding. ▪ Avoid seasonally marshy areas & floodplains.
Flora	Disturbance or loss of endangered plant species or communities (terrestrial, wetland, aquatic) due to survey activities.	▪ Discourage any wanton destruction of vegetation and habitats beyond the designed project works.
Fauna	Disturbance or loss of protected/endangered animal species/communities and their habitat.	▪ Minimize vegetation clearance. ▪ Protect water & soils from pollution.
Noise	Noise generated by survey activities, especially vehicles, pump testing activities	▪ Working hours should be restricted from 7am – 6pm.
Air quality	Dust from vehicle movements.	▪ Avoid excessive vehicle movements. ▪ Limit vehicle speeds on unsurfaced tracks to 20kph.
Health and safety	Risk of accidents and ill health as a result of the project.	▪ Hold safety talks with workers before work.
Public nuisance	General nuisance such as noise, waste and dust.	▪ Minimize number of workers at site.
Construction Phase		
Land acquisition for infrastructure	The land-take would be permanent where all the project components would be constructed and temporary along the pipeline network. However, both the transmission and distribution lines would be confined to the road reserves where possible	▪ The district and local authorities in Sub County have already been engaged together with the local land lords and they agreed with communities whose land will be used for the proposed project construction. No grievances were reported and are envisaged. ▪ Compensation (where possible) to land owners as project affected persons.
Loss of vegetation cover and top soil	The existing vegetation and top soil will be cleared to give way to the construction process on all sites. This is likely to cause loss of habitat and disturbance to faunal communities in the affected sites but at an	▪ After construction, there should be landscaping and re-vegetation. The premises will be planted with vegetation/grass and ornamental trees.

	insignificant level.	▪ The water source should be fenced off to reduce on going agricultural activities around the borehole to avoid pollution entering it especially when it rains heavily. ▪ Minimize vegetation clearance by clearly demarcating work areas. ▪ Provide environmental awareness training to all employees. ▪ Rehabilitate all disturbed areas.
Increase susceptibility to Soil Erosion	Increased soil erosion is likely to occur in the vicinity of project sites during the construction of the water source points, pump stations, installation of the water pipe reticulation and other related construction works. The site earthworks will reduce soil stability and hence make the soils aggregated and more susceptible to erosion especially during the rainy season.	▪ The sites will be hoarded off to intercept any eroded material and any soil material will remain within the site. ▪ The project proponent will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. ▪ Use proper techniques for trenching and shoring
Increased siltation of the aquatic habitats	Some of the excavated sediments from the project site and the construction spoils emanating from the excess excavated material and construction debris are likely to increase siltation especially in the nearby seasonal swamp to the motorized borehole and therefore affecting the associated aquatic habitat.	▪ Ensure that the site is at all times drained adequately and surface run off is directed appropriately to avoid water logging of adjacent area and the undulating drainage channel
Effects of Poor Solid Waste Management	Waste will be generated during the construction of the WSS. The waste stream from the construction will include cement bags, timber and pipe cuttings, empty water bottles, food remains from workers onsite and other forms of waste. If not well managed, the area could be prone to nuisance from foul smell, breeding of vermin and vectors, and lead to outbreak of diseases.	▪ Waste collection bins will be provided at strategic positions at the sites for temporary waste storage. ▪ The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes. ▪ The proponent will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA/KDLG/ Sub County. ▪ Burning of waste on-site shall not be allowed.
Increased incidences of diseases.	The increase of people involved in the project activities is likely to increase the incidences of diseases in the area. Consequently, there will be potential risk of contracting sexually transmitted diseases (STDs) especially the Human Immuno-	▪ The contractor should liaise with the District and Sub County CDO to mobilise communities during the recruitment process to reduce on influx of people who are unskilled. ▪ The contractor should emphasise

	Deficiency Virus/Acquired Immuno-Deficiency Syndrome (HIV/AIDS) among the program workers and the local communities. This will be increased due to influx of people seeking for employment.	equal opportunities for both men and women. ▪ The Contractor should, in conjunction with local health authorities, undertake to educate and sensitise the workforce on communicable diseases such as cholera, STDs and HIV/AIDS. ▪ Condoms must be made available to the workforce
Visual intrusion	This will mainly arise from the erection of service reservoir tanks on the high altitude (hills). In addition, visual intrusion will occur where project activities are likely to create disfigured landscapes in the project area especially where the construction activities will result in deposition of large spoils and digging of the trenches.	▪ The contractor should maintain as much as possible the existing landscapes and plant trees and vegetation to enhance the visual aspect. ▪ Rehabilitate all areas disturbed by construction and landscape with trees, grass and shrubs.
Increased accidents and occupational hazards	Implementation of the project will definitely increase volume of human and motor traffic in the project area. The increase in human and motor traffic will be aggravated by the transportation of construction materials, water pipes and other equipment required in constructing the water supply facilities. This is likely to result in a higher risk of accidents and occupational hazards occurring in the area of operation.	▪ The contractor should ensure that workers are provided with adequate personal protective wear to mitigate injuries such as gloves, helmets, overalls and gumboots. ▪ Traffic guides and signs should be utilized to avoid accidents on busy roads and junctions especially with vehicles transporting materials ▪ Fence all construction sites. ▪ Place warning signs. ▪ Enforce maximum traffic speeds to 20kph
Sourcing of Construction Materials	Sourcing of materials such as sand, gravel bricks/blocks and timber if not well regulated and controlled can have a significant impact in the points of sourcing.	▪ The Contractor should liaise with local authorities to ensure that materials such as sand and gravel are only taken from quarries and borrow pits with the necessary environmental permits.
Occupational Health and Safety Risks for the Workforce	Construction traffic, excavation machinery, blasting of rocks and trenches may pose accident risk to workers either when equipment is operated by inexperienced workers or when in a poor mechanical condition or falls into the trenches.	▪ All construction workers will be oriented on safe work practices and guidelines and ensure that they adhere to them. ▪ Training will be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences. All must fully be aware and mentally prepared for potential emergency.

		▪ Regular drills will constantly follow on various possible incidences. This will test the response of the involved stakeholders. Such drills will keep them alert and they will become more responsive in the case of incidences. ▪ Signage will be used to warn staff and/ or visitors that are not involved in construction activities of dangerous places.
Social Misdemeanour by Construction Workers	▪ While most workers may originate from the local community where they have families, there might be others from distant places and working away from their families. With some disposable income to spend, this might induce illicit sexual relationships, with attendant risk for spread of HIV/AIDS. ▪ Labour influx in the project community such as increase in irresponsible activities that may increase HIV/AIDS due sexual relations between project workers and the local community; workers taking advantage of young girls in the community due to high poverty levels and vulnerability, teenage pregnancies and dropping out of school etc. ▪ Violence Against Children such as potential use of child labour; sexual relationship with underage children, teenage pregnancies, school drop outs etc. ▪ Conflict in the community/families (social cohesion and disruption) due to project workers engaging in sexual relationships with married women in the community etc.	▪ Framework (responsible staff, action plan, etc.) to implement during project execution. ▪ A sensitisation programme for the would-be affected local communities will be conducted prior to commencement of and during the project implementation. ▪ A code of conduct (appropriate to behaviours in workplace and with respect to relations with local community) will be developed and approved by MWE which will be signed by all workers on the project. ▪ Local workers will preferentially be employed, paid directly through their banks and access to bars by workers from outside the project area in the local communities controlled. ▪ All construction workers shall be orientated and sensitized about responsible sexual behaviour, GBV, Violence Against Children, HIV/AIDS etc. in project communities. ▪ Contractor(s) will maintain a complaints redress mechanism for all complaints that will arise from the interaction between construction workers and the communities within the project sites/areas including a record of how these complaints have been addressed.
Archaeological / Historical Sites	Throughout the consultations with the locals and local leaders, no known archaeological or historical sites exist on the proposed project routes, and proposed construction sites. Therefore, no impacts on any features of importance to national	▪ The Contractor shall ensure that key members of his staff are briefed. Any such features that may be found that were not apparent on surface investigation will be reported by the project management and appropriate

	heritage are expected.	procedures followed to hand them over to the authority responsible for national heritage and antiquities.
Groundwater Quality	The groundwater could become polluted as a result of construction activities, pit latrines and indiscriminate waste disposal practices.	▪ The borehole should be covered and sealed so that dirt, water, sand and other debris cannot fall in. ▪ The boreholes should have concrete aprons around their base to prevent dirty water seeping back into the hole. ▪ Do not develop pit latrines close to boreholes. ▪ Dispose of all wastes in an approved disposal site.
Fauna	Disturbance or loss of protected/endangered animal species/communities and their habitat due to construction activities (noise, dust, fumes, pollution, vehicles)	▪ Minimize vegetation clearance. ▪ Protect water resources from pollution. ▪ Protect soils from contamination. ▪ Rehabilitate all disturbed areas.
Operation Phase		
Water quality and pollution	The quality of water recommended is that which is physically, chemically and bacteriologically safe for human consumption. When not thoroughly treated, water could be a source of water related diseases which could affect the project communities, thereby causing an epidemic in the area. Transmission of water can also result into pollution and pollution entering the boreholes	▪ The borehole should be covered and sealed so that dirt, flooded water, sand and other debris cannot fall in. Transmission and distribution pipes should also be covered underground to reduce exposure. ▪ The boreholes should have raised concrete aprons around their bases to prevent dirty water seeping back into the holes. ▪ The drilled borehole areas should be raised well-head by building earthworks to prevent the flooded water, dirt and other debris to accumulate around it
Water quantity and yield	This could be due to declining groundwater recharge and over pumping. The project sites are prone to suffering from rapid land use change (deforestation, soil erosion, etc.) thus the recharge of the ground water supplying the borehole may be affected in the long run.	▪ Get involved with Water source catchment protection and management planning that could improve land management and restore groundwater recharge. ▪ Encourage contour ploughing, mulching and other agricultural practices that increases soil water retention and percolation into the underlying aquifer. ▪ Reduce the amount of water being taken – if demand in the area is growing then look at developing new

		water sources. ▪ Keeping records of how much is being pumped (either volumes or number of hours for which the pump is being used per day). Find out if sudden drops in level correspond to pumping activity.
Water Supply System failure	Insufficient cost/funding for operation and maintenance would lead to poor maintenance of the system which eventually could lead to frequent breakdowns of the water supply system and consequent shut down, which further could require major and costly rehabilitation. Other sources of failure in the water system could be due to sabotage (possibly by the water vendors who envisage loss of livelihoods), illegal connections which could result in decreased water pressure, and vandalism (theft of water system parts)	▪ Payment for water supply services is the only way to keep the service running continuously and therefore tariffs would be designed to ensure financial viability. Cost recovery would be achieved through service fee payments. ▪ Put in place a water user committee to oversee the operations of the water system. ▪ Fence off the areas like water abstraction points, pump houses, water storage reservoir tanks and other water supply structures like the community taps like kiosks to mitigate trespass and sabotage
Water pollution due to cutting of the pipes	Digging and construction of water facilities within close vicinity/on the water transmission network could result in pollution and loss of water	▪ The developer should hire services of security guards to monitor and guard the water supply system facilities. ▪ Sensitization and awareness about the dangers of vandalizing the water supply system facilities should be done especially by the local leaders. ▪ Legal and applicable punitive measures like arrests and prosecution should be taken to those caught vandalizing the water system facilities in order to curtail and to serve as an example to those who would want to engage themselves in such acts.
Noise levels from Generators	Using of generators to boost the pumping of the water at the pumping stations may lead to moderate noise levels around the project area	▪ Installation of solar system instead of generator ▪ Service the generators regularly to minimize on the noise. ▪ Switch on generators only for few hours to boost on the pumping hours but always use the solar systems
Decommissioning Phase		
Surface Water Quality	Pollution of water bodies from erosion of unconsolidated materials, contaminated soil, wastes (solid and liquid), etc. As a	• Rehabilitate all areas e.g. grass/tree planting. • Take samples of the runoff water into

	result of demolition activities.	the receiving water body nearby and ensure free pollution. • Remove all contaminated soil identified and dispose of it in an approved site. • Close any waste disposal facility on site and make provision for drainage in such a way as to prevent future pollution.
Flora	Disturbance or loss of plant species or communities (terrestrial, aquatic) due to dust fall-out onto leaves and soil, dump erosion.	• Rehabilitate or stabilize all cleared areas using indigenous vegetation until handover of the site.
Fauna	Disturbance or loss of animal species/communities and their habitat due to the lack of rehabilitation etc.	• Rehabilitate or stabilize all cleared areas using indigenous vegetation where possible.
Soils	Re-use of soils in rehabilitation and re-instatement of pre-project capability.	• Replace subsoil and overburden first and then cover with saved topsoil. Do not use heavy equipment to replace topsoil because this can cause compaction.
	Soil erosion from denuded areas and demolition activities.	• Maintain erosion protection works. • Rehabilitate or stabilize all disturbed areas.
Topography	Reinstate the topographic profile.	• Backfill, contour and landscape.
Air quality	Dust from un-rehabilitated sites and demolition activities.	• Avoid dusty activities e.g. loading and dumping on windy days & monitor dust emissions.
	Odours from waste dump.	• Avoid activities that can lead to pilling of wastes in the project area. • Dispose of all the wastes in gazetted sites
Noise and vibration	Noise generated by demolition equipment and earth moving equipment	• Prescribe noise reduction measures if appropriate e.g. restricted working and transport hours and noise buffering.
Health and safety	Risk of accidents and ill health as a result of the project	• Fence all unsafe and dangerous areas & monitor environmental health (air quality, water quality).
Aesthetic and amenity values	Improvement of the visual impact of the site on scenic views.	• Rehabilitate with trees, grass and shrubs where possible. • Consult with the local community and tourist industry.

No physical relocation issues are anticipated however; a Resettlement Action Plan (RAP) has been prepared to address all compensation issues that are anticipated and an Environment and Social Management Plan (ESMP) has also been presented in this ESIA report to ensure positive impacts are enhanced while negative impacts are avoided and or mitigated.

This ESIA report provides NEMA with the necessary information required for approval of the E&S aspects of the project, as well as providing guidance to MWE to improve the project design and implementation, in compliance with the proposed project ESMP. Therefore, the proposed project is environmentally and socially feasible for implementation provided the recommended mitigation and monitoring measures are implemented, and the proposed implementation arrangements are upheld.

1. INTRODUCTION

1.1 Background

The Government of Uganda (GOU) received credit from the World Bank (WB) towards implementation of the Integrated Water Management and Development Project (IWMDP) under the Ministry of Water and Environment. The Project Development Objective (PDO) is to improve access to water supply and sanitation services, capacity for integrated water resources management and the operational performance of service providers in project areas. The project will also contribute to the achievement of National Development Plan III (NDP III) objectives, Vision 2040 and Sustainable Development Goals. Under the IWMDP, funds have been provided for ESIA, RAP and SPPs.

The Project will support WSS infrastructure investments in small towns located primarily in Uganda's Northern and Eastern regions and in RGCs in the country's Central and Midwestern regions. The water resources activities are designed to consolidate IWRM in overall water sector planning and infrastructure development. Specific water resources measures will be conducted in the Upper Nile and Kyoga WMZs where Catchment Management Plans (CMPs) have been prepared for sub-catchments and where most of the WSS infrastructure investments proposed under this Project are located. The Project will integrate infrastructure investment, water source and catchment protection measures, and comprehensive sanitation planning to ensure sustainability and increased resilience to climate change and variability. The Project will provide Technical Assistance (TA) aimed at consolidating water sector reforms to support efficient and effective service delivery models for small towns and RGCs.

Component 1 will support Water Supply and Sanitation in Small Towns and Rural Growth Centres and support to Districts Hosting Refugees. Sub Component 1.1 Support to Small Towns and Rural Growth Centres (RGCs) will support activities designed to improve the sustainable provision of water supply and sanitation services in small towns and RGCs in the Recipient's territory. The sub-component targets the districts of Buyende, Kaliro, Namayingo, Mayuge, Jinja, Namutumba and Kamuli in Eastern Uganda; Mityana, Mubende, Kassanda, Kyankwanzi, Nakasongola, Rakai, Lyandonde, Sembabule, and Mukono in Central Uganda; and Kagadi, Kakumiro, Kiruhura, Kazo, Kisoro, Kyegegwa, Kyenjonjo in Western Uganda.

In order to address the water supply and sanitation gap in the above districts, the then 32 solar powered piped water supply systems now revised to 26 have been proposed. These water supply and sanitation infrastructure will be implemented as part of the strategy to improve access to clean water, improved sanitation and hygiene in the selected RGCs. The main components of the large solar piped water systems will include; a production well as a water source, a raw water pumping main to a reservoir, an elevated storage reservoir on a steel tower, Solar Pumps, Solar Panels, chlorine dosing unit, pump motor, pump house, distribution network, and service connections. The project will also support water sources protection activities in all the project areas.

DWD under MWE as an implementing agency of the Client, applied a portion of the proceeds of this credit for the Consultancy Services for Environmental and Social Impact Assessments for the Kasese Water Supply and Sanitation System with the production wells at the geographic UTM coordinates 36N 303843East, 93712North (Magabirano source), 36 N 304397East, 92490North (Kasese source), 36 N 306430East, 92510North (office block) and 36 N 307733East, 92104North (Reservoir site) location.

MWE specifically the Rural Water and Sanitation Department (RWSD) under the Directorate of Water Development (DWD) therefore has carried out an ESIA of the proposed construction of the piped water supply and sanitation system for Kasese Rural Growth Centre in Kiziba Sub-County, Rakai District in

accordance with the requirements of the National Environment Management Authority (NEMA) for approval before implementation.

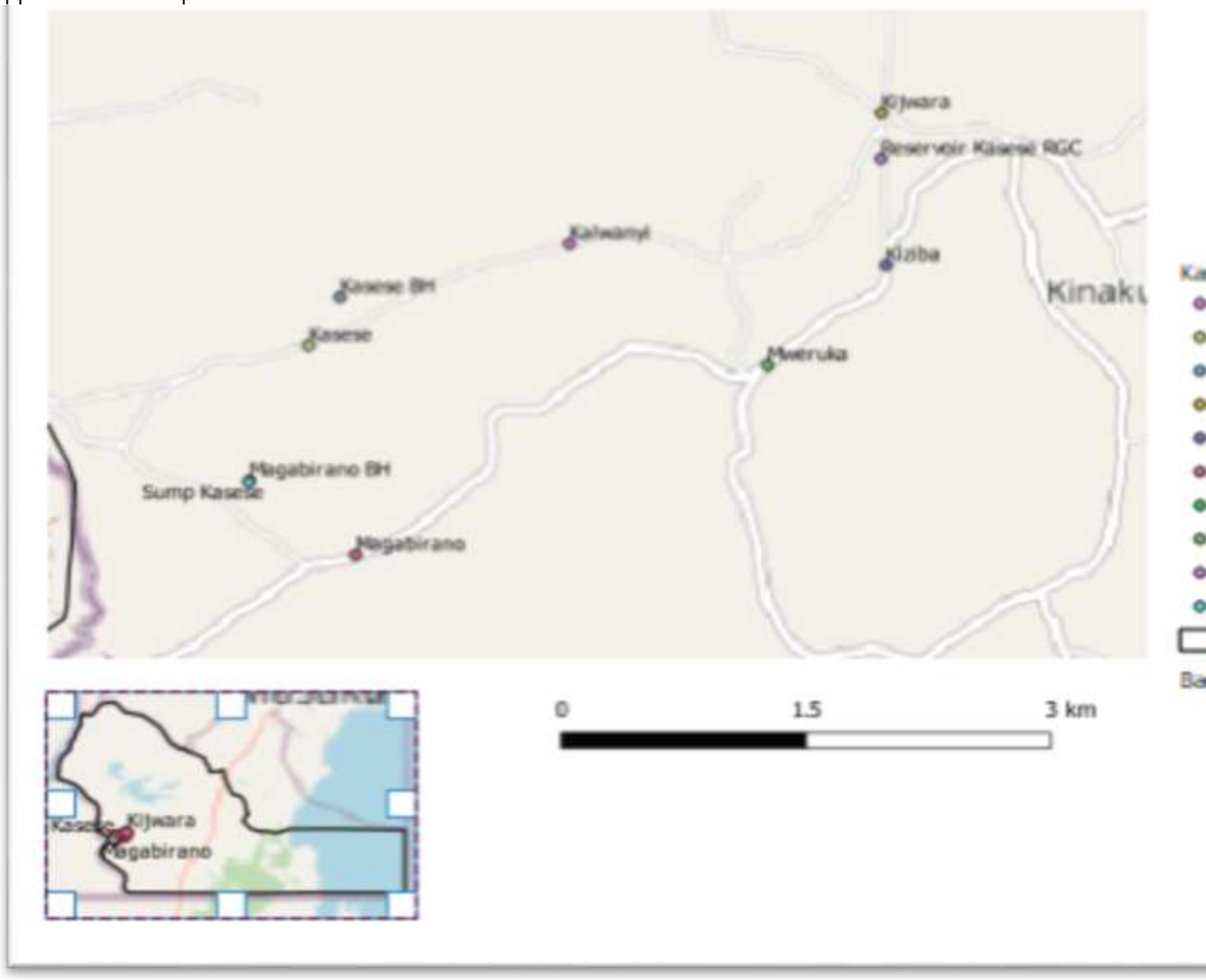


Figure 1: Location of Kasese RGC WSS in Kaziba sub county, Rakai District

1.2 Justification of the Project

The people in Kasese RGC and the surrounding areas depend on wells, boreholes, open rivers/ streams and shallow wells as sources of water. This water is unreliable and not safe for drinking. Using the mixed method approach which combined detailed insights and understanding obtained from using qualitative approaches with the ability to generalize to a wider population offered by quantitative data collection, a Social Economic and Health Survey was conducted in the project area. A total of 308 households were surveyed as part of assessing the social impact. The vast majority 87.84% of the survey respondents were the head of their household. Perspectives of both genders were captured and represented, with 76% male and 24% female respondents in addition to gender-specific Focus Groups (FGs) and Key Informant Interviews (KIIs). Qualitative data was gathered to provide supporting details for the quantitative data collection surveys. Qualitative data collection was based on KIIs, FGs, and participatory methodologies including village transect walks.

The survey revealed that the population within Kasese RGC have a total of 25 boreholes and no piped supply system. 69.4% of the households use pit latrines. 1.2% of the sample households reported using pour flush toilets connected to a septic tank and 8.4% reported going to the bush for excreta disposal whereas 0.3% of the households reported using a plastic bag/bucket for excreta disposal. The survey also indicated that of the 309households sampled that use a private pit latrine, 216households (71%) report they share the latrine with other households. The remainder 29% have a pit latrine for exclusive use by their household members.

Furthermore, the current water sources are not safe and the quality of the water is poor for drinking. Therefore implementation of the project will relieve women from wasting time at water sources, school going children will be able to go to school and the quality of water will improve hence improving the quality of life among the population.

The increasing population in the proposed project area has resulted in the need to increase on the accessibility and provision of safe water and sanitation services for the local communities. In the view of the above, MWE, specifically the Rural Water and Sanitation department (RWSD) under the DWD will be implementing a project whose overall objective is to sustainably increase access to safe water supply and improve on sanitation to the communities of Kasese RGC in Rakai district thereby contributing to Sustainable Development Goals (SDGs) 6 and 12 the PDO, NDPIII, and Vision 2040.

1.3 Project area

The location of the RGC that will constitute the project lie in Kiziba Sub-county (currently Mweruka Town Council) in Rakai District. Rakai district is located in south western region of Uganda, west of Lake Victoria about 65.5 km by road to the south west of Masaka Municipality, the largest metropolis in the central sub region and about 192 km to the south west of Kampala, the capital city of Uganda. The district lies west of Lake Victoria between longitudes 31oE, 32oE and at a latitude of 0oS. It is bordered by Lwengo and Lyantonde districts to the North; Kiruhura district to the North-West; Isingiro district to the West and South-West; and Kyotera district to the east and South-East. The district has got its headquarters at Rakai Town where the Town Council offices are located. It is connected through Masaka district with a tarmac road from Kampala. The district is also accessed by an all season earthed based road from the Lyantonde district headquarters. There is electricity power from UMEME and telephone by all service providers save for the rural areas.

Kiziba Sub-County (SC)/currently Mweruka Town Council is one of the nine Sub-counties in Kooki County, Rakai District. It is located South-West of Rakai district headquarters, 45km along the main road to Isingiro district. It boarders with Kyalulangira Sub County in the North, Isingiro district in the west and in the South it borders Kibanda Sub-county which is in Kyotera District. The Sub-County is comprised of five (5) parishes and fifty (50) number villages. With reference to the updated scope of works, Kasese RGC is the centre of focus within the Sub-County. All centres to be considered are within 5 km of Kasese RGC. We note that all the settlements under consideration in Kiziba Sub-County (currently Mweruka Town Council) are linear settlements of permanent structures. Figure 3 is a google earth view of the centres and the points of interest for the project implementation.

The water source to be developed is based on the two Production wells (Boreholes), two pump stations for the two boreholes i.e. Magabirano and Kasese boreholes both in Kasese RGC estimated to yield 5.1m^3/h and 17.5 m^3/h respectively.

1.4 ESIA Requirements

The proposed construction of a water piped system in Kasese RGC falls under Schedule 5 of the National Environment Act No.5 of 2019, which requires mandatory ESIAs specifically under Utilization of water resources and water supply (No. 4) and abstraction or utilization of ground water (b) and support facilities (k) (i.e. ground water resources including water abstraction). The proposed intervention is in the category of projects requiring mandatory ESIA before implementation. It is in this regard that in accordance with the National Environment Act (NEA), the Scoping/Terms of Reference (ToR) were prepared and submitted to NEMA for consideration, which paved way for undertaking a full ESIA for the project. A copy of the approval letter from NEMA has been attached in Annex 1.

In preparing this report, particular attention was paid to the issues specified in the EIA Regulations of 2020. This ESIA presents information required for the protection of the environment and affected communities during the design, construction and operation stages of the proposed project. This will enable NEMA and other lead agencies take a decision on whether to approve the progress of the project in light of the identified E&S impacts or not. Specific attention was also paid to the Environmental Impact Assessment Guidelines and the specific EIA guidelines for water sector for Uganda.

In compliance with the World-Bank Safeguard Operational Policies (OPs), the ESMF was prepared to provide guidance to the implementing agency (MWE) on the E&S screening and subsequent assessment of subprojects required during implementation such as the preparation of this ESIA, including the relevant subproject specific ESMP that must be developed. The RPF was prepared because the exact subproject sites were unknown at the time and provided a guiding framework to help MWE in identifying and managing potential project impacts and risks on project affected persons/communities associated with loss of land/livelihoods (physical or economic displacement/resettlement), property, cultural resources and/or restrictions on land use (RAP preparation) during project implementation. Overall, the project is likely to trigger five (5) World Bank OPs which included Environmental Assessment (OP/BP/GP 4.01), Natural Habitat (OP 4.04), Physical Cultural Resources (OP 4.11), Involuntary Resettlement (OP/BP 4.12), and Forests (OP 4.36). However, Safety of Dam (OP4.37) and International Water Ways (OP 7.50) will not be triggered by the project. In addition, safeguards implementation should comply with the requirements of Investment Project Financing (IPF) and the World Bank Group Environmental, Health, and Safety (EHS) Guidelines for general Construction and Decommissioning as well as the EHS guideline for Water and Sanitation.

1.5 Objectives of the ESIA

This ESIA report has been prepared following Uganda's and the World Bank's Environmental and Social requirements, sets out to identify potential E&S impacts of the proposed Kasese RGC Water Supply and Sanitation Project, with a view of informing the final engineering design and recommending mitigation measures to be implemented during construction and operational phases of the project. The main objective is to carry out an ESIA for the proposed construction of Kasese RGC piped water supply system in Kiziba Sub-County (currently Mweruka Town Council), Rakai district. Specific objectives include the following:

- To study the baseline environmental and socio-economic conditions of the project areas and their surrounding and to assess how these conditions will be affected by the proposed development.
- To identify and assess the likely impacts (positive and negative) of the proposed project and to recommend feasible measures to avoid, minimize or mitigate the negative impacts.
- To develop an environmental and Social Management Plan/Mitigation plan for the identified negative impacts and an environmental monitoring plan for project implementation.

- To compile an Environmental and Social Impact Statement for submission to NEMA for consideration and approval.

This ESIA focused on the following scope for the proposed project components:

- Pump stations
- Storage reservoir
- Guard house
- Water office
- Sump and Booster station
- 6 Stance waterborne toilet
- Pipeline network

Section 3.2 on project description and design elaborates the details of each of the above mentioned project components assessed under the scope of this ESIA. The proposed 6 stance waterborne toilet will not require an elaboration of the ESIA in reference to the thresholds provided under Schedule 5 of the National Environment Act No.5 of 2019 for sanitation facilities.

1.6 Details of Developer and Investment Cost

The project is to be implemented by the Ministry of Water and Environment. The investment cost of the project is approximately Uganda Shillings Five Billion, Three Hundred Twelve Million, Nine Hundred Seventy-Six Thousand, One Hundred Thirty-Five Shillings only **(UGX5,312,976,135).** The address/contact person of the Developer is presented below:

Permanent Secretary
Ministry of Water and Environment,
Headquarters, Plot 3-7, Kabalega Crescent, Luzira,
P. O. BOX 20026, Kampala, Uganda

1.7 Response to NEMA Approval of ToR comments

SN.	REQUIREMENT	COMMENT
1.	Provide a detailed description of all project components including location and GPS coordinates for the water sources and other key project infrastructure. In addition, indicate the size (length and diameter) of the transmission and distribution networks.	Addressed under Chapter 3 of the Project Description
2.	Undertake a comprehensive hydrological investigative studies and baseline analysis of water quality for the water sources to determine potential impacts of the project on the area hydrology and other baseline characteristics.	The potential impacts of the project on underground water resources within the proposed project area, and the mitigation actions to address such impacts have been addressed under Chapter 8 of the impacts and the corresponding mitigation measures. The hydrological assessment was done during the sitting of the boreholes and the water quality analysis done during the pump testing and these results have been used as the baseline information for water quality
3	Develop a comprehensive water source protection	Water Source protection planning has been

	plan that can be implemented to ensure that the water source is protected during construction and operation. Append the plan to the ESIA Report	undertaken and a plan prepared. The plan will be implemented during both construction and operation to protect the water source
4	Evaluate the risks associated with the project and emergency preparedness options in case of system breakdown.	Addressed under Chapter 8 of the anticipated impacts and mitigation measures
5	Undertake comprehensive consultations with all the relevant key stakeholders especially the local communities in the rural growth centres of Magabirano, Kasese, Kiziba and Rakai District Local Government authorities, the Directorate of Water Resources Management (DWRM) particularly in regard to the potential impacts of the proposed project on water resources in the project area. The views of the stakeholders consulted should be well documented and appended to the ESIA report.	Consultations were made as evidenced under Annex II and chapter 7 of this Report.
6	Include in the ESIA report, comprehensive analysis of alternatives/options of the project components and route networks, selected project location, design and technology, among other aspects.	Addressed under Chapter 6 of this Report
7	Append to the ESIA report authentic copies of land ownership and acquisition documents and/or resettlement action plans for the temporal or permanent land acquisition for the project.	Appended as evidenced in Annex III
8	Indicate the actual total project (investment) cost including costs of works, machinery/equipment and land where applicable; and these should be submitted by a Certified Valuer and Valuation Certificate attached to the ESIA in accordance with regulation 18(1) of the National Environment (Environment and Social Assessment) Regulations S.I 143/2020.	Addressed under section 1.8 of this report
9	In line with Regulation 49 (2) of the National Environment (Environmental and Social Assessment) Regulations S.I. No. 143/2020, pay a non-refundable administration fee of thirty percent (30%) of the total fees payable on submission of the Environmental and Social Impact Statement	Addressed as attached before the Cover page

1.8 Structure of the report

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

1) Cover Page (Title of the proposed project, Location, Name, Address and information of the developer)
2) Table of content

3) Declaration by ESIA team and their details
4) List of acronyms
5) Executive Summary
6) Introduction
7) Policy, Legal and Administrative/Institutional Framework.
8) Description of the Proposed Project.
9) Description of methodology and techniques used in the assessment and analyses of project impacts,
10) Baseline conditions of the physical, biological and socio-economic environment of the project area, including results of relevant studies and other geophysical and geotechnical studies.
11) Description/Assessment of the potential E&S impacts of project activities.
12) Analysis of Alternatives.
13) Potential environmental and Social Impacts and Mitigation Measures.
14) Environmental and Social Management Plan (ESMP) matrices detailing measures for addressing potential negative environmental and social impacts of the project. In addition, the ESMP should clearly identify institutional arrangement, roles, responsibilities, implementation schedules and costs in addressing the mitigation measures proposed in this ESIA, including capacity building requirements; and
15) Propose an E&S Monitoring Plan with clear monitoring indicators and institutional roles to be used in tracking the implementation and compliance of the proposed mitigation measures;
16) List of References.
17) Appendices:
    - Approved Scoping Report/Terms of Reference
    - Land ownership documents
    - Records of Stakeholder meetings
    - Data and Unpublished Reference Documents.
    - Map, drawing and pictorial complement, especially to convey information on the project affected area and proposed project activities
    - Chance Finds Procedure
    - Grievance Redress Mechanism.

2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Introduction

Key legislation governing an ESIA study in Uganda includes the National Environmental Act (NO. 5 of 2019) of the laws of Uganda and the Environmental and Social Assessment Regulations, S.I. No. 143 of 2020. The National Environment Act established NEMA and entrusts it with the responsibility to ensure compliance with ESIA process and procedures in planning and execution of development projects. The procedures require that a project proponent prepares an ESIA report with a clear assessment of relevant potential impacts, based on TORs developed from a scoping exercise. This requires that the ESIA addresses potential direct and indirect socio-environmental impacts during the pre-construction, construction, operation and decommissioning phases and an environmental and social management plan (ESMP) has also to be prepared.

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

2.2 Policies relevant to the Proposed Project

Table 2 below presents the Policy framework related to the project

Table 2: Policy framework related to the Project

Policy	Goal	Relevancy
National Environment Management Policy, 2014	The overall policy goal is sustainable development which maintains and promotes environmental quality and resource productivity for socio-economic transformation. The Policy provides a system of Environmental Impact Assessment (EIA) and environmental monitoring so that adverse environmental impacts can be foreseen, eliminated or mitigated.	Environment and development are interrelated, and this policy requires that environmental aspects are considered in all development projects such as the construction activities. Therefore, this ESIA study has been conducted to take into consideration any adverse social and environmental impacts of the construction activities of the proposed Kasese RGC piped Water Supply System.
The National Water Policy, 1999	To manage and develop the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with the full participation of all stakeholders.	Water abstraction permits should be obtained from DWRM before operation phase. Water source protection measures have been proposed under the ESMP and full WSPP will also be prepared as part of the assignment and should be implemented to ensure safe water quality and quantity.

The National Gender Policy, 2007	Provides a framework and mandate for all stakeholders to address and implement the gender imbalances within their respective sectors.	This policy would especially apply in the recruitment process of labour, both during construction and operation phase. Men and women should have equal opportunities for available jobs. This policy also requires provision of a work environment that is safe and conducive to women, as it is for men, considering gender-disaggregated differences and vulnerabilities.
The Occupational Health and Safety (OHS) Policy, 2006	This policy seeks to: Provide and maintain a healthy working environment; Institutionalize OHS in the power-sector policies, programs and plans; and Contribute towards safeguarding the physical environment. The OHS Policy also takes into consideration the Health Sector Strategic Plan, all of which aim to improve the quality of life for all Ugandans in their living and working environment.	This policy will be especially relevant for OHS of construction crews and subsequently, operation and maintenance personnel. The policy will also have relevance in mitigation measures that protect the public from health and safety impacts as a result of project construction and subsequent operation and maintenance activities.
The Environmental Health Policy, 2005	The policy provides a framework for the development of services and programs at National and Local Government levels that establish the environmental Health priorities.	Analysis of water quality was done at the design stage and during the pump testing where the water quality analysis report was prepared. The results of the analysis have been used and are presented under the Section on Water Quality as part of the baseline information.
The National Wetlands Policy, 1995	To promote the protection of Uganda's wetlands in order to sustain their ecological and socioeconomic functions. Wetlands should not be drained and converted without NEMA's approval.	No sourcing of materials e.g. sand and stones for construction activities is permitted without undertaking an environmental impact assessment for NEMA's consideration.
The National Land Policy, 2013	The goal of this Policy is: "to ensure an efficient, equitable and optimal utilization and management of Uganda's land resources for poverty reduction, wealth creation and overall socio-economic development". One of its objectives is to ensure sustainable utilization, protection and management of environmental, natural and cultural resources on land for national socio-economic development.	By undertaking an ESIA for the proposed project, the developer is ensuring planned and environmentally friendly infrastructure development. Enhancement and mitigation measures should be implemented by the developer and the contractor(s) to ensure that all land use practices conform to land use plans and the principles of sound environmental management such as biodiversity preservation, soil and water protection, conservation and sustainable land management.
The National Health Policy, 2010	To reduce mortality, morbidity and fertility, and the disparities therein.	Contribute to the reduction of water borne diseases thereby improving on the health of communities,

		especially the girl child and mothers who are mainly involved in collection of water.
Uganda National Climate Change Policy, 2015	The overarching objective of the policy is to ensure that all stakeholders address climate change impacts and their causes through appropriate measures, while promoting sustainable development and a green economy including integration of climate change issues into planning, decision making and investments in all sectors.	ESIA promotes the wise use of water resources to minimize harmful effects to the environment and water resource monitoring. It promotes and strengthen the conservation and protection against degradation of watersheds, water catchment areas, river banks and water sources in order to increase their resilience to climate change impacts.
The National Policy on HIV/AIDS and the World of Work, 2007.	To ensure HIV/AIDS is addressed in the workplace, the policy encourages employee awareness and education on HIV/AIDS. To protect the infected and affected persons from discrimination, employers are required to keep personal medical records confidential. Employees living with, or affected by, HIV and AIDS, and those who have any related concerns, are encouraged to contact any confidant within the organization to discuss their concerns and obtain information.	This policy is relevant to the project if implementation of proposed construction activities leads to influx into the project area by people seeking construction jobs and indulging in prostitution or irresponsible sexual fraternization associated with HIV/AIDS risk. The provisions of this policy are expected to be fulfilled by the construction contractors or their subcontractors, especially in regard to having an in-house HIV Policy, worker sensitization and provision of free condoms.
National Orphans and other vulnerable children's Policy, 2004	The goal of the Policy is full development and realization of rights of orphans and other vulnerable children. The policy provides support to vulnerable children and families such that their capacity to sustain themselves is strengthened; and provides residential care for orphans and other vulnerable children as a last resort	The project Developer (MWE/DWD) and the contractor(s) including their sub-contractor(s) will ensure that the project activities do not compromise or in any way affect the lives and livelihood of all the vulnerable groups like the orphans and children in general during the project implementation
National Equal Opportunities Policy, 2006	The National Equal Opportunities Policy provides a framework for re-dressing imbalances, which exist against marginalized groups while promoting equality and fairness for all. With a goal of: providing avenues where individuals and groups' potentials are put to maximum use by availing equal opportunities and affirmative action.	The Water supply projects come along with a lot of opportunities including service delivery, trainings and employment. The project will avail equal opportunities and affirmative action such as employing both men and women including marginalised groups like disabled people who are local residents during construction and operation phases, sourcing of construction materials locally etc.
The National Child	The policy provides an enabling environment for the prevention,	The project management including all the contractors will

Labour Policy, 2006	protection and elimination of child labour. It is intended to establish guiding principles in Uganda's effort to eliminate child labour and priorities for government and stakeholder action. This policy is based on recognition that all human beings, adults and children, have rights. Children by virtue of their age and needs are entitled to specific rights, including education, health, survival development, protection and participation	ensure that all employees are above 18years and not school going students or pupils.
The National Policy for Older Persons, 2009	The policy seeks to achieve equal treatment, social inclusion and empowerment of older persons. The values of the policy are: i. Equity; Fairness, fair play, impartiality and justice in the distribution of benefits and responsibilities in society. ii. Respect; Views, opinions and rights of older persons will be upheld while they are also expected to exhibit high sense of self- respect. Commitment; The willingness to work hard and give all the energy and time to meet the vision. iii. Accountability; All stakeholders are expected to fulfil their obligations towards one another iv. Equality; All older persons will be accorded same opportunity and rights as other individuals.	Persons above 65 years old are categorized as old. These should be incorporated in the compensation process where necessary and will be treated with Equity and respect; all their views will be considered regarding the execution of the project.
The National Policy for the Conservation and Management of Wetland Resources, 1995.	The goal of this Policy is to curtail the rampant loss of wetland resources and ensure that benefits from wetlands are sustainable and equitably distributed. Wetlands acting as sources of wastewater treatment should be fully protected. This policy outlines guidelines for wetland resource developers.	The proposed project is aimed at Conservation and Management of Wetland Resources within the catchment area. The designs will adhere to the principles of sustainability such that areas within wetlands are left intact, as much as possible.
The National Policy on the Elimination of Gender Based Violence in Uganda, 2019	The policy emphasizes early intervention to prevent re-victimization of and long-term effects for girls, including interpersonal violence, sexual coercion, alcohol and drug abuse and mental health problems, reporting cases of violence against children immediately. The common forms of Sexual Gender Based Violence (SGBV) include; sexual advances, assault, rape, fraud and verbal abuses.	The Contractor should have a sexual harassment policy that is communicated to all workers as well as continuous sensitization on GBV, risk and prevention mechanism.

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

2.3 Laws relevant to the Proposed Project

Table 3 below presents the Legal framework related to the project

Table 3: Legal framework related to the project

Legal Framework	Relevancy	Requirement
The Constitution of the Republic of Uganda; 1995; amended as at 15th February 2006, Government of Uganda.	The State shall promote sustainable development and public awareness of the need to manage land, air and water resources in a balanced and sustainable manner for the present and future generations. The constitution provides some relevant social dimensions such as advancement of women (Article 33: rights of women); protection of children (Article 34 on the rights of children); persons with disabilities (Article 35: protection of People with Disabilities - PWDs); and access to information (Article 41: right of access to information). The Constitution is the cardinal law in Uganda upon which all environmental laws and regulations are founded.	All environmental impact actions of the project are therefore meant to conform to the broader objectives of the Constitution which requires a healthy environment for all citizens. ESIA report has been prepared for NEMA's consideration before implementation of the project. Therefore, this Project will be implemented in a manner that will incorporate the appropriate safeguards for environmental and social issues, especially land take. Any land required for the implementation of the construction activities will be obtained within the confines of the law, after a Resettlement Action Plan (RAP) has been conducted where possible.
The National Environment Act No. 5 of 2019	This act provides for various strategies and tools for environment management, which also includes the ESIA for projects likely to have significant environmental impacts. The Third Schedule of the National Environment Act, No. 5 of 2019 lists projects to be	The Act governs and guides environmental management in Uganda. This ESIA is prepared to conform to the Act's requirement that projects likely to have significant environmental impact undertake an

	considered for environmental and social impact assessment. Under that categorization, most water resources related projects fall under two ground and surface water resources.	ESIA before they are implemented. ESIA report has been prepared for NEMA's consideration before implementation of the project.
The Water Act, Cap 152 and The Water Resources Regulations, 1998	Management of water resources Regulation and issuing of water use, abstraction and wastewater discharge permits; Prevention of water pollution. Managing and monitoring and regulation of water resources	Water abstraction permits should be obtained from DWRM before operation phase. Water analysis was done during the design stage and pump testing where a water quality analysis report was prepared. Water analysis was done under ESIA and results (see Annex VII) compared to those obtained at design stage and national standards for portable water. The quality of treated water will be regularly monitored to ensure it meets portable water standards.and these results have been used during this ESIA and results compared to those of national standards for portable water.
The Land Act, Cap 227	Section 74 (i) states that where it is necessary to execute public works on any land, an authorized undertaker shall enter into mutual agreement with occupier or owner of the land in accordance with Act.	The land tenure systems will be important during resettlement planning. The extent of works designed to ensure the construction of the Kasese RGC WSS will necessitate land take in the Project Area. Any land required for the implementation of this Project will be acquired in accordance with the provisions of this Act and the Bank Safeguards Policies.
The Land Acquisition Act, 1965	This law elaborates on land acquisition procedures for early entry into the delineated land as compensation matters are finalized with the objective of timely Project delivery. Reference to this Act has been made while proposing strategies for addressing unreasonable speculative persons who may jeopardize Project delivery by demanding exorbitant compensation.	MWE will issue Notices of Entry at the start of RAP disclosures.
The Occupational Safety and Health Act, 2006	Provision of Occupation Health and Safety of workers and Inspection of places of works. This Act requires that employers provide and maintain safe working conditions and take measures to protect workers and the public from risks and dangers of their works, at his or her own cost (Section 13). Employers with more than 20 workers	An ESMP has been prepared and the Contractor will ensure the workplace is registered under the Ministry of Gender, Labour and Social Development (MoGLSD) under the Department of OHS. The construction activities will require workers during the construction,

	should prepare and often revise a written policy with respect to safety and health of workers (Section 14). The contractor therefore is obliged to provide employers with washing facilities, First Aid, facilities for meals and safe access to workplaces	and operation and maintenance phases. Therefore, the Act requires that MWE and all contractors must ensure that workers have a safe working environment at all times and that their health is not at risk as whilst at work.
The Workers' Compensation Act, 2000	This requires compensation to be paid to a worker injured or acquired an occupational disease or has been harmed in any way in the course of his/her work.	This Project will require workers during construction, operation and maintenance phases. Any injury or illness resulting from Project related activities will be subject to conditions of the Workers' Compensation Act. Rakai District Labour officers will also be involved in ensuring compliance of the Contractor's' with labour laws. The developer shall ensure that all contractors and sub-contractors provide personal protective equipment (PPE) to employees to minimize accidents and injuries and ensure workers safety onsite.
The Physical Planning Act, 2010 The Physical Planning (Amendment) Act 2020	Section 37 requires an EIA permit for developments before they are implemented. It states: "Where a development application related to matters that require an environmental impact assessment, the approving authority may grant preliminary approval subject to the applicant obtaining an EIA certificate in accordance with the National Environment Act". Section 2A of the Amendment provides a right to clean and health environment. And every Ugandan has a duty to create, maintain and enhance a well-planned environment. Any result of act or omission by any person likely to breach a physical development plan or physical planning standard report to relevant authorities or file a civil suit against any person whose act or omission has breached or likely to breach a physical development plan or physical planning standard.	MWE shall use established guidelines to acquire land and compensate where possible for acquired lands, as well as safeguarding the natural environment, in line with the provisions of this Act. Where necessary RAP will be prepared for the Water transmission lines in fulfilment of the above provisions before construction activities are implemented.
The Public Health Act,	The Public Health Act aims at avoiding pollution of environmental	The disposal of waste from the proposed project will

Cap 281	resources that support health and livelihoods of communities. It gives local authorities powers (Section 103) to prevent pollution of watercourses.	have to be appropriately managed so as to prevent risk to public health, in line with the provisions of this Act.
The Local Governments Act, Cap 243	Provides for the system of local governments based on the decentralization of district for the enforcement of environmental law.	The developer will work closely with the District Water Officer (DWO), District Natural Resources Officer (DNRO) and Sub-County Community Development Officer in carrying out monitoring activities to ensure no damage onto the environment and social amenities.
Investment Code Act, Cap 92	Section 18(2) (d) of the Act requires an investor to take necessary steps to ensure that development and operation of an investment project do not cause adverse ecological and socio-economic impacts.	MWE is the implementing agency for the project that received funding from the World Bank. This ESIA is in partial fulfilment of the requirements of this Act, since adverse ecological and socio-economic impacts as a result of the project implementation have been identified and mitigation measures developed.
Employment Act, 2006	This Act is the principal legislation that seeks to harmonize relationships between employees and employers, protect worker's interests and welfare and safeguard their occupational health and safety through: i) Prohibiting forced labour, discrimination and sexual harassment at workplaces (Part II; Part IV). ii) Providing for labour inspection by the relevant ministry (Part III). iii) Stipulating rights and duties in employment (weekly rest, working hours, annual leave, maternity and paternity leaves, sick pay, etc. (Part VI). iv) Continuity of employment (continuous service, seasonal employment, etc. (Part VIII). This Act is relevant to both construction & operation phases.	The Act will govern labour arrangements and conditions under which persons hired by the project work. It prohibits Child labour (a condition the contractor must comply with) as well as providing guidance on work rights during the post-construction phase.
The Mining Act, Cap. 148	Stone quarry sites and gravel borrow pits will be necessary for materials needed to construct the concrete works of the project components. Therefore, applicable licenses shall be obtained from the Commissioner of the Geological Survey and Mines. The Mining Act of 2003 regulates mining developments including set up of new quarries and/or sandpits. Relevant environmental studies required for this license application are described in Part XI.	This Act will apply to the project's contractor(s) who will be required to obtain license for extraction of stone/ aggregate and murram materials required for construction. The extraction of stone/aggregate and murram materials will be undertaken in line with the provisions of this Act. Issues of restoration of the sites after extraction of murram will be of key importance after construction of the proposed project.

The Children's Act, Cap 59	This is an Act to reform and consolidate the law relating to children; to provide for the care, protection and maintenance of children; to make provision for children charged with offences and for other connected purposes. Part II of the second schedule of this Act defines a child as a person below the age of eighteen (18) years. In the same schedule under Section 8 of this Act provides that no child shall be employed or engaged in any activity that may be harmful to his or her health, education or mental, physical or moral development.	This Project will require workers during construction, operation and maintenance phases. No child should be employed under project work force requirement however, any employment or engagement of children will be done in line with the restrictions of this Act and the Employment Act to ensure that risks to children are either eliminated, or reduced to as low as reasonably practicable. In addition, the contractor will confirm age of potential labourers prior to hiring through National Identity card, birth certificate or confirming with LC and community elders. Rakai District Probation Officers will provide guidance to Contractors and their employees' areas of compliance.
The Equal Opportunities Commission Act, 2007	An Act to make provision in relation to the Equal Opportunities Commission pursuant to articles 32 (3) and 32 (4) and other relevant provisions of the Constitution; to provide for the composition and functions of the Commission; to give 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 marginalised 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.	MWE, the contractor and the operator will work hand in hand with ensure that that there is no discrimination and inequalities against any individual or group of persons on the ground of sex, age, race, colour etc. Local recruitment of workers among others will be prioritised for men, youth and women. A complaints mechanism will be put in place to ensure there is redress of registered grievances.
The National Council for Disability Act, 2003	The Act provides for the establishment of a National Council for Disability, its composition, functions and administration for the promotion of the rights of persons with disabilities set out in international conventions and legal instruments, the Constitution and other laws, and for other connected matters. Part IV provides for the establishment of lower councils for disability.	MWE, the contractor and the operator will work hand in hand with the already formulated District and Sub County Council for Disability in ensuring that the needs of the persons with disabilities are observed.
The Historical	Sub-section 12(1) requires that any portable object discovered in the	This Act requires that any chance finds encountered

Monuments Act, 1967	course of an excavation shall be surrendered to the Minister who shall deposit it in the Museum. The Act adds that, notwithstanding provisions of the subsection, where any object is discovered in a protected site, place, or monument, the owner of the protected site, place, or monument shall be entitled to reasonable compensation.	during project construction shall be preserved by the Department of Museums and Monuments in the Ministry of Tourism, Wildlife and Heritage. Any chance find objects, material or infrastructure that may be identified as falling under the category of 'archaeological pale-ontological ethnographical and traditional interests' during the Project implementation will therefore, be reported to the Department of Museums and Monuments for advice and where necessary undergo a forensic assessment
The National Environment (Environmental and Social Assessment) Regulations, 2020	According to sections 15 of the Regulations, the developer of any project that has or is likely to have a significant impact on the environment is required to undertake an ESIA process after approval of the ToRs.	ESIA report has been prepared for NEMA's consideration after the approval of the Terms of References before implementation of the proposed project.
The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000	In Regulation 17 (1), every landowner, occupier or user who is adjacent or contiguous with a wetland shall have a duty to prevent the degradation or destruction of the wetland and shall maintain the ecological and other functions of the wetland. The tool used under these Regulations to ensure compliance is the permit.	Prior to any works at the discharge of effluent back into the environment or any wetland, MWE will seek permission from NEMA, as provided for in these Regulations. Water source protection measures and an independent WSPP have been prepared to protect any wetland resources within the catchment area from being polluted.
The National Environment (Waste Management) Regulations, 2020	Regulation 5 (1) stipulates that a person who generates waste, a waste handler or product steward has a duty of care and shall take measures to ensure that waste is managed in a manner that does not cause harm to human health or the environment among other provisions.	These regulations apply to both construction and operation-phase waste which should be managed in a way such as to avoid environmental and public health impact. Therefore, all the generated various types and volume of waste should be managed and conform to these regulations.
The National Environment (Noise Standards and Control) Regulations, 2000.	Part III Section 8 (1) requires facility operators, to use the best practicable means to ensure that the emission of noise does not exceed the permissible noise levels. The regulations require that persons to be exposed to occupational noise exceeding 85 dBA for eight hours in a day should be provided with requisite hearing protection.	All construction activities should be carried out between 7am – 6pm by the Contractor as working hours. No construction activities to be carried out at Night. Noise levels should also be monitored and not to exceed 85dB as per Regulation.

<table>
<tr><td>The Water Resources Regulations, 1998</td><td>With regard to water abstraction, Part II: Section 3 Sub-section (1) of these regulations requires application for Water Permits by anyone who: (a) Occupies or intends to occupy any land; (b) Wishes to construct, own, occupy or control any works on or adjacent to the land referred to in regulation 10; may apply to the Director for a water permit.</td><td>Water abstraction permit will be obtained by the developer from the Directorate of Water Resources Management (DWRM) before operation phase.</td></tr>
<tr><td>The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 2020</td><td>Section 5 details that a person shall not discharge effluent into water or land except in accordance with the Act, the Water Act, the National Environment (Waste Management) Regulations, 2020, the Petroleum (Waste Management) Regulations, 2019, the Water (Waste Discharge) Regulations, these Regulations and environmental standards. For this project, this standard is applicable to liquid waste/ sewage treatment plant and public toilets.</td><td>Effluent/liquid waste (such as human waste, food scraps, oils, soaps and chemicals) should not be discharged into any wetland or in the River water resources and should be managed in a manner that does not cause harm to human health or the environment.</td></tr>
<tr><td>Draft National Air Quality Standards, 2006</td><td>The draft national air quality standards provide Uganda's regulatory air quality standards.
<table><tr><th>Pollutant</th><th>Averaging time for ambient air</th><th>Standard for ambient air</th></tr><tr><td>Carbon dioxide (CO_2)</td><td>8 hour</td><td>9.0 ppm</td></tr><tr><td>Carbon monoxide (CO)</td><td>8 hour</td><td>9.0 ppm</td></tr><tr><td>Hydrocarbons</td><td>24 hour</td><td>5 mg m^{-3}</td></tr><tr><td>Nitrogen oxides (NO_x)</td><td>24 hour
1 year arithmetic mean</td><td>0.10 ppm</td></tr><tr><td>Smoke</td><td>Not to exceed 5 minutes in any one hour</td><td>Ringlemann scale No.2 or 40% observed at 6m or more</td></tr><tr><td>Soot</td><td>24 hour</td><td>500 µg Nm^{-3}</td></tr><tr><td>Sulphur dioxide (SO_2)</td><td>24 hour</td><td>0.15 ppm</td></tr><tr><td>Sulphur trioxide (SO_3)</td><td>24 hour</td><td>200 µg Nm^{-3}</td></tr></table>Note: ppm = parts per million; 'N' in µg/Nm-3 connotes normal atmospheric conditions of pressure and temperature (25oC and 1 atmosphere).</td><td>These standards will apply particularly during construction of the pump station and reservoirs.</td></tr>
<tr><td>The National Environment (Audit) Regulations, 2020</td><td>Part III on Environmental Compliance Audit, Section 12, Sub-section (1) requires the developer of a project or activity listed in Schedule 3 to these Regulations to carry out an environmental compliance audit.</td><td>The project will involve construction and operation of water supply and sanitation facilities that have a potential to impact negatively of the environment. Therefore, MWE should conduct Environmental Audits to assess if there are impacts, to what extent and mitigate them.</td></tr>
</table>

2.4 WORLD BANK SAFEGUARD POLICIES AND REQUIREMENTS

The IWMDP is assigned an EA Category B given that significant adverse environmental and social impacts are not expected due to the nature of the proposed activities. Following the environmental and social screening of the proposed project activities, the anticipated negative impacts will be localized, site-specific and small to moderate in scale. The project is not anticipated to generate any potential large scale, significant and/or irreversible impacts. None of the project activities will be located in environmentally sensitive areas, and all the associated impacts can be mitigated with relatively standard mitigation measures.

Overall, by their nature, location, scale & scope, including the environmental and social context where the Kasese RGC Cluster WSS project will be situated, will have minimal adverse environmental and social impacts. Therefore, negative impacts are expected to be mitigated with known technology, good practices and management solutions, resulting in residual impact of minor significance. This therefore qualifies the project to be EA Category B.

The objective of the World Bank's environmental and social safeguard policies is to prevent and mitigate undue harm to people and their environment during the development process. These policies provide guidelines for Bank and borrower staff in the identification, preparation, and implementation of programs and projects. Safeguard policies provide a platform for the participation of stakeholders (World Bank, 2006). The triggered safeguard policies are presented in the Table 4 below:

Table 4: World Bank Operational Policies to be triggered by the project

Yes √ or No X	If applicable, how might it apply?
√	Environmental Assessment (OP/BP/GP 4.01) The Environmental Assessment (EA) Safeguard is to ensure that projects are environmentally and socially sustainable, and provide a basis for improved decision making. OP 4.01 evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The proposed project will largely generate positive impacts contributing to public health, economic growth, and environmental sustainability. OP 4.01 is triggered as the project may have potential negative environmental and social impacts through the construction and operational phases. Possible impacts during construction include; impacts on water bodies associated due to earthworks and wastewater generated from construction activities; emissions of particulate matter by earthworks and removal of vegetation cover; Occupational, Health, and Safety (OHS) risks; and social misdemeanour by workers. The impacts during construction phase will be temporary while works are carried out. During the operation phase, the potential risks include unpleasant odours and noise from the operation of sanitation facilities; inadequate sludge management and wastewater effluent discharges; possible impacts on surface and/or ground

	water due to leakages from and intrusion of storm water to the facilities (sewers, manholes, ponds, septic tanks). The anticipated negative impacts will be localized, site-specific and small to moderate in scale. All project adverse impacts are expected to be mitigated with known technology, good practices and management solutions, resulting in residual impact of minor significance. With respect to AC, the environmental management plan will include management measures for the removal, packaging, transportation and disposal of existing asbestos waste. Works and equipment will be designed based on technical studies to ensure safe yield from groundwater and surface water resources. The water and sanitation facilities are relatively small. The Project is classified as Category B because it will not generate any potential large scale, significant and/or irreversible impacts, it is not located in environmentally sensitive areas, and impacts can be mitigated with relatively standard mitigation measures. Safeguards instruments: Compliance will be ensured through diligent application of Environmental and Social Management Framework (ESMF) and site specific Environmental and Social Impact Assessments (ESIAs)/Environmental and Social Management Plans (ESMPs) during implementation. The Project will follow the WB- EHS Guidelines for Water and Sanitation.
√	Natural Habitats (OP/BP 4.04) While no significant negative impacts on natural habitats are anticipated by project works, the policy is triggered because most of the sanitation facilities may discharge their effluent into wetlands. In addition, the project will also involve catchment management and some of the investments may involve afforestation, reforestation and improvement of watersheds. Depending on the subprojects and potential negative impacts to the natural habitats (forests, wetlands, lakeshores, and riverbanks), these subprojects will include/encompass natural habitats assessment and mitigation under the given sub-project ESIA/ESMP to protect or preserve any flora & fauna species identified at risk of being affected. If a subproject can cause irreversible damages, it will be excluded.
√	Forests (OP/BP 4.36) OP 4.36 is triggered due to potential project impacts on health and quality of forests, especially in the catchment areas where the project will support afforestation, reforestation and improvement of watersheds. Compliance will be ensured through the site specific ESIAs/ESMPs that shall ensure inclusion of forests assessment and mitigation.
X	Pest Management (OP 4.09) The project will not involve or support the purchase, manufacture or use of pesticides. The Project will not lead to increased/changed use of pesticides.
√	Physical Cultural Resources (OP 4.11) The policy is triggered due to the possibility of chance finding of physical cultural resources

	during construction. Any potential physical cultural resources will be addressed by incorporating reporting and handling procedures as part of site specific ESIA and dealt with in the context of the ESMF. The ESMF has provided a generic Chance Finds Procedure that will guide handling accidental encounter of archaeological resources.
√	Involuntary Resettlement (OP/BP 4.12) The purpose of this policy is to avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. The key objectives of this operational policy are to: a. Avoid or minimize involuntary resettlement scenarios, where possible and examine all viable alternative project designs; b. Support affected persons in restoring/improving their former living standards, income generation and production capacities, or at least in restoring them; c. Encourage community involvement in planning and implementing resettlement actions, and provide assistance to affected people regardless of the legality of land tenure. The policy does not only cover physical displacement, but also any loss of land or other assets associated to the proposed actions resulting in: a. relocation or loss of shelter; b. loss of assets or access to assets; and loss of income sources or means of livelihood, whether or not the affected person is to reallocate to a new area. The policy is therefore triggered because of the potential negative social impacts that might result from the need for land acquisition and/or the loss of access to economic assets and livelihoods due to Integrated Water Resources Management (IWRM) and WSS activities. The RAP for the project was prepared as guided by the RFP which was prepared by MWE and disclosed in 2018. Both instruments will be disclosed by MWE on its website and on that of the World Bank. For sub-projects covered under the RPF, these shall be subjected to social screening and where necessary their RAP shall be prepared and implemented before commencement of implementation of any such activities.
X	Indigenous Peoples (OP 4.10) There are no areas occupied by indigenous people in the project area.
X	Safety of Dams (OP/BP 4.37) OP 4.37 is not triggered as the project will not finance rehabilitation and construction of small dams (i.e. dams smaller than 15m, as per OP 4.37). The Project does not support the construction or rehabilitation of large dams and subprojects do not include structures that will rely on the performance of an existing dam or dam under construction (DUC).
X	Projects in Disputed Areas (OP/BP/GP 7.60) OP 7.60 is not triggered as there are no known disputed areas in the project districts. If any, the project will not support any activities in disputed areas.

X	Projects on International Waterways (OP/BP/GP 7.50) This policy is not triggered since the water source is not an International Waterway.

2.4.1 WORLD BANK POLICY ON DISCLOSURE OF INFORMATION

The World Bank, through its Disclosure Policy BP 17.50, requires that all safeguard documents be disclosed in the respective countries as well as at the Bank's Info shop or Website prior to appraisal or for Fast Tracking Initiative prior to Signing of the Grant Agreement. The Bank recognizes the right to information, and has information disclosure policies which generally contain the following elements: principles of disclosure; exceptions to disclosure; routine disclosure; and request driven disclosure. Disclosure of documents (including a summary of the project, and a summary of Environmental Assessment) should be in the local language, at a public place accessible to project-affected groups, local non-governmental organizations and other interested persons. In-country disclosure of information is the responsibility of the borrower, in this case of the project proponent through the steering committee or the individual institutions that will be implementing a project, in this case the MWE. Disclosure at the Bank's website is the responsibility of the World Bank. Documents that need to be disclosed include:

- Integrated Safeguards Data Sheet;
- All Safeguard mitigation plans: (i). ESIA, and/or ESMPs; and (ii). RAP.

All documents should be made available to stakeholders well in advance of consultations and all public consultations should be completed and draft or final documents should be disclosed prior to the project appraisal. In addition, all final documents, including the results of the consultations should be disclosed for the record. For the present ESMF document, information disclosure was initiated with the stakeholder consultations and public meetings held in selected project sites and Ministries or Agencies. The meetings provided an opportunity for stakeholders to provide comments and useful inputs to be taken into consideration when planning and eventually implementation of the proposed project.

Since the EMSF was completed, it is proposed that the disclosure process be through continued interaction with stakeholders using contacts gathered during public meetings. A pubic advert shall be sent to most widely distribute and read newspapers in the country, to inform stakeholders of the availability of the ESMF document for review and comments. The MOWE shall ensure the availability of the full ESMF in their Public Library and Website, including websites and offices of MWE, and participating Districts and sub counties, where the public can have access and provide any comments.

2.5 World Bank Project Classification

The proposed project is classified as Category B as per WB project classification. The proposed construction and operation of Kasese RGC piped water supply facilities will be restricted within the user-communities. The project will not directly affect ecosystems such wetlands, forests, grasslands and other natural resources. World Bank classifies a proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental and social impacts as presented below in Table 5.

Table 5: World Bank Project Classification

Category A	A project is classified as Environmental Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. The project impacts may affect an area broader than the sites or facilities subject to physical works. Environmental assessment for a Category A project examines the project's potential

	negative and positive environmental impacts, compares them with those of feasible alternatives including the "without project" situation, and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.
Category B	A project is classified as Environmental Category B if its potential adverse environmental impacts on human populations or environmentally important areas, including wetlands, forests, grasslands, and other natural habitats, are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects. Here the project is required to develop an ESMP that outlines potential negative and positive environmental impacts and measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.
Category C	A project is classified as Environmental Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further environmental assessment is required for a Category C project.
Category FI	A project is classified as Environmental Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

2.6 Environmental Health and Safety Guidelines Specific to Water Supply and Sanitation Projects

The World Bank Group (WBG) Environmental Health and Safety (EHS) General Guidelines are recommended to be used by the project. This section provides an overview on how the general approach to be taken with regards to the management of EHS issues at the sub-project or project level. The WBG EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). They shall be referred to and used to guide EHS issues in specific industry sectors, and they should be used together with the safeguard policies. These shall govern both workers' (occupational) safety and public safety. However, the application of the EHS Guidelines to existing facilities that will be rehabilitated/expanded may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines shall be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment in which site-specific factors are taken into account. Effective management of environmental, health, and safety (EHS) issues entails the inclusion of EHS considerations into corporate- and facility-level business processes through the following steps:

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

The following were considered when assessing the potential risks related to health, safety and security: Infrastructure and Equipment Safety; Hazardous Materials Safety; Environmental and Natural Resource Issues (such as floods/ landslides etc.); Community safety and exposure to project related risks; Emergency Preparedness and Response. The General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors. This document should be used together with the relevant Industry Sector Guideline(s). The General EHS Guidelines (2007) relevant to this Project are summarized in Table 6:

Table 6: World Bank General EHS Guidelines relevant to this Project

Aspect	Relevancy to the proposed project
Environmental	
Air Emissions and Ambient Air Quality This guideline applies to facilities or projects that generate emissions to air at any stage of the project life-cycle. This guideline provides an approach to the management of significant sources of emissions, including specific guidance for assessment and monitoring of impacts.	This guideline is relevant because fugitive emissions are expected during the construction phase of this Project. These guidelines will be referenced for acceptable air quality levels during Project implementation, particularly for fugitive sources.
Wastewater and Ambient Water Quality This guideline applies to projects that have either direct or indirect discharge of process wastewater, wastewater from utility operations or storm water to the environment. These guidelines are also applicable to industrial discharges to sanitary sewers that discharge to the environment without any treatment. Projects with the potential to generate process wastewater, sanitary (domestic) sewage, or storm water should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety, or the environment.	This Project is primarily about water abstraction, treatment, supply and management. As the guidelines state, any wastewater discharge, even of uncontaminated will be managed properly before discharge. These guidelines will be referenced for principles of HSE regarding wastewater management, to improve efficiency and sustainability of the Project.
Waste Management These guidelines apply to projects that generate, store, or handle any quantity of waste across a range of industry sectors. Solid (non-hazardous) wastes generally include any garbage, refuse. Examples of such waste include domestic trash and garbage; inert construction / demolition materials; refuse, such as metal scrap and empty containers (except those previously used to contain hazardous materials which should, in principle, be managed as a hazardous waste); and residual waste from industrial operations, such as boiler slag, clinker, and fly ash. Hazardous waste shares the properties of a hazardous material (e.g. ignitability, corrosivity, reactivity, or toxicity), or other physical, chemical, or biological characteristics that may pose a	This Project will produce waste during the construction period. The operation and maintenance phase also have an insignificant element of waste management since the operation will only involve the water abstraction, treatment and supply. These guidelines will be referenced for principles of HSE regarding waste management during the life of this Project.

potential risk to human health or the environment if improperly managed.	
Noise This guideline addresses impacts of noise beyond the property boundary of the facilities. Noise prevention and mitigation measures should be applied where predicted or measured noise impacts from a project facility or operations exceed the applicable noise level guideline at the most sensitive point of reception	The pump station is far away from residential areas and houses and it is not close to schools and health care institutions which are considered to be very sensitive receptors. Noise emissions shall be monitored against the WB's guidelines during construction, operation and maintenance:
Contaminated Land This guideline provides a summary of management approaches for land contamination due to anthropogenic releases of hazardous materials, wastes, or oil, including naturally occurring substances. Releases of these materials may be the result of historic or current site activities, including, but not limited to, accidents during their handling and storage, or due to their poor management or disposal. Contaminated lands may involve surficial soils or subsurface soils that, through leaching and transport, may affect groundwater, surface water, and adjacent sites. When contamination of land is suspected or confirmed during any project phase, the cause of the uncontrolled release should be identified and corrected to avoid further releases and associated adverse impacts	The Contractor(s) will ensure that hazardous materials, wastes, or oil will not be discharged or released onto soils and land. All servicing and maintenance of construction vehicles such as trucks and equipment shall not be done on site.
Occupational Health and Safety	
Communication and Training This includes guidelines for OHS Training, Visitor Orientation, New task employee and contractor training, Area signage, labelling of equipment, communicate hazard codes, among others. Provisions should be made to provide OHS orientation training to all new employees to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow employees.	Supervising Consultants and Contractors for the Project will have to ensure that OHS requirements for the Project are met in line with these guidelines
Physical Hazards Physical hazards represent potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity. Single exposure to physical hazards may result in a wide range of injuries, from minor and medical aid only, to disabling, catastrophic, and/or fatal. Multiple exposures over prolonged periods can result in disabling injuries of comparable significance and consequence.	During the construction of the Kasese RGC WSS such as dredging, equipment and machinery which generate noise and vibrations will be used. These operations will be guided by these guidelines.

Sources of potential for such injury include rotating and moving equipment, noise, vibration, eye hazards, industrial vehicle driving and site traffic, ergonomics, repetitive motion, manual handling, among others.	
Personal Protective Equipment (PPE) Personal Protective Equipment (PPE) provides additional protection to workers exposed to workplace hazards in conjunction with other facility controls and safety systems. PPE is considered to be a last resort that is above and beyond the other facility controls and provides the worker with an extra level of personal protection.	Supervising Consultants and Contractors for the Project will have to ensure that PPE requirements for the Project are met in line with these guidelines. PPE will be provided (as required) for eye and face protection, head protection, hearing protection, foot protection, hand protection, respiratory protection, body/leg protection
Monitoring Occupational health and safety monitoring programs should verify the effectiveness of prevention and control strategies. The selected indicators should be representative of the most significant occupational, health, and safety hazards, and the implementation of prevention and control strategies	Stringent monitoring of HSE aspects will be crucial for the successful implementation of the Project, to have risks reduced to levels that are as low as reasonably practicable.
Community Health and Safety	
Water Quality and Availability Groundwater and surface water represent essential sources of drinking and irrigation water in developing countries, particularly in rural areas where piped water supply may be limited or unavailable and where available resources are collected by the consumer with little or no treatment. Project activities involving wastewater discharges, water extraction, diversion or impoundment should prevent adverse impacts to the quality and availability of groundwater and surface water resources. Project activities should not compromise the availability of water for personal hygiene needs and should take account of potential future increases in demand	In the project area, there's no potential for the Project to impact on water quality and availability. There are no other water pipes crossing or traversing near the proposed project area which could cause disruption during Project implementation to guarantee measures in line with these guidelines to be put in place.
Structural Safety of Project Infrastructure Hazards posed to the public while accessing project facilities may include: Physical trauma associated with failure of building structures; Burns and smoke inhalation from fires; Injuries suffered as a consequence of falls or contact with heavy equipment; Respiratory distress from dust, fumes, or noxious odors; Exposure to hazardous materials; Reduction of potential hazards is best accomplished during the design phase when the structural design, layout and site modifications	This guideline will be referenced in line with the integrity of the structures and any hoarding installed. PPE will be provided to persons accessing the project facilities. For all public roads and access roads used by the construction activities, dust suppression using water will be carried out by the Contractor(s). All visitors will be inducted in EHS requirements before accessing any construction site/area. Safety signs and safe systems of work will be developed for each workstation.

can be adapted more easily.	
Traffic Safety Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on public roads. Prevention and control of traffic related injuries and fatalities should include the adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents. Road safety initiatives proportional to the scope and nature of project activities.	Accessibility to the Kasese RGC WSS is along the Rakai community roads and work at the proposed site will disrupt traffic. Delivery of materials and movement of equipment for the Project will also impact traffic. This guideline will be referenced in line with traffic safety during Project implementation
Disease Prevention Communicable diseases pose a significant public health threat worldwide. Health hazards typically associated with large development projects are those relating to poor sanitation and living conditions, sexual transmission and vector-borne infections. Communicable diseases of most concern during the construction phase due to labor mobility are sexually transmitted diseases (STDs), such as HIV/AIDS. Recognizing that no single measure is likely to be effective in the long term, successful initiatives typically involve a combination of behavioral and environmental modifications. Reducing the impact of vector-borne disease on the long-term health of workers is best accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease.	The risk of spread of communicable and vector-borne diseases exists, particularly due to potential influx of Project workers and water impoundment in some cases, as required during construction. This guideline will be referenced in line with disease prevention in the Project communities.
Emergency Preparedness and Response All projects should have an Emergency Preparedness and Response Plan that is commensurate with the risks of the facility and that includes the following basic elements: Administration (policy, purpose, distribution, definitions, etc.); Organization of emergency areas (command centers, medical stations, etc.); Roles and responsibilities; Communication systems; Emergency response procedures; Emergency resources; Training and updating; Checklists (role and action list and equipment checklist); Business Continuity and Contingency.	On any construction site, there is a potential that risks will occur. It is important to have measures in place to readily contain and respond to any risks when they occur. This guideline will be referenced in line with emergency preparedness and response.
Construction and Decommissioning	

Environment Guidelines on prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities include: Noise and vibration, soil erosion, sediment mobilization and d transport, air quality, solid waste, hazardous materials, wastewater discharges, and contaminated land.	These impacts are applicable to this Project, and will be addressed in line with these specific guidelines
Occupational Health and Safety Guidelines are provided on aspects of OHS including over-exertion, slips and falls, work in heights, struck by objects, moving machinery, dust, confined spaces and excavations, and other site hazards.	These impacts are applicable to this Project, and will be addressed in line with these specific guidelines
Community Health and Safety Projects should implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning. Risks may arise from inadvertent or intentional trespassing, including potential contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards	These impacts are applicable to this Project, and will be addressed in line with these specific guidelines.

2.7 Institutional Framework

Table 7 below presents the institutional framework.

Table 7: Institutional framework related to the project

Institution	Mandate
Ministry of Water and Environment (MWE)	MWE is responsible for policy formulation, setting standards, strategic planning, coordination, quality assurance, provision of technical assistance, and capacity building. The ministry under its Water Development directorate – DWD, is carrying out the ESIA for the proposed Kasese RGC Piped Water Supply system. The ministry also monitors and evaluates sector development programmes to keep track of their performance, efficiency and effectiveness in service delivery. The ministry has three directorates: Directorate of Water Resources Management (DWRM), Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA). MWE is the lead agency for water Development and construction of the Water Supply System.
Ministry of Lands, Housing and Urban Development	Through the Chief Government Valuer (CGV) in the Valuation Department, MLHUD is responsible for reviewing and approving the Valuation Report developed as part of this RAP.

(MLHUD)	The valuation report is critical in ensuring timely payment of fair and adequate compensation as well as ensure that the Project Construction and next steps commence in time.
Ministry of Tourism, Wildlife and Antiquities (MTWA)	In-charge of protecting and preserving the sites with remain of cultural or archaeological importance when identified during construction activities for conservation, preservation, restoration and salvage.
National Environmental Management Authority (NEMA)	The National Environmental Act, NO.5 of 2019 establishes NEMA as the principal agency responsible for coordination, monitoring and supervision of environmental conservation activities. NEMA is under MWE but has a cross-sectoral mandate to oversee the conduct of ESIAs through issuance of guidelines, regulations and registration of practitioners. It reviews and approves environmental impact statements in consultation with any relevant lead agencies. NEMA works with District Environment Officers and local environment committees at local government levels who also undertake inspection, monitoring and enforce compliance on its behalf. NEMA will therefore review and approve the ESIA report and through the District Environment Officer, undertake environmental monitoring during project implementation.
Directorate of Water Resources Management (DWRM)	DWRM is responsible for issuing of water abstraction and wastewater discharge permits. The primary goal of the directorate is to promote sustainable development of Uganda's water sector. The directorate is into design and implementation of water quality assessments, monitoring ground and surface water resources, laboratory and field works and ultimately water pollution control.
National Water and Sewerage Corporation (NWSC)	The National Water and Sewerage Corporation Statute establishes the NWSC with a mandate to operate and provide water and sewerage services in areas entrusted to it on a sound commercial and viable basis. NWSC operates in cities and larger towns as well as decentralization and private sector participation in small towns.
Directorate of Water Development (DWD)	Lead agency responsible for policy guidance, coordination and regulation of all water sector activities including provision of oversight and support services to the local governments and other water supply service providers. DWD has the mandate to promote the provision of clean and safe water to all persons, investigate, control, protect and manage water in Uganda for any use in accordance with the provisions of the Water Statue, 1995
Directorate of Environmental Affairs (DEA)	The Wetlands Management Department (WMD) within DEA is mandated to manage wetland resources and its goal is to sustain the biophysical and socio economic values of wetlands in Uganda for present and future generations. Wetlands are under a lot of pressure from conversion for industrial development, agriculture, wastewater treatment facilities. WMD has an inventory of the major wetlands in country in the National Wetlands Information System (NWIS). The inventory provides an overview of wetland resource, their values, threats and possible management options.
Ministry of Gender, Labour & Social Development (MoGLSD)	MoGLSD sets policy direction and monitoring functions related to labour, social inclusion, gender and general social development. Its OHS Department in the ministry is responsible for inspection and mentoring of occupational safety in workplaces and this could be during project construction and operation of the laboratory facilities. The OHS Department in this Ministry is responsible for undertaking inspections of construction sites to ensure safe working conditions.
District Local	The proposed project is within the jurisdiction of Rakai District Local

Administration Structures	Government (RDLG), headed by a Local Council V (LC V) Chairman and Chief Administration Officer (CAO) who are the political and technical heads respectively. Various district offices whose functions would be relevant to the project include offices of Natural Resources/Environment, District Health Inspector, District Planner, Community Development Officer, District Director of Health Services, District Water Officer, District Engineer. Equally important are village-level local council administration (LC I and LC III). Leaders at these levels of local administration are closer to residents and therefore important in effective community mobilization, sensitization and dispute resolution given that the water supply project will serve communities. Local government structures are important for mobilizing support for the project as well as monitoring its social-environmental impacts both during construction and operation phases.

3. PROJECT DESCRIPTION

3.1 Location of the Proposed Project

The locations of the RGCs that will constitute the project lie in Kiziba Sub-county (currently Mweruka Town Council) in Rakai District. Rakai district is located in south western region of Uganda, west of Lake Victoria about 65.5 km by road to the south west of Masaka Municipality, the largest metropolis in the central sub region and about 192 km to the south west of Kampala, the capital city of Uganda. The district lies west of Lake Victoria between longitudes 31°E, 32°E and at a latitude of 0°S. It is bordered by Lwengo and Lyantonde districts to the North; Kiruhura district to the North-West; Isingiro district to the West and South-West; and Kyotera district to the east and South-East. The district has got its headquarters at Rakai Town where the Town Council offices are located. It is connected through Masaka district with a tarmac road from Kampala. The district is also accessed by an all season earthed based road from the Lyantonde district headquarters. There is electricity power from UMEME and telephone by all service providers save for the rural areas.

Kiziba Sub-county (SC)/Mweruka Town Council is one of the nine Sub-counties in Kooki County, Rakai District. It is located South-West of Rakai district headquarters, 45km along the main road to Isingiro district. It boarders with Kyalulangira Sub county in the North, Isingiro district in the west and in the South it borders Kibanda Sub-county which is in Kyotera District. The Sub-county is comprised of five parishes and fifty number villages. With reference to the updated scope of works, Kasese RGC is the centre of focus within the Sub-county. All centres to be considered for water supply are within 5 km of Kasese RGC. We note that all the settlements under consideration in Kiziba Sub-County (currently Mweruka Town Council) are linear settlements of permanent structures. Figure 3 is a google earth view of the centres and the points of interest for the project implementation.

Table 8: Project Sites in Relation to Mweruka

Entity	Places of Interest	Estimated Distance from Mweruka (km)	N (Northing)	E (Easting)	Z (Height mAMSL)
Adjacent RGCs	Mweruka	-	9907357	306942	1443
	Kiziba	0.99	9908024	307667	1479
	Kijwara	2.0	9909041	307639	1476
	Kalwanyi	1.97	9908167	305727	1312
	Kasese	3.73	9907488	304128	1301
	Magabirano	3.21	9906092	304416	1290

Figure 2: Map of Uganda showing Rakai District.

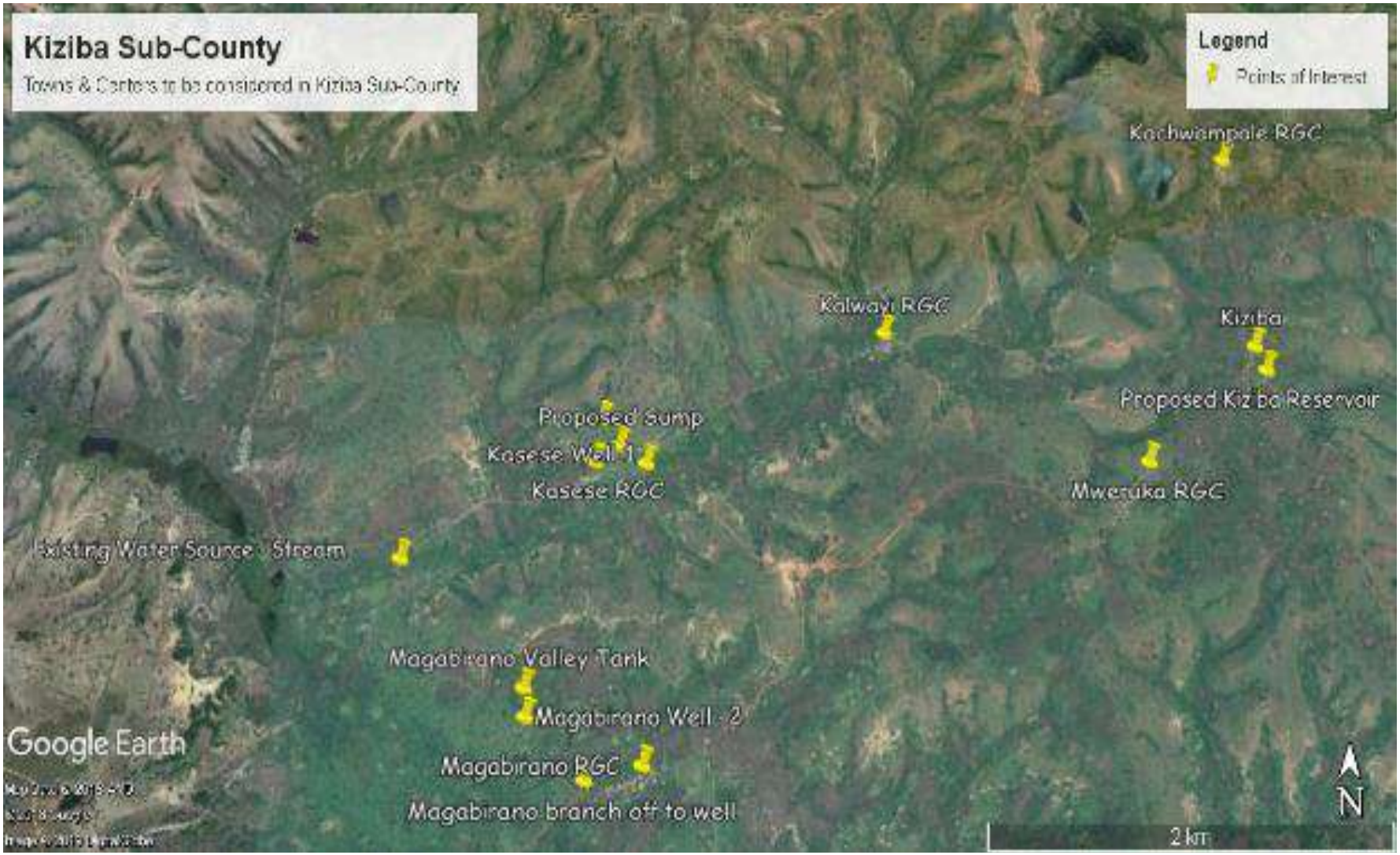


Figure 3: Kasese RGC Project Area

3.2 Project Description and Design

3.2.1. Design Criteria

This section is concerned with the establishment of design parameters and standards, for water supply and sanitation, to be used in the design of the project interventions. The criteria have been adopted from the Ministry of Water and Environment (MWE) Water Supply Design Manual, 2nd Edition (2013). The summary of the water supply design criteria along with comparison details from the MWE Water Supply Design Manual, 2nd Edition, 2013 and previous studies criteria is also given in Table below:

Table 9: Summary of Water Supply Design Criteria

Design Criteria	Abbreviations and Dimensions	DWD Design Manual (2013)	Adopted Design Criteria
Baseline Data- Population			
Design Period	Years	NA	20
Design Horizon	Year	NA	2044
Population at Design Horizon	P [inh.]	NA	9,560
Maximum Day Demand	m^3/day	NA	378
Hydraulic Criteria			
Max Day Factor		1.1 - 1.3	1.3
Peak Hour Factor		2.0	2.0
Maximum flow velocities in the pipes	m/s	-	0.75 - 2.5
Maximum Head losses in the main pipes	m/km	-	10
Operating Pressures			
Minimum in Distribution Network	m	-	5
Maximum in Distribution Network	m	-	150
Water Losses			
In Distribution System (UfW)	% of Total Average Day Demand	20% – 25%	20%
Intake & Treatment Plant Use	% of Maximum Day Demand	0% - 10%	0%
Pipe Material Selection			
Large Diameter (>250mm ND)			Ductile Iron or Steel
Medium Size Diameter (100-250mm ND)			uPVC
Small Size Diameter (< 90mm OD)			HDPE
Minimum Pipe Cover			
General Pipe Laying	m	0.6 -3.0	~ 0.9
Pipes laid below roads and reserves	m	0.9	1.2
Storage Capacity			
Sizing of Reservoirs - Balancing Storage	% of Maximum Day Demand	50%	30%
Sizing of Reservoirs - Emergency Storage (Firefighting)	% of Maximum Day Demand	50%	10%
Other Design Criteria			
Water Treatment Plant Operation Time	hour/day	-	-
Pumping Stations Operation Time	hour/day	-	10
Distribution System Operation Time	hour/day	-	24
Water Treatment Quality Standards- Drinking Water		Uganda (US - 201: 1994)	Uganda (US - 201: 1994)
Specific Water Demand			
Domestic Consumption			
House Connection			
High Income Housing	l/c/d	200	50
Medium Income Housing	l/c/d	100	
Yard Tap			
Multiple Households	l/c/d	50	40

Design Criteria	Abbreviations and Dimensions	DWD Design Manual (2013)	Adopted Design Criteria
Single Household	l/c/d	40	
Public Stand Post	l/c/d	20	20
Part Time Users (Urban Poor)	l/c/d		5
Institutional Consumption			
Schools			
Day			
With pit latrine	l/std/d	10	5
With water closet	l/std/d	20	10
Boarding	l/std/d	100	20
Hospitals / Health Centres			
Health Care Dispensaries	l/visitor/d	50	20
Health Centre I- No modern facilities			
In patients	l/bed/d	50	50
Out patients	l/c/d	NA	5
Non-Resident staff	l/c/d	NA	10
Resident staff	l/c/d	NA	10
Health Centre II- with maternity and pit latrine			
In patients	l/bed/d	70	70
Out patients	l/c/d	NA	10
Non-Resident staff	l/c/d	NA	10
Resident staff	l/c/d	NA	20
Health Centre III- with maternity and pit latrine			
In patients	l/bed/d	100	100
Out patients	l/c/d	NA	10
Non-Resident staff	l/c/d	NA	10
Resident staff	l/c/d	NA	20
Health Centre IV- with maternity and water closet			
In patients	l/bed/d	150	100
Out patients	l/c/d	NA	10
Non-Resident staff	l/c/d	NA	10
Resident staff	l/c/d	NA	40
Hospital, District- with surgery unit			
In patients	l/bed/d	200	100
Out patients	l/c/d	NA	10
Non-Resident staff	l/c/d	NA	10
Resident staff	l/c/d	NA	100
Hospital, Regional Referral- with surgery unit			
In patients	l/bed/d	400	150
Out patients	l/c/d	NA	10
Non-Resident staff	l/c/d	NA	10
Resident staff	l/c/d	NA	100
Administrative Offices			
With pit latrine	l/worker/d	-	5
With water closet	l/worker/d	70	40
Mosque	l/c/d	NA	20
Church	l/c/d	NA	5
Prisons	l/inmate/d	NA	50
Commercial / Industrial Consumption			
Hotels / Lodges			
High class	l/bed/d	600	600
Medium class	l/bed/d	300	300
Low class	l/bed/d	50	50
Bars / Restaurants			
High class	l/bar/d	1000	1000
Low class	l/bar/d	700	700
Shops			
Small Town	l/shop/d	150	50
Fuel Station/Washing Bays			
Small Town	Station/d	5000	500
Markets	l/ha/d	20000	500 l/market/day

Design Criteria	Abbreviations and Dimensions	DWD Design Manual (2013)	Adopted Design Criteria
Public Sanitation			
Small Town	l/person/d	50	20
Food Industry			
Dairy	Milk received (m3)	2 - 5	200 l/d
Abattoir	Animals slaughtered (ton)	5 -10	200 l/abattoir/day
Butchery	l/d	NA	50
Grain millers (Dry processing mills)	Grain received (ton)	2 - 5	30 l/d
Other Industries			
Tannery	Raw skins (ton)	50 - 150	50
Cotton mill	Cotton thread (tufi)	50 - 150	50
Medium Scale (water intensive)	m3/ha/d	40	40
Medium Scale (medium water intensive)	m3/ha/d	15	15
Small Scale (dry)	m3/ha/d	5	5

3.2.2 Design Horizon

The MWE Water Supply Design Manual (2013) gives the following timeline for the determination of the Design Horizon:

1) Initial Year - Year of Commissioning Water Supply System taken to be 5 years after commencement of Feasibility Studies.
2) Ultimate Year- 20 years Design Horizon from Initial Year.

The consultant has taken 2024 as the initial year. Therefore, in summary, the design is based on:

a) Base Year- 2019;
b) Initial Year- 2024; and
c) Ultimate Year- 2044.

3.2.3 Hydraulic Peak Factors

The Average Day Demand which depicts the daily water consumption by domestic and non-domestic consumers is subject to seasonal climatic variations, harvest seasons, and other factors such as transient population, and religious and cultural festivals. To allow for increased demands during these seasons, a maximum day peak factor of 1.3 is proposed, so long as the source(s) has/have a higher output(s) than the demand. Application of the above factor to the Average Day Demand gives us the Maximum Day Demand which may be used to design the capacities of the water source works, raw and treated water transmission mains, pumping stations, water treatment plants, and reservoirs. If, however the source(s) is/are a borehole(s) then the design of the above components will be based on the maximum volume of water that can be extracted from it/them save for the reservoir. This latter scenario is what is obtaining in this project and therefore the factor will only apply to the sizing of the reservoirs.

Hourly fluctuations in demand vary depending on water usage. These fluctuations are catered for by peak hour factors which tend to be high for small rural communities and lower for larger communities. Distribution mains have to be designed with adequate capacity to meet the peak hour demands of the consumers being supplied. To accommodate the peak hourly flow in the major distribution mains from the reservoir(s) to the RGC a peak hour factor of 2.0 is proposed.

3.2.4 Transient Population

This population is allowed for within the maximum day factor of 1.3 as discussed above.

3.2.5 Pipe Flow Velocities

In order to limit hydraulic forces on bends in the distribution networks and to limit water hammer effects, it is proposed that the maximum flow velocities should not exceed 0.75 – 2.5 m/s. For water pumping mains the flow velocities at the optimum pipe diameter shall apply. Head losses in the main pipelines will be limited to maximum of 10 m/km.

3.2.6 Operating Pressures

In line with the MWE Water Supply Design Manual, 2nd Edition (2013), the pressures in the distribution system will, where possible, be kept below PN 6 (60m of Water Head) and above PN 1 (10m of Water Head).

3.2.7 Un-accounted for Water (UfW)

Allowance must be made in the feasibility study and detailed design for losses, and other unaccounted for water use. This is also known as Non-Revenue Water (NRW). According to IWA1, this is the difference between System Input Volume and Billed Authorized Consumption. This NRW is a result of Unbilled Authorised Consumption, Apparent, and Real (Physical Water) Losses which include:

1) Unbilled Metered and Unbilled Unmetered Consumption (Unbilled Authorized Consumption);
2) Unauthorized Consumption (Apparent Losses). This includes meter bye passes, illegal connections, meter reversals, etc.
3) Metering Inaccuracies and Systematic Data Handling Errors (Apparent Losses);
4) Water Pipe leakages and bursts on Transmission and Distribution mains, and service connection pipes up to the consumer meter (Real Losses);
5) Storage Reservoir leakages and overflows (Real Losses).

Many studies have been carried out in Uganda on NRW. The NRW can be given either as a percentage of the average daily water consumption or of water production (System Input volume). The latter ratio has been selected. In this approach, the UfW is assumed to be constant and not subject to seasonal variations. The Water Supply Design Manual[2] also recommends that an allowance of 17 m^3/km/day be allowed to cater for leakages, water demand for flushing pipelines, storage tanks and other ordinary internal waterworks usage. However, experience with new systems though tend to put the NRW at between 15% - 25% of the plant output. Accordingly, we propose that a figure of 20% UfW is used in the determination of the water demand.

3.2.8 Raw Water Intake / Treatment Plant Water Usage

Water losses also occur at the intake and water treatment plant where water is used for cleaning screens, backwashing the rapid gravity filters, cleaning the water structures, general intake and treatment plant water usage e.g. laboratory and sanitation facilities, etc. Where a system has components stated above, the generally acceptable percentage is 10% of the Maximum Day Demand

1 The International Water Association, 2014

[2] Water Supply Design Manual, Ministry of Water and Environment, 2nd Edition, 2013

to cater for these losses. However, in the case of this project where the sources are boreholes and plant use is negligible, we shall adopt zero percent (0%) for plant use.

3.2.9 Selection of Pipe Materials

Choice of material for the laying of pipes and replacement of old pipework installations will be based on commonly used pipe material sizes in the country as follows:

1) Large diameter (>300mm ND) – Ductile Iron or Steel
2) Medium size diameter (110 – 300mm ND) – uPVC
3) Small size diameter (< 90mm OD) – HDPE

3.2.10 Storage Capacity

Storage reservoirs are designed to fulfil the following functions:

a) To provide for fluctuations in consumer demand during the day (e.g. the peak hour flow), without having to design the treatment plant and pumping mains to match this peak flow. It thus provides a balance between the demand rate of transmission (at maximum day demand) and consumption rate (peak hour flow). This is the balancing storage. Additionally, the storage reservoir provides for a fairly constant residual pressure and flow to the consumers; and
b) The storage reservoir also provides a reserve capacity for firefighting, power interruptions, and allows time for system repairs and essential maintenance upstream of the storage to be made without interrupting flow to the consumers. This is the Emergency Storage.

It is proposed to size the storage at 30% of the maximum day's demand for balancing purposes, plus 10% of maximum day's demand for emergency storage. The storage capacity of 162 cubic meters is required for the water supply system.

3.2.11 System Operation Time

The distribution system is assumed to operate 24 hours per day. The pumping stations will however operate for a maximum of 16 hours/day.

3.2.12 Water Treatment and Quality

The World Health Organization's (WHO's) Guidelines for Drinking Water Quality, set up in Geneva in 1993, and lately revised in the 4th Edition, 2011; are the international reference points for the establishment of national regulations and standards for drinking water. It should be mentioned that though WHO recognises that drinking water should be acceptable to consumers in appearance, taste, and odour. No guideline values have been set for constituents influencing water quality that have no direct link to adverse health impacts.

In the case of the Water and Sanitation Programme, the quality of water to be delivered to the end consumer should conform to Uganda Drinking Water Standard (US-201: 2008, 2nd Edition). The Uganda Standard US-201 was first declared a National Standard in 1994 and revised in 2008 in line with the WHO guidelines and other market requirements.

This is given in Table below along with the WHO 2011 standards for comparison purposes.

Table 10: Drinking Water Quality Standards Uganda (2008) & WHO (2011)

Characteristic	Unit	US-201: 2008 Requirement	WHO 2011 Requirement
Physical Requirements			
Colour	Hazen units, max. Pt scale	15	No Guideline
Odour		Acceptable to consumers and no abnormal changes	No Guideline
Taste		Acceptable to consumers and no abnormal changes	No Guideline
Turbidity	NTU	5	1
Dissolved Solids	mg/l	700	No Guideline
Suspended Solids	mg/l	0	No Guideline
Electrical Conductivity (EC)	µS/cm	1500	250
Chemical Requirements			
pH		6.5 - 8.5	6.5 – 8.5
Total Hardness (as CaCO3)	mg/l	500	No Guideline
Calcium (as Ca)	mg/l	75	No Guideline
Sodium (as Na)	mg/l	200	200
Magnesium	mg/l	50	No Guideline
Arsenic (as As)	mg/l	0.05	0.01
Copper (as Cu)	mg/l	1.0	2.0
Chloride (as Cl)	mg/l	250	250
Chromium (as Cr 6+)	mg/l	0.05	0.05
Fluoride (as Fl)	mg/l	1.0	1.5
Iron (as Fe)	mg/l	<0.30	No Guideline
Manganese (as Mn)	mg/l	0.1	0.1
Nitrates (as NO3)	mg/l	5	50 (Total Nitrogen)
Barium	mg/l	1.0	0.7
Aluminium (as Al)	mg/l	0.1	0.2
Sulphates	mg/l	200	250
Zinc (as Zn)	mg/l	5.0	3.0
Lead (as Pb)	mg/l	0.05	0.01
Selenium (as Se)	mg/l	0.01	0.01
Cadmium (as Cd)	mg/l	0.01	0.003
Phenolic substances (C6H5OH)	mg/l	0.001	No Guideline
Mercury (as Hg)	mg/l	0.001	0.001
Cyanide	mg/l	0.01	0.07
Poly nuclear aromatic substances	mg/l	nil	No Guideline
Residual free chlorine	mg/l	0.2	0.2
Mineral oil	mg/l	0.01	No Guideline
Anionic detergents	mg/l	0.2	No Guideline
Pesticides		Trace	Trace
Carbon chloroform extracts (CCE, organic pollutants)	mg/l	0.2	No Guideline
Source: Uganda Bureau of Standards, WHO Guidelines, 2011			

3.2.13 Specific Water Demand

3.2.13.1 Domestic Consumption Rates

The per capita domestic consumption rates are based on the level of service being offered. In determining the rates of consumption for the water demand, a comparison of the rates used in previous studies in the country with those in the MWE Water Supply Design Manual, 2nd Edition, 2013 was carried out and summarized in Table below.

Table 11: Comparison of Unit Demands for Domestic Consumption

Source	House Connections (l/c/d)	Yard Tap (l/c/d)	Stand Post (l/c/d)	Urban Poor (l/c/d)
MWE Design Manual, 2013	100 - 200	40 - 50	20	0
Adopted	80-120	40-50	20	0
Source: Ministry of Water and Environment: Water Supply Design Manual, 2nd Edition, 2013				

3.2.13.2 Service Levels

Four levels of service and corresponding per capita consumption rates are proposed and these are summarized below and in Table below.

1) For House Connections in the town, medium income housing is predominant therefore the rate of 50 l/c/d from the MWE Water Supply Design Manual, 2013 has been adopted.
2) The rate of consumption at the yard tap shows little variation across the various towns. A single household figure of 40 l/c/d from the MWE Water Supply Design Manual, 2013 has been adopted.
3) The stand post consumption of 20 l/c/d is considered the minimum to sustain healthy existence and is therefore adopted.

Table 12: Per Capita Domestic Consumption Rates

No	Domestic Consumer Category	Description	Per Capita Consumption (l/c/d)
1	House Connection (HC)	Low income housing with no inside installation. i.e. low income, single household with yard tap.	50
2	Yard Tap (YT)	Medium income consumers- single / multiple households using yard taps. This connection with no internal plumbing or water borne sanitation.	40
3	Public Stand Post (SP)	Low Income Users- usually offsite supply, either from a stand post or purchase from a neighbour.	20
Source: Project Estimates, Ministry of Water and Environment, Water Supply Design Manual, 2nd Edition, 2013			

No.	Consumer Category	Description of Customer category	Per Capita Consumption (l/c/d)	
			WSDM	Adopted
1	Public Stand Post (SP)	Low Income Users- usually offsite supply, either from a stand post or purchase from a neighbour.	20	20
2	Low income using kiosk or public stand taps	Most squatter areas, to be taken as the minimum	20	20
3	Low income, multiple households	Low income housing with no inside installations	20	40

	with yard tap			
4	Low income, single household with yard tap	Low income housing with no inside installations	50	50
5	Medium income household	Medium income group housing, with sewer or septic tank	100	80
6	High income household	High income group housing, with sewer or septic tank	200	120
Source: Project Estimates, Ministry of Water and Environment, Water Supply Design Manual, 2nd Edition, 2013				

3.2.14 Non-Domestic Consumption Rates

This category covers the institutional, commercial, and industrial consumers. The proposed rates have been adopted from the DWD design manual (2013) and rates used in other similar schemes designed recently. They have been determined from within the specified ranges to suit the socio economic and socio-cultural conditions in the town.

3.2.15 Design Economic Life

Annual maintenance cost factors and Design Economic life of the various design components have been adopted from the MWE Water Supply Design Manual, 2nd Edition, 2013. The relevant factors are summarized in Table below.

Table 13: Annual Maintenance and Economic Life of Design Components

Component	Economic Life (Years)	Annual Maintenance Cost (% of Construction Cost)
Intake Works, Treatment Works	40, 30	1%
Boreholes and Wells	20	1%
Mechanical and Electrical Items	10	5%
Pipelines, Water Meters	30, 15	1%
Masonry / Concrete Storage reservoirs	30	1%
Steel storage reservoirs including Towers	20	2%
Masonry Buildings	30	1%
Gantries, Water Kiosks, Latrines	20	2%
Site Works: Roads, Fences	20	1%
Source: MWE Water Supply Design Manual, 2nd Edition, 2013 and Project Estimates		

3.2.16 Formula for Design of Transmission Mains

The transmission mains will be designed using the Hazen-Williams Formula using an excel spread sheets to design the main requirements in the ultimate design year. The formula is as follows:

Q = K*C*A*R^0.63*S^0.54

Where:
- Q = Discharge in the section (m^3/s)
- C = Hazen Williams roughness coefficient (unit less)
  120 for Steel Pipes, 140 for HDPE and uPVC
- A = Flow area m^2
- S = Friction slope (m /m)

K = Constant (0.85 for SI)
R = Hydraulic radius (m)

and

$R = D/4$

Where: R = Hydraulic radius (m)
D = Diameter (m)

3.2.17 Design Period and Demand

The water supply has been designed for the ultimate year 2044.

In the design, the system has been sized on the basis of the maximum day water demand of 378m^3/d and Peak hour demand of 695m^3/d. The design demand determination was reflected in the Feasibility Study and Preliminary Design Report and the calculations have been summarized in Table below.

Table 14: Summary of Demand Calculation

RGC	Average Day Demand, m^3/d			Maximum Day Demand, m^3/d			Peak Hour Demand, m^3/d		
	2024	2034	2044	2024	2034	2044	2024	2034	2044
Kalwanyi	12.6	15.8	20.1	19.5	24.6	31.1	35.8	45.2	57.2
Kasese	14.6	18.6	23.6	22.7	28.8	36.6	41.7	52.9	67.4
Mweruka	16.9	21.4	26.8	26.3	33.1	41.6	48.3	60.9	76.4
Kijwara	10.3	13.1	16.7	16.0	20.3	25.9	29.5	37.4	47.6
Magabirano A	15.7	19.8	25.0	24.3	30.6	38.8	44.7	56.3	71.3
Magabirano B	18.7	23.6	29.9	28.9	36.6	46.4	53.2	67.2	85.3
Kobukurura	13.1	16.6	21.1	20.3	25.7	32.7	37.3	47.2	60.1
Ndaga A	13.2	16.6	21.0	20.4	25.7	32.5	37.5	47.2	59.7
Katunga	8.8	11.1	14.1	13.6	17.2	21.9	25.0	31.6	40.2
Kijonjo	15.5	19.7	25.0	24.1	30.5	38.8	44.2	56.1	71.4
Kyemwa	12.8	16.2	20.5	19.8	25.0	31.8	36.4	46.0	58.5
Total	**152.1**	**192.3**	**243.9**	**235.8**	**298.0**	**378.0**	**433.6**	**548.0**	**695.0**
Source: Field Studies and Investigations									

3.2.18 Development Strategy

The water supply system will be based on ground water. Water will be pumped from the two boreholes to a sump located at Magabirano from which surface centrifugal pumps will deliver the water to the storage reservoir. Distribution from the reservoir tank will be by gravity to the consumers.

3.2.19 Well Development

The Ministry of Water and Environment through the Rural Water Supply and Sanitation Department carried out well siting, drilling and borehole construction of the production wells. Two boreholes were drilled in Kiziba village (Kasese and Magabirano boreholes) and recommended for utilisation as the water sources. The test pumping reports were provided and analysed. The results from the analysis of the test pumping reports are discussed below.

a) Kasese Borehole

Plate 1: The second borehole drilled in Kasese ward as the potential water source

It can be seen from Figure below. Step Tests Drawdown and Recovery for DWD-60890 Kasese Borehole that the well reached a drawdown of 117.8.m after step 4 (pump rate of 25m^3/h). The well however recovered 97% in 90 minutes.

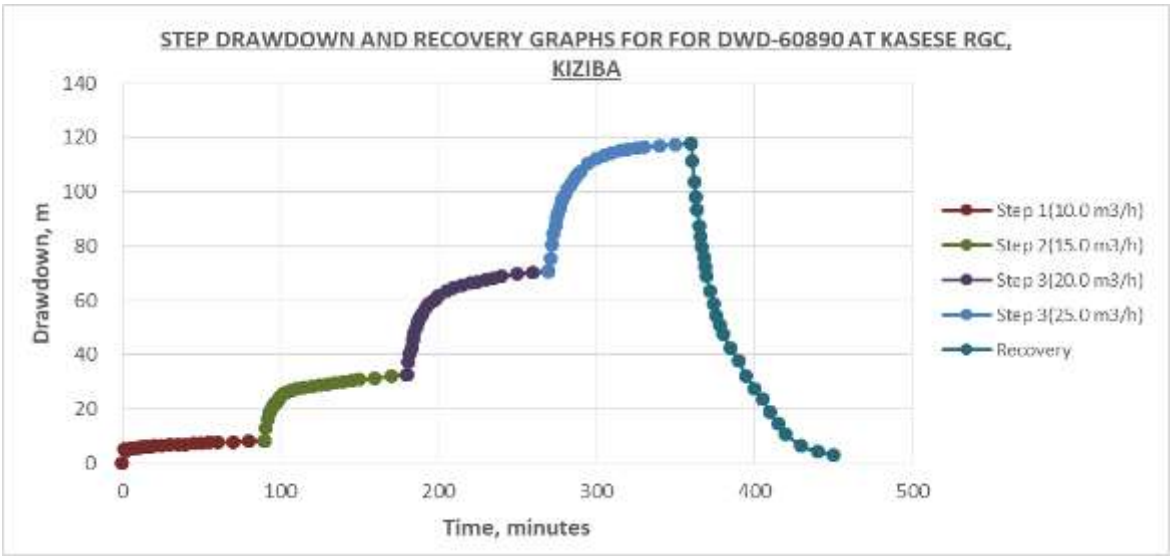


Figure 4: Step Tests Drawdown and Recovery for DWD-60890 Kasese Borehole

After 72 hours of constant pumping at 18m^3/h, the well reached a drawdown of 77.48m. It recovered 95% in 2 hours. The constant test pump drawdown and recovery is shown Figure below. The Figure shows that 100% recovery could be achieved in approximately 3 hours.

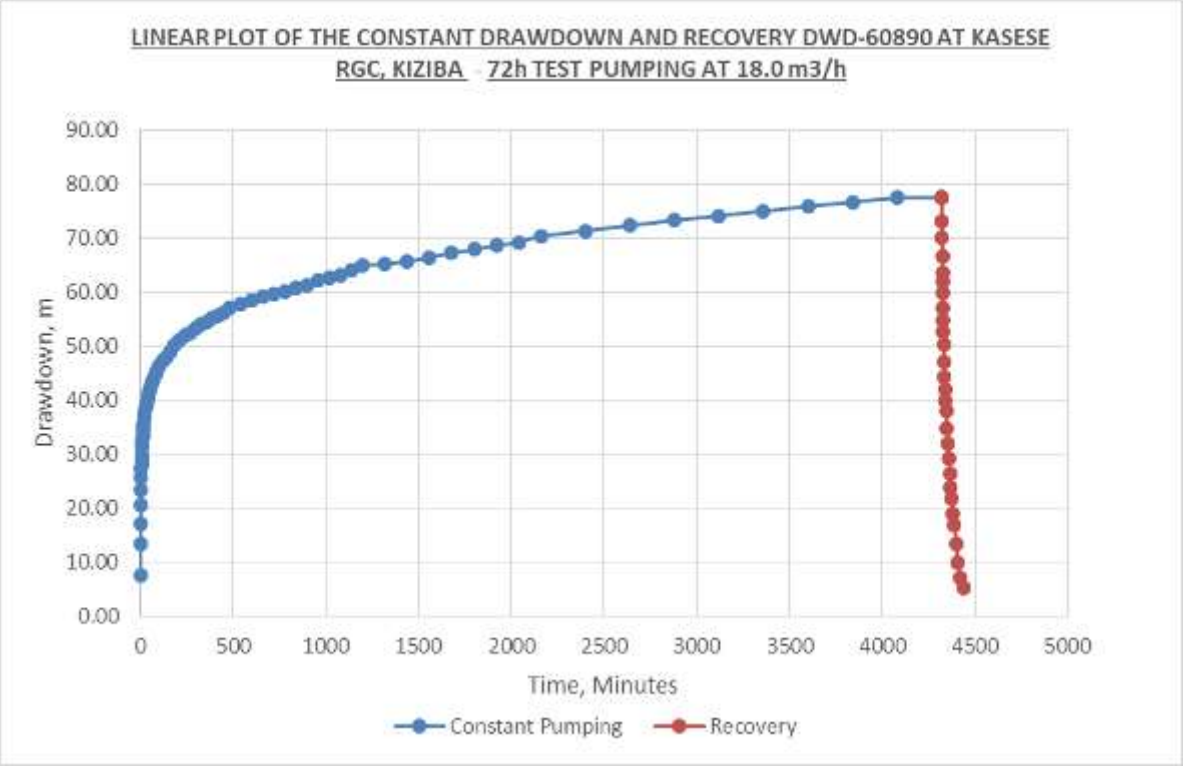


Figure 5: 72-HourTest Drawdown and Recovery for DWD-60890 Kasese Borehole

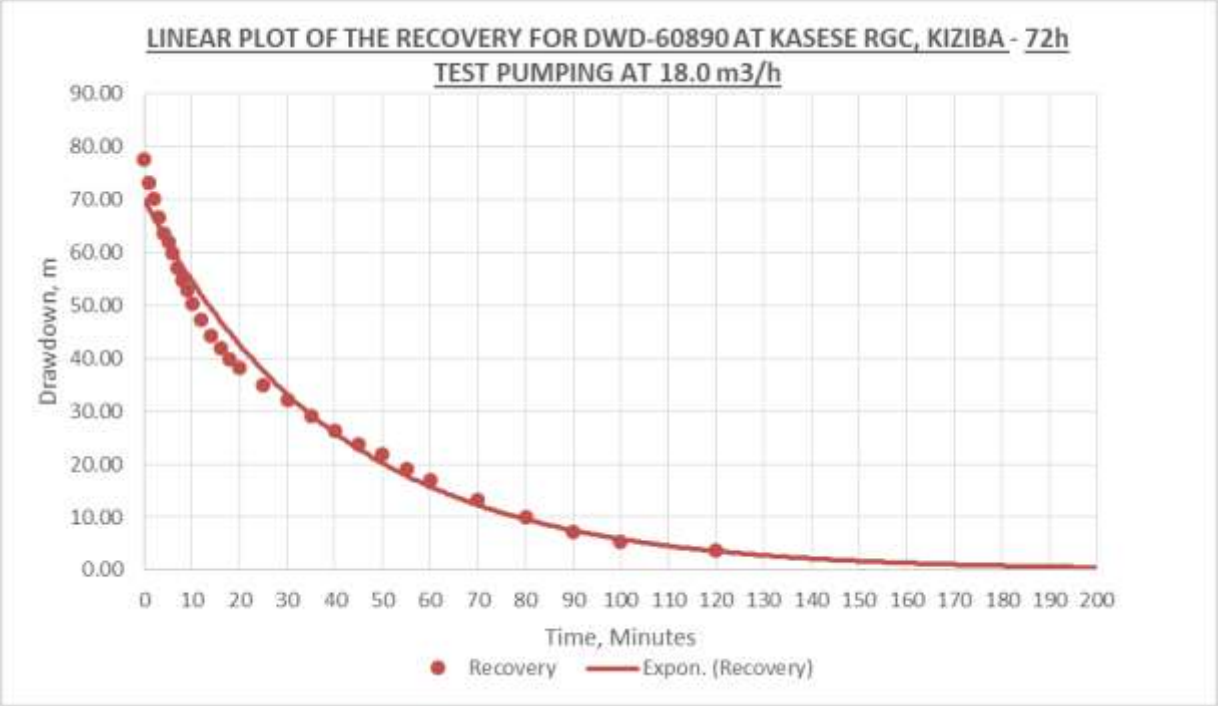


Figure 6: 72-Hour Test Recovery for DWD-60890 Kasese Borehole

It can therefore be concluded that it is safe to design the pump station and the pumping main using a flow of 18m^3/h. The summary of the test pumping report is shown in Table below.

Table 15: Summary of Test Pumping Results.

Summary of Data from test pumping operation	
Parameter	**Data**
Measured current Depth(m)	142.6
Pump Depth, (m)	130
Static water level (mbgl)	1.6m
Dynamic Water Level (mbgl)	79.08
Draw Down (m)	77.48
Recommended Pump Installation Depth (mbgl)	69m or 98
Discharge Rate (m^3/h)	18
Total Test Time (hrs)	72
Available draw down	128.4
Created Draw down out of Available drawdown	60.4%
Recovery	95% in 2hrs.

According to the test pumping report, it was recommended to install pump at 69m or 98m. The Consultant has recommended that the pump be installed at a depth of 100m.

b) Magabirano Borehole

Plate 2: One of the drilled boreholes as the potential water source in Magabirano cell

The well reached a drawdown of 81.72.m after step 3 (pump rate of $5.8m^3/h$) as shown in Figure below. The well was however able to recover only 80% in 120 minutes.

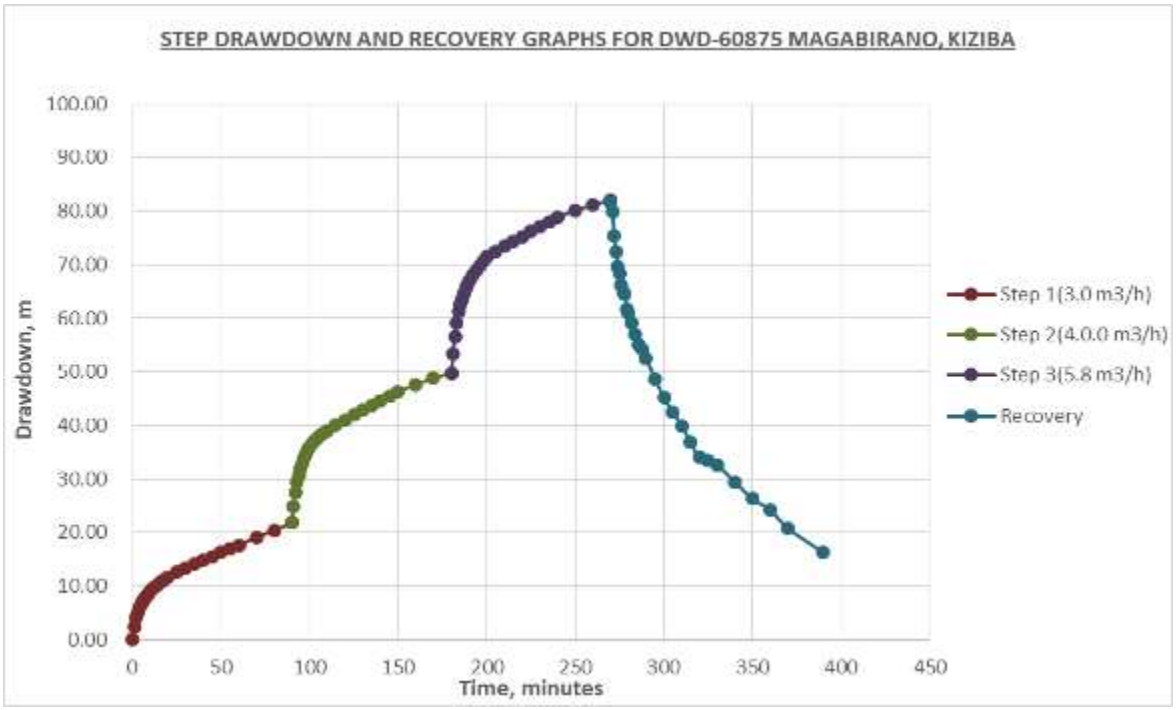


Figure 7: Step Tests Drawdown and Recovery for DWD-60875 Magabirano Borehole

After 72 hours of constant pumping at 4.0m^3/h, a drawdown of 79.74m was reached. It recovered only 72% in over 5 hours. The extrapolating the chart in Figure shows that 100% recovery would require a relatively long time.

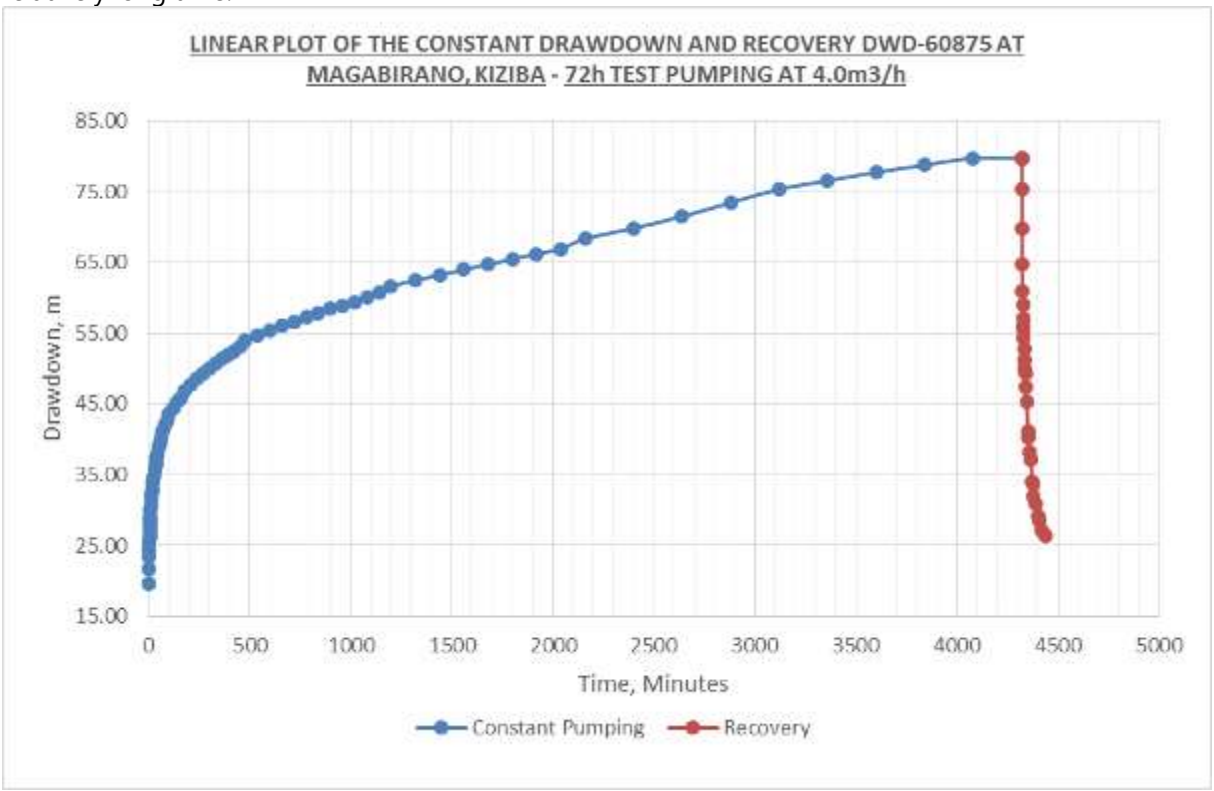


Figure 8: 72-HourTest Drawdown and Recovery for DWD-60875 Magabirano Borehole

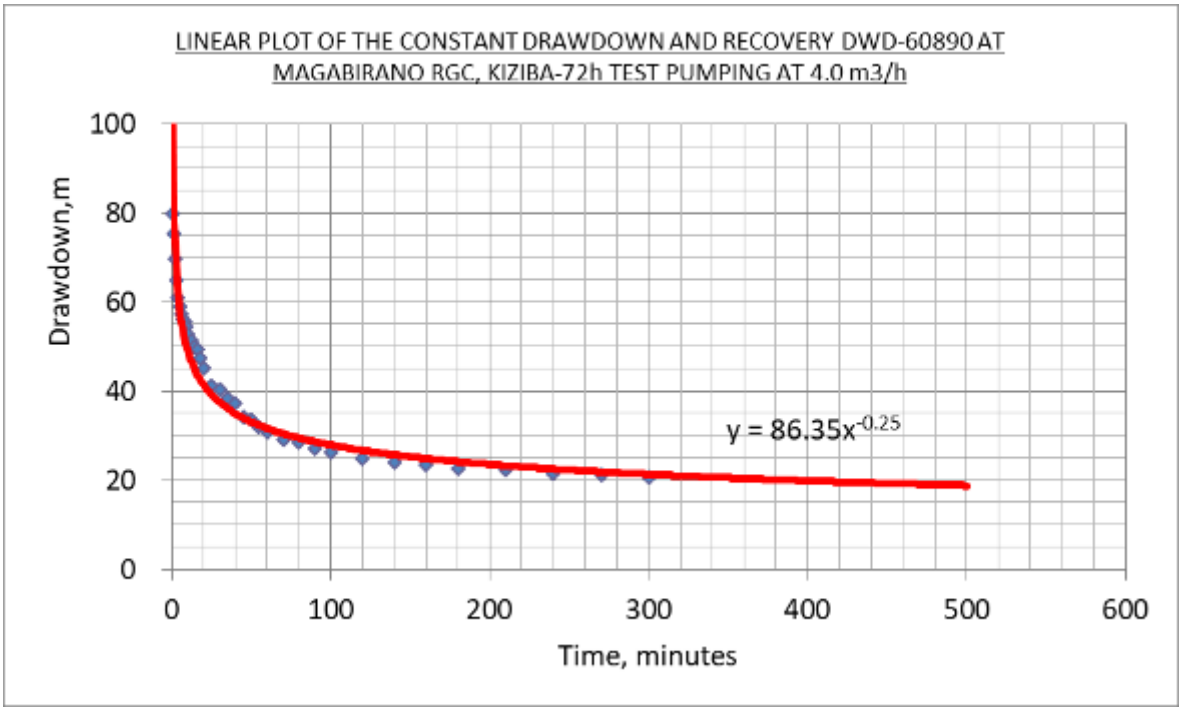


Figure 9: 72-Hour Test Recovery for DWD-60875 Magabirano Borehole

Given the scarcity of water in the area and the relatively little contribution this particular borehole makes to the production of water for the entire system, 100% of the test pumping yield (4.0m^3/h) was however used. This is because it requires less than 13 hours of pumping per day to satisfy the demand before the future year. It is therefore assumed that the borehole will therefore have significant time to recover. The summary of the test pumping report is shown in Table below.

Table 16: Summary of the Test Pumping Results

Parameter	Data
Measured current Depth(m)	151.70
Pump Depth, (m)	110
Static water level (mbgl)	21.28
Dynamic Water Level (mbgl)	101.02
Draw Down (m)	79.74
Recommended Pump Installation Depth (mbgl)	120
Discharge Rate (m3/h)	4.0
Total Test Time (hrs.)	72
Available draw down (m)	88.7
Created Draw down out of Available drawdown	89.9%
Recovery	74% in 5hrs

According to the test pumping report, it was recommended to install pump at 120m. The pump was therefore placed at the recommended depth during the hydraulic design of the pump and pumping main. The safe yields of the boreholes are therefore 4.0 and 18.0m^3/hr. An analysis of the borehole yield against the maximum day demand was carried out as seen in Table 17.

Table 17: Analysis of Available Groundwater vs Demand

Borehole No.	Location (Village)	Well Status	Borehole Yield (m^3/hr)	Abstraction (m^3/hr)	Pumping Duration (hrs)	Groundwater Supply (m^3/day)	Groundwater Supply Vs. Maximum Day Demand		
							2024	2034	2044
							Water Demand (m^3/day) per Year		
							236	298	378
Required Future Year Pumping Regime									
Supply Vs Demand									
DWD-60875	Magabirano	Newly Drilled	4.0	4.0	7	28.0	12%	9%	7%
DWD-60890	Kasese	Newly Drilled	18.0	18.0	7	126.0	53%	42%	33%
Total for All Available Wells			**22.0**	**22.0**	**7**	**154.0**	**65%**	**52%**	**41%**
Surplus(Deficit)(m^3/day)							***-82***	***-144***	***-224***
Surplus(Deficit)(m^3/h)							***-11.7***	***-20.6***	***-32.0***

Analysis of an alternative pumping duration of 13 and 16 hours was performed in Table below.

Table 18: Required Future and Ultimate Year Pumping Regime

Borehole No.	Location (Village)	Well Status	Borehole Yield (m^3/hr)	Abstraction (m^3/hr)	Pumping Duration (hrs)	Groundwater Supply (m^3/day)	Groundwater Supply Vs. Maximum Day Demand		
							2024	2034	2044
							Water Demand (m^3/day) per Year		
							236	298	378
13 Hour Pumping Regime									
Supply Vs Demand									
DWD-60875	Magabirano	Newly Drilled	4.0	4.0	14	56.0	24%	19%	15%
DWD-60890	Kasese	Newly Drilled	18.0	18.0	14	252.0	107 %	85%	67%
Total for All Available Wells			**22.0**	**22.0**	**13**	**308.0**	**131 %**	**103 %**	**81%**
Surplus(Deficit)(m^3/day)							***72***	***10***	***-70***
Surplus(Deficit)(m^3/h)							***5.6***	***0.8***	***-5.4***
16 Hour Pumping Regime									
Supply Vs Demand									
DWD-60875	Magabirano	Newly Drilled	4.0	4.0	16	64.0	27%	21%	17%
DWD-60890	Kasese	Newly Drilled	18.0	18.0	16	288.0	122 %	97%	76%
Total for All Available Wells			**22.0**	**22.0**	**16**	**352.0**	**149 %**	**118 %**	**93%**
Surplus(Deficit)(m^3/day)							***116***	***54***	***-26***
Surplus(Deficit)(m^3/h)							***7.3***	***3.4***	***-1.6***
Source: Field Study Estimates									

Table 19: Various Pumping Regime

System Flow	Unit	Years									
		2024	2028	2031	2034	2035	2036	2039	2040	2041	2044
		0	4	7	10	11	12	15	16	17	20
Maximum Day Demand	m^3/d	236	261	279	298	306	314	338	346	354	378
Production Capacity, 7h regime	m^3/d	154	154	154	154	154	154	154	154	154	154
Surplus (Deficit)	m^3/d	-82	-107	-125	-144	-152	-160	-184	-192	-200	-224
Production Capacity, 9h regime	m^3/d	198	198	198	198	198	198	198	198	198	198
Surplus (Deficit)	m^3/d	-38	-63	-81	-100	-108	-116	-140	-148	-156	-180
Production Capacity, 11h regime	m^3/d	242	242	242	242	242	242	242	242	242	242
Surplus (Deficit)	m^3/d	6	-19	-37	-56	-64	-72	-96	-104	-112	-136
Production Capacity, 13h regime	m^3/d	286	286	286	286	286	286	286	286	286	286
Surplus (Deficit)	m^3/d	50	25	7	-12	-20	-28	-52	-60	-68	-92
Production Capacity, 14h regime	m^3/d	308	308	308	308	308	308	308	308	308	308
Surplus (Deficit)	m^3/d	72	47	29	10	2	-6	-30	-38	-46	-70
Production Capacity, 16h regime	m^3/d	352	352	352	352	352	352	352	352	352	352
Surplus (Deficit)	m^3/d	116	91	73	54	46	38	14	6	-2	-26

The Table above the following should be noted that:

a) A combined borehole yield of 22.0m^3/h over 7-hour pumping regime imposed by solar would not be able to satisfy just the initial year demand (2024) of 236m^3/day. There will be a shortfall of 82m^3/d,144m^3/d and 224 m^3/d the initial, future and ultimate year respectively.
b) An alternative pumping regime of 13 hours per day would be sufficient up to the future year 2031.
c) An alternative duration of 14 hours however results in a supply deficit of 6m^3/d in the year 2036.
d) 16-hour pumping regime will result in a supply deficit of 2 m^3/d and 26 m^3/d in year 2041 and the ultimate year 2044 respectively.

The two boreholes will therefore be sufficient to supply the system up to the year 2041 basing on 16 hours of pumping. This therefore requires extending the grid power to the two pump stations. Another borehole will therefore be drilled to curb the deficit.

3.2.20 Water Quality Assessment

Water quality testing of the samples obtained from the drilled boreholes in Kasese and Magabirano villages was undertaken and the results availed to the consultant. The water samples were analysed for physio-chemical parameters at the National Water and Sewerage Corporation (NWSC) laboratory in Bugolobi, Kampala. The suitability of the proposed sources for drinking was characterized in accordance with the Uganda National Potable water standards (specifically US EAS12, 2014). Annex VI

show the results of the water quality tests of the proposed Kasese and Magabirano boreholes respectively.

The samples generally showed satisfactory results with all the parameter values meeting the National Drinking Water Quality Standards, hence no need for any treatment process. However, only chlorine disinfection has been proposed to ensure a residual chlorine to guard against contamination of the water in the extremity of distribution mains.

3.2.21 Design of Water Supply Interventions

a) Borehole Design Elements

The design of the infrastructure to extract and deliver water from the production boreholes includes:

- Construction of borehole pump houses, installation of submersible pumps and pipework.
- Pumping mains from the boreholes to the sump.
- Transmission main from the sump to the reservoir.
- Supply and installation of power requirements for the intake sites.
- Associated Borehole Pump House site works.

b) Borehole Pumps and Transmission Mains

The determination of the pump capacities for the production wells and sizes of the transmission mains were designed using Hazen-Williams Formula and a spread sheet was used to design the main requirements in the design year 2040. The detail of the calculation for the design of the borehole pumps and the main sizing is summarised in Table below.

Table 20: Raw Water Pump Details

Borehole Number	**DWD 60875 (Magabirano)**	**DWD 60890 (Kasese)**
Borehole Yield (m^3/hr)	**4.0**	**18.0**
Abstraction Rate (m^3/hr)**(100% of Borehole Yield)**	**4.0**	**18.0**
Hours of Pumping (hr)	16	16
Efficiency Pump (%)	58.7%	68.8%
Efficiency Motor (%)	75.5%	81.2%
Total Daily Delivery (m^3/day)	64	288
Pumping Main Section No. 01 (From Pump Installation Point to Ground Level at Borehole)		
Ground Level at Borehole (m AMSL)	1260.890	1272.530
Depth of Borehole (m BGL)	151.700	142.600
Dynamic Water Level (m BGL)	101.020	79.080
Pump Installation Depth in Borehole (m BGL)	120.000	100.000
Cwh	120	120
Pipe Details	**DN 50 PN30**	**DN 100 ST PN30**
Pipe Diameter ND (mm)	50.00	65.00
Pipe Diameter ND (m)	0.050	0.065
Flow in Pipe (m^3/hr)	4.000	18.000
Flow in Pipe (m^3/s)	0.001	0.005
Velocity (m/s)	0.57	1.51
Length of Pipe Section No. 01 (m)	**120.00**	**100.00**
Total Static Lift from DWL to the ground	101	79
Friction Loss (m)	1.33	4.99
Fittings losses - 10% (m)	0.13	0.50

Borehole Number	DWD 60875 (Magabirano)	DWD 60890 (Kasese)
Total Head loss in Section 01 (m)	**1.46**	**5.49**
Pumping Main Section No. 02 (From Ground Level at Borehole to Ground Level at Sump)		
Ground Level at Highest Point (m AMSL)	1261.89	1298.117
Ground Level at Sump(m AMSL)	1261.89	1261.89
Inlet Level at Sump (m AMSL)	1264.890	1264.890
Ground Level at Borehole (m AMSL)	1260.890	1272.530
Cwh	140	140
Pipe Details	**OD50 HDPE PN10**	**OD110 HDPE PN10**
Pipe Diameter ND (mm)	44.00	96.80
Pipe Diameter ND (m)	0.044	0.097
Flow through pipe section 02 (m^3/hr)	4.000	18.000
Flow through pipe section 02 (m^3/s)	0.001	0.005
Velocity (m/s)	0.73	0.68
Chainage at Manifold	0+050	2+715
Chainage at Borehole	0+000	0+000
Length of Pipe Section No. 02 (m)	**50.00**	**2,715.00**
Static Lift from Borehole Ground Level at Borehole to Sump	4	26
Friction Loss (m)	0.77	14.65
Fittings losses - 10% (m)	0.08	1.46
Total Head loss in Section 02 (m)	**1**	**16**
Total Pumping Head from Borehole to Sump		
Total Static Head from Borehole Installation Point to Sump	105.02	104.67
Total Head loss from Borehole Installation Point to Sump	2.31	21.61
Total Pumping Head from Borehole to Sump	**107.33**	**126.27**
Summary of the Design		
Total Length of Transmission		
DN 50 PN30	120	
DN 100 ST PN30		100
OD50 HDPE PN10	50	
OD110 HDPE PN10		2715
Capacity of pump in each borehole		
Head (m)	107	126
Flow (m^3/hr)	4.0	18.0
Power (KW)	**2.6**	**11.1**
Source: Project estimates.		

A simple cost analysis was performed to determine the least cost pipe size. The graph below shows the selection of the least cost pipe size.

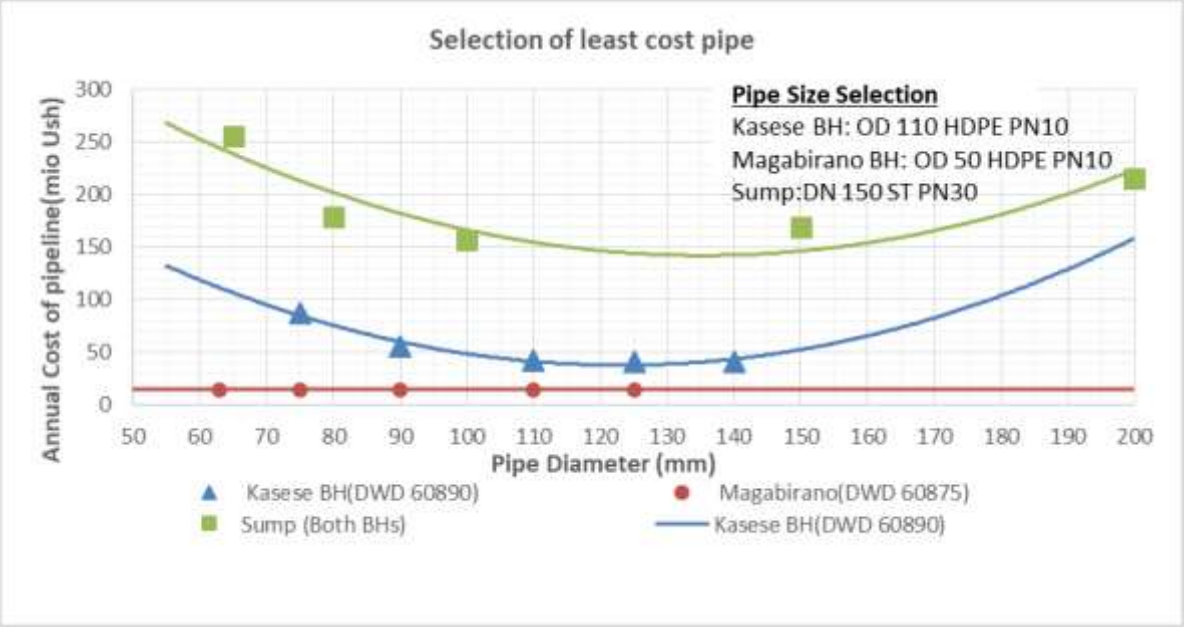


Figure 10: Selection of least cost pipe size

The pump houses should have the following characteristics,

- The pump houses are to be made in block work.
- The pump houses and all necessary auxiliary facilities are envisaged to fit on a size of land of about 3,600m^2.
- Fencing in chain link of about 120m and 240m each with 1No. double leaf access gate at Kasese and Magabirano respectively.

The boreholes will have a pump and transmission main with the following characteristics:

- Flow of 4.0 m^3/h at 107m head for the DWD 60875; borehole riser pipe of ND 50 ST PN30, 120m long; and pumping main of OD50 HDPE PN10, 50m long up to the sump.
- Flow of 18.0 m^3/h at 126m head for the DWD 60890; borehole riser pipe of ND 65 ST PN30 ,100m long; and pumping main of OD110 HDPE PN10, 2715m long up to the sump.
- Flow of 22.0 m^3/h at 266m head, ND 150 ST PN30, 5592m long; for the transmission mains from the sump to the reservoir.

The borehole pump house will be the standard 3.5m X 3.0m floor area pump house with a semi-detached office/storeroom giving a total floor area of 7.2m X 3.0m. The pump house will contain the associated pipework, fittings and electrical switch gear. A single roomed 3.0m X 3.0m floor area pump attendant and guard house with a drainable VIP toilet will also be constructed at the borehole sites. In addition, the sites will also contain the solar panels and the transformer for stepping down the grid power. It is estimated that the total area for the sites shall each be 3,600 m^2 (60m x 60m) at Kasese and Magabirano.

c) Sump and Pump House

A sump has been provided within the vicinity of the Magabirano Borehole. The sump has been provided at because of the following reasons:

- The sump is needed to collect water from the two boreholes. A common transmission main of was then designed to convey the water from the sump to the reservoir, a distance

of 5,592m away. This is because constructing two separate and lengthy transmission mains (a combined distance of 13,905m) from the two boreholes up to the reservoir was found to be more expensive.

- It would also allow for aeration of the water to take place. Aeration brings water and air in close contact and helps in removing dissolved gases (such as carbon dioxide) and oxidizes dissolved metals such as iron, hydrogen sulfide.
- The sump would also allow for the chlorination of the water. A chlorine dosing facility was provided at the roof of the sump to ensure dosage by gravity.

The design of the sump was performed as shown in Table below. The provided volume of the sump is 32.4 m^3. This is capable of holding water for a maximum of 90 minutes when the two boreholes are being pumped. The sump and pump house will be constructed as a single unit with the pump house housing the booster pumps which shall be a vertical centrifugal pump and electrical switch gear and drawing water from a collection tank (sump) while delivering it to the reservoir tank. Two pumps will be installed, to operate on duty/standby schedule. These will be electric multistage centrifugal surface pumps with the following main parameters: -

i) Flow 22.0m^3/hr, 266m head- To supply water up to the future year.

Table 21: Hydraulic Design of the Sump

Design of Sump			
Design Criteria			
S.No.	Particulars	Values	
1	Detention Time / Period	20.0 to	60 minutes
2	Length/Width Ratio	1.0 to	2 m
3	Depth of Well	1.0 to	3 m
6	Free Board	0.3 m	
Design Assumptions			
Detention Time		60 minutes	
Depth of Sump (m)		2.7	
Design Calculations			
Flow into the sump (m3/h)		22	
Required Volume of Sump (m3)		22.00	
Area of the Sump(m2)		8.15	
Length/Width Ratio		2.0	
Required Length of the Sump (m)		2.85	
Adopted Length (m)		4	
Required Width(m)		2.04	
Provided Width(m)		3	
Provided Area(m2)		12	
Height (m)		2.7	
Freeboard(m)		0.3	
Total Height (m)		3	
Summary			
S.No.	**Particulars**	**Values**	
1	Number of Sumps	1 Unit	
2	Length of Sump (m)	4	
3	Width of Sump (m)	3	
4	Total Height (m)	3	

d) Clear Water Pumping Mains

The clear water transmission main proposed is of Ductile Iron (DI) material owing to the extremely high pressures (266m) required to deliver water to the reservoir due to the nature of the terrain within the project area. **Error! Reference source not found.** below shows the calculation of the clear water main pump requirements.

Table 22: Clear Water Pump Details

Parameter	Clear Water Main Pumps
Combined Flow from the Boreholes(m^3/day)	**22.00**
Total Amount of Water Abstracted (m^3/day)	**22.00**
Hours of Pumping (hr)	13
Efficiency (%)	55.0%
Required Delivery (m^3/hr)	22.00
Required Delivery (m^3/s)	0.0061
Ground Level at Sump (m amsl)	1261.8900
Pump Installation Level (m amsl)	1261.890
Water Level in the sump (m amsl)	1263.890
Ground Level at Reservoir (m amsl)	1516.200
Inlet Level (m amsl)	1521.860
Static Lift (m)	258.0
Hazen Williams Coefficient, Cwh (C)	120
Pipe Details	**DN 150 ST PN30**
Pipe Diameter (mm)	150.00
Pipe Diameter (m)	0.150
Velocity (m/s)	0.346
Flow in Pipe (m^3/s)	0.0061
Length of Pipe (m)	**5592**
Friction Loss (m)	6.9
Fittings losses - 10% (m)	0.7
Total Friction Loss (m)	7.6
Total Head in Clear Water Main (m)	**265.6**
Head Used for Clear Water Mains (m)	**266**
Power (kW)	**29.0**
Source: Project Estimates	

e) Energy and Power

Solar energy has been proposed. However, grid power will have to be extended to the boreholes to extend the pumping durations as solar alone is not able to satisfy the existing and projected water demand. The power requirement of the pumps has been calculated using the formula seen in Table below.

Table 23: Pump Power Requirement Equation

P= [ρ x g x h x Q/3600]/(e1 x e2)
Where;
P is required input power (Watts)
ρ is water density (kg/m^3) = 1000
g is gravity constant (m/s^2) = 9.81

h is pump head (m)
Q is pump capacity (m^3/hr)
e1 is efficiency of pump = taken from selected pump details
e2 is efficiency of pump motor = taken from selected pump details

The pump power requirement is summarized in Table below.

Table 24: Pumps Requirements

Item	Head (m)	Flow (m3/hr)	Power (kW)
DWD 60875 (Magabirano)	107	4.0	2.6
DWD 60890 (Kasese)	121	18.0	10.7
Sump Surface Pumps	266	22.0	29

The solar radiation of Rakai which is about 4.45kWh/m^2/day (equivalent to 6.5 peak sun-hours) was used for calculating its solar energy demand. Solar radiations have daily and seasonal variations. It can be seen from **Error! Reference source not found.** that November is the worst-case month with the lowest average monthly radiation of 133.42kWh/m^2/month. The design month for the solar components was therefore November.

The calculation of the required was performed using the equations shown below and the required solar components are shown in **Error! Reference source not found.** below.

$$Required\ Number\ of\ Solar\ Panels = \frac{Pump\ Energy\ Requirement(kWh)}{Energy\ Captured\ by\ 1\ Solar\ Panel\ (kWh)} \times F.O.S$$

$$Pump\ Energy\ Requirement = Motor\ Power(kW) \times No.of\ Peak\ Sun\ Hours\ per\ Day(h)$$

$$Energy\ Captured\ by\ 1\ Panel = Panel\ Power\ Rating \times \frac{Solar\ Irradiance}{1000} \times No.of\ Peak\ Sun\ Hours$$

Table 25: Monthly Averaged Radiation for Rakai (kWh/m2/day)

Global Monthly Radiation at a Slope of 100(kWh/m2)										
Month	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**Total**	**Average**
January	159.8	158.6	146.63	134.73	134.86	157.57	145.76	177.05	1215	**151.875**
February	160.84	141.96	133.09	138.49	142.75	137.21	163.97	156.91	1175.22	**146.9025**
March	146.37	148.36	175.67	155.98	158.3	161.47	156.54	171.11	1273.8	**159.225**
April	162.62	129.99	150.87	153.4	145.17	160.9	156.69	143.54	1203.18	**150.3975**
May	143.99	154.42	146.48	157.17	157.79	153.35	151.4	141.24	1205.84	**150.73**
June	160.63	172.04	148.46	169.75	179.28	157.38	170.07	165.79	1323.4	**165.425**
July	178.76	162.7	159.7	173.27	188.12	181.53	185.83	184.88	1414.79	**176.84875**
August	167.98	166.74	160.67	147.82	176.85	178.68	149.74	163.04	1311.52	**163.94**
September	163.42	156.23	146.87	154.86	142.62	157.58	141.86	152.64	1216.08	**152.01**
October	157.83	154.72	143.03	146.05	143.07	151.94	143.68	153.44	1193.76	**149.22**
November	137.42	110.28	140.44	136.43	129.83	138.91	139.06	135.01	1067.38	**133.4225**
December	154.88	125.3	142.08	143.18	119.89	144.6	140.9	137.44	1108.27	**138.53375**
Source: EU Photovoltaic Information System (PVGIS)										

Table 26: Pump Solar Requirements

Parameter	**DWD 60875 (Magabirano)**	**DWD 60890 (Kasese)**	**Sump**
Pump			
Head, m	107	126	266
Flow, m^3/h	4	18	22
Efficiency of Pump+Motor	45%	75%	55%

Parameter	DWD 60875 (Magabirano)	DWD 60890 (Kasese)	Sump
Calculated Motor-Pump Power, kW	2.60	8.26	28.99
Rated Power of Motor, kW	3	8	29
Hours per day	7	7	7
Daily Energy Requirements, kWh/day	21	56	203
Voltage, V	3phase-440	3phase-440	3phase-440
Sun Radiations			
Design Month	November	November	November
Location	Rakai	Rakai	Rakai
Total Monthly Radiation (November), kWh/month	1067.38	1067.38	1067.38
Average Monthly Radiation, kWh/month	133.42	133.42	133.42
Average Daily Radiation, kWh/day	4.45	4.45	4.45
Peak Sun Hours	6.5	6.5	6.5
Average Hourly Radiation, kW	684.22	684.22	684.22
Solar Array			
Selected Panels	275wp	275wp	275wp
Nominal Voltage, V	24	24	24
Maximum Power Voltage	31	31	31
Short Circuit Current	9.36	9.36	9.36
Rated Maximum Power(at standard test conditions (1000w/m^2),W	275	275	275
Actual power (at 684w/m^2), W	188.2	188.2	188.2
Daily Energy Captured (7 hours), Wh/day	1317.12	1317.12	1317.12
Safety Factor	1.2	1.2	1.2
Required Number of Panels	19	51	185
Provided Number of Panels	19	54	190
Array Configurations/Solar Panel Strings			
Number of Panels in Series	19	18	19
No of Panel Parallel Strings	1	3	10
Total Voltage, V	456	432	456
Total Current, A	9.36	28.08	93.6
Inverter			
Rated Power , kW	3.3	8.8	31.9
Cables			
Rated Voltage of Motor, V	440	440	440
Maximum Voltage Drop, DU, V	5%	5%	5%
Rated Current of Motor, A	5.5	17.5	65.1
Cable Length, m	140	140	140
Power Factor, cos(phi)	0.85	0.85	0.85
sin(phi)	0.53	0.53	0.53
Inductive Resistance, W/m	0.000078	0.000078	0.000078
Specific resistance, W mm^2/m	0.02	0.02	0.02
Minimum Cable Area, mm^2	1.03	3.28	12.19
Provided Cable Area, mm^2	10	10	16

The power requirement includes the supply and installation of mono crystalline PV Solar panels each rated at 275W 24 Volts DC, including: PV solar panel support structure (solar array) for mounting solar panels; all electrical accessories; complete as per specifications. It is assumed that the solar power will be operational for 7 hours and since there exists grid power which will also be utilised to extend the pumping regime.

A cost analysis for the available energy options, that is solar only, grid power only and a combination of grid power and solar power (hybrid system) was performed as shown in Table below. A 20-year life-time energy cost of HEP was calculated as shown in Table 27 for the third option. It was assumed that

the grid power will be used for the extra pumping hours required, stretching from 3 hours in the initial year to 10 years in the ultimate year.

i. Option I (Solar Energy Alone)

It can be seen from
overleaf that Solar energy requires a relatively high capital investment cost (Ush 360 million) but a small operation and maintenance cost of Ush 4 million, amounting to a lifecycle cost of Ush 364 million over the 20-year period. Despite the relatively low cost of solar, the option of using solar would not be able to supply enough water to satisfy the demand as it is limited to a maximum of 7 hours a day, hence the need for grid power.

ii. Option II (HEP Alone)

Grid power on the other hand has a lower capital investment cost (Ush 308 million) but very high operation costs (Ush 2,334 million), in terms of utility bills. This option will therefore result in a lifecycle cost of 2,642 million.

iii. Option III (A Hybrid System)

The last option involves using a combination of solar and grid power, with the grid power being used to extend the pumping duration to curb the water deficit when using solar alone. The lifecycle investment and operation cost of the solar components amounts to Ush 364 million and the one for the HEP components is Ush 1,450 million. The total lifecycle cost of this option is therefore Ush 1,814 million.

In conclusion, the best energy option that satisfies the water demand turned out to be the hybrid system as it is the least expensive and can also guarantee reliability of the system. In conclusion, the best energy option that satisfies the water demand turned out to be a hybrid system of both solar and grid power as it is the least expensive and can guarantee reliability of the system

Table 27: Pumps H.E.P requirements

Item	2024	2027	2030	2033	2034	2037	2040	2043	2044
Water Produced (in '000 m^3 / year)	86.1	92.4	99.2	106.4	109.0	117.0	125.5	134.7	138.0
Pumping hours per day	10.7	11.5	12.3	13.3	13.6	14.6	15.6	16.8	17.2
Hours of HEP per day	3.7	4.5	5.3	6.3	6.6	7.6	8.6	9.8	10.2
Percentage of Hours of HEP per day	35%	39%	43%	47%	48%	52%	55%	58%	59%
Energy Costs (USh mio. / year)	30.1	36.5	43.4	50.7	53.3	61.3	70.0	79.3	82.5

Table 28: Capital Investment and Operation& Maintenance Costs of the Energy Sources

Option	Solar Only-7 hours						Remarks
1		**Component**	**Unit**	**Quantity**	**Rate (millions)**	**Amount (millions)**	Insufficient to meet Demand
	Investment Costs	Solar Panels and Accessories	No.	262	1.375	360	
	Operation and Maintenance	Operation and Maintenance	%	1	1%	4	
	Total					**364**	
2	**HEP ONLY-16 hours**						Sufficient to meet demand
	Investment Costs	Extending HEP	km	4	52	208	
		Transformer and Accessories	No.	2	50	100	
		Sub Total				308	
	Operation and Maintenance	Energy Cost	year	20	117	2,334	
		Sub Total				2,334	
	Total					**2,642**	
3	**HEP+ SOLAR (Hybrid)**						
	Solar Components						Sufficient to meet
	Investment Costs	Solar Panels and Accessories	No.	262	1.375	360	

Option	Solar Only-7 hours						Remarks
	Operation and Maintenance	Operation and Maintenance	%	1	1%	4	demand
		Sub Total				**364**	
	Investment Costs	Extending HEP	km	4	52	208	
		Transformer and Accessories	No.	2	50	100	
		Sub Total				**308**	
	Operation and Maintenance	Energy Cost	year	20	57	1,142	
		Sub Total				1,142	
	Total					**1,814**	
Source: Project Estimates							

f) Disinfection Facilities

Disinfection of the water from the production wells will be effected by the installation of an Electrolytic Disinfecting Machine, as in MIOX on-site generator or equivalent, capable of the automatic electrical generation of up to 5kg/day, 100% free-available chlorine disinfectant solution from a common salt (NaCl) brine solution at a flow rate of 22l/h complete with chlorine dosing pump unit.

g) Storage Reservoir

The required storage capacity has been computed as 40% of the maximum day demand since these are small rural settings whose water demand will rapidly increase with increase in income levels as the areas develop into bigger trading centres and later on towns. The required storage capacity is 142m^3. However, a 162m^3 main reservoir has been adopted due to the fact that the 142m^3 tank does not exist on the market. The reservoir's storage capacity at various stages of the design period is reflected in Table below.

The proposed location of the reservoir is in Kiziba RGC and the land requirements is 15 meters X 30 meters of permanently acquired land. The coordinate of the reservoir site is 9,907,811.04N, 304,320.66E. This is the location that would ensure that every part of the network receives water with at least a pressure of 10m, even at hours of peak flows. It is proposed to elevate the reservoir to a height of 6m only. At that height, the nearest settlement is still able to receive water at the required pressure head of 10m, hence it was not necessary to place the reservoir higher than 6m above ground.

Table 29: Reservoir Storage Capacity

Item	2024	2034	2044
MD Demand- m^3/day	236	298	378
Storage Capacity (m^3)	162	162	162
Hours of Storage	16	13	10
Storage Capacity (%)	69%	54%	43%
Source: Project Estimates			

The reservoir will be made of square cold pressed steel panels of length 1.00m and shall be provided with inlet, overflow, outlet, and drain pipe work. The following fittings shall also be provided for the reservoir;

a) Internal ladder of aluminium;
b) Wall mounted level indicator;
c) Vents on the tank roof;
d) Roof level access cover of galvanised steel; and
e) 1 No. Lightning Arrestor.

The access covers shall be at least 100 mm above the finished level of the roof and shall be lockable. The roof vents shall be similarly set out and shall be fitted with vermin proofing and mosquito proofing fabric.

The overall internal dimensions of the reservoir (162m^3) are as follows: -

i) Length - 8.0m;
ii) Width - 7.0m; and
iii) Depth - 3.0m.

The pipe work (rated PN6) of the reservoir shall be in Epoxy Coated Steel Pipe work as follows;

1) Inlet - DN 150;
2) Outlet - DN 100;
3) Overflow - DN 200; and
4) Drain - DN 100.

h) Main Reservoir Site Works

The site works at the reservoir consists of the following:

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

The outlet from the main reservoirs shall be fitted with new bulk flow meters. The site layout drawings for the respective reservoir are presented in Annex IV.

i) Distribution Network

The distribution network has been analysed and sized using Epanet V2.0. This Water Distribution Modelling Software has been used due to its interoperability with AutoCAD and ARCGIS. The model was analysed by performing an Extended-Period Simulation (EPS) over a 24-hour period. A flow pattern using Diurnal Demand was adopted with consideration of the selected peak hour factor and in reference to the MWE Manual 2013. Simulations were done for Night flows (Night flow factor= 0.5), Normal Flows (Normal Flow Factor = 1.0 - 1.5) and Peaked Flows (Peak Flow Factor = 2.0). The network was designed for those areas with defined access roads but the possibility of extending it was catered for since the project area is expected to expand. Consequently, the smallest size of pipe chosen in the distribution network is OD 50 HDPE. Pipes smaller than this will be laid as network intensification lines.

Table below shows the sizes and length of the distribution pipes while **Error! Reference source not found.** overleaf shows the Epanet Model whose details are attached in the Annex V.

Table 30: Distribution Mains

Pipe type	Diameter (mm)	Length (m)
HDPE PN10	OD 50	3,495
HDPE PN16	OD 50	16,986
	OD 63	368
	OD 75	3,552

	OD 90	3,480
uPVC PN10	OD 110	1,740
Total	-	**29,621**

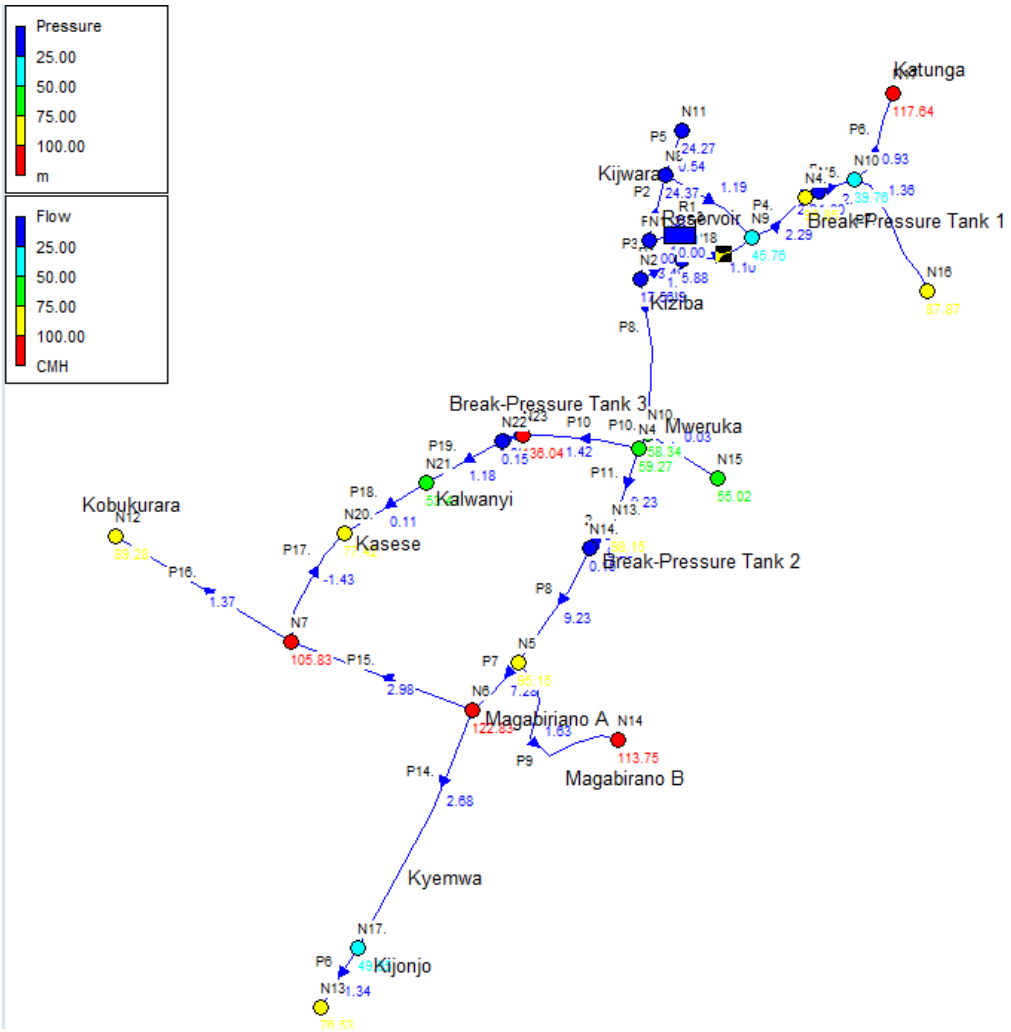


Figure 11: Kasese RGC Cluster Epanet Distribution Network Model

j) Break-Pressure Tanks

In order to limit the maximum pressure in a pipeline and thus the cost of the pipes, three break-pressure tanks were introduced to limit the pressure by providing an open water surface at certain places along the pipeline. The capacity of the break-pressure tanks will be 1m^3 and will be made of masonry. The tanks will be provided with float valves, overflow and washout valves. The table below shows the locations of the break-pressure tanks that have been provided.

Table 31: Population per Category Criteria

Break Pressure Tank	Location	Chainage	Elevation	Hydraulic Head	Static Head
BPT1	Distribution Main3	2+405	1407.45	1521.25	113.18
BPT2	Distribution Main 1	2+940	1408.80	1521.25	112.45
BPT3	Distribution Main 4	0+560	1376.09	1521.25	145.16

k) Service Connections

The location of the service pipes will not be known until applications for connections are received. At this stage, only an estimate of the sizes, quantities and costs can be given. On the basis of the population to be served, the total number of connections required in the ultimate 2044 has been estimated as in **Error! Reference source not found.** below. The population served by the system is given in above. The criteria used to determine the number of service connections for each served population category is as follows.

Table 32: Population per Category Criteria

Category	Population Served	Source of Criteria
House Connection	5 persons per household	Socio-Economic Study Data
Yard Taps	1 Households per yard tap	Project Estimates
Standpipes	200 persons Per Standpipe	Maximum Number- DWD Water Manual 2013
Urban Poor	150 persons per Standpipe	Standpipe coverage

The required number of service connections is given below in Table.

Table 33: Required Service Connections

Served Population				
Year	**House Conn**	**Yard Tap**	**Stand Pipe**	**Total**
2024	32	159	6,167	**6,358**
2034	70	304	7,422	**7,796**
2044	116	501	8,938	**9,556**
Number of service connections				
Year	**House Conn**	**Yard Tap**	**Stand Pipe**	**Total**
2024	6	32	31	**69**
2034	14	61	37	**112**
2044	23	100	45	**168**

A total of 168 No. service connections shall have been made in the RGC by the ultimate year 2044 as seen in **Error! Reference source not found.** above while 69 are anticipated in the initial year 2024. It has been assumed that the connection materials will be supplied by the project on the payment of the connection fees. The number and location of the public stand posts will be determined during the construction period.

l) Network Intensification

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

m) Geotechnical Investigation and Structural Design

In order to ensure the structural integrity of the storage reservoir, geotechnical investigations were carried out at the reservoir and sump locations. The primary purpose of this study was to determine the stratigraphic characteristics of the site based on field observations and laboratory tests for the proposed development including the bearing capacities of the site from the Light-Weight Dynamic Penetrometer (DPL) results. The field work involved intrusive site works, in-situ testing and sampling.

The field work was followed by geotechnical laboratory testing of the sampled materials. The two sites that were investigated have soil properties that will support the structures to be installed without any modification, save for minor earth works and landscaping. The Consultant was able to design in detail the tank structures based on the bearing capacity obtained for the site.

n) O&M Tools and Equipment

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

i) Plumbing Tools and Equipment;
ii) Mechanical Tools and Equipment;
iii) Electrical Tools and Equipment;
iv) Miscellaneous Tools; and
v) Chemical Equipment and Chemicals.

The proposed tools and equipment are listed in Table below.

Table 34: Tools and Equipment

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
PE 2.1	Blowlamp: pump action, pressure type, approx. 0.5 litre capacity, complete with wind proof nozzle and one set of replacement parts	No.	1
PE 2.2	Brushes, wire type for cleaning parts, 300 mm long, 3 rows of approximately15 tufts with 25 mm long steel bristles	No.	2
PE 2.3	File, flat machinist's, length 250 mm, second cut	No.	1
PE 2.4	File, flat machinist's, length 250 mm, smooth cut	No.	1
PE 2.5	File, flat machinist's, length 250 mm, bastard cut	No.	1
PE 2.6	File, half-round machinist's, length 250 mm, smooth cut	No.	1
PE 2.7	File, half-round machinist's, length 250 mm, but bastard cut	No.	1
PE 2.8	File handles, 100 x 27 mm	No.	2
PE 2.9	Hammer, mechanic's, 200 & tempered forged steel head, ash or white hickory handle, polished face	No.	1
PE 2.10	Mattocks	No.	2
PE 2.11	Pliers, arc joint, minimum 5 adjustments, 240 mm long	No.	2
PE 2.12	Saw, Plumbers, 400 mm, fine tooth edge for cutting metal and coarse teeth for cutting wood, complete with 5No. blades	No.	2
PE 2.13	Screw drivers, assorted, hammer-proof, non-inflammable plastic handle	Set	2
PE 2.14	Shovels	No.	2
PE 2.15	Tape measure, Stanley type steel, metric units, 5 m	No.	2
PE 2.16	Tapping machine, furnished with ratchet crank for manual operation, for making tappings from DN 15 (1/2") to DN 50 (2") on mains of DN 25 (1") to DN 300 (12")	No.	1
PE 2.17	Die set with stock, for threading from DN 15 to DN 150	No.	1
PE 2.18	Vice with parallel jaw 100 mm as Peddinghaus, Matador 10203, portable type, with tripod stand	No.	1
	WATER QUALITY TESTING KIT		

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
QE 3.1	Portable analysis kit such as Potalab 1 (Wag-WE10010) of M/s Wagtech International or similar with reagents to carry out 300 tests for microbiological and physico-chemical testing	Set	
	MISCELLANEOUS TOOLS		
MT 4.1	Contractor's pick axe with point and chisel steel end, length 800 mm	No.	2
MT 4.2	Steel hoe, blade width 200 mm, 1.5 kg complete with good wooden handle	No.	2
MT 4.3	Seamless pressed tray wheelbarrow, steel frame, with pneumatic wheels, 80 litres	No.	2
MT 4.4	33CC 2-Cycle Petrol-Powered engine Straight Shaft Attachment Capable String Lawn Trimmer with 17-inch cutting path (including 10No. replacement trimmer lines)	No.	1
MT 4.5	Steel rakes	No.	3
	CHEMICAL EQUIPMENT AND CHEMICALS		
CE 5.1	Stainless steel graduated (metric) buckets (10 litres)	No.	2
CE 5.2	Stainless steel scoops for scooping chemicals - 1 kg capacity	No.	2
CE 5.3	Food Quality Common Salt (NaCl) in 50Kg Sacks	No.	4

3.3 Construction Activities

a) Project Phases

- *Mobilization Phase* - This phase will involve mobilization of the construction human resource (approximately 15-20), equipment, construction materials, erection of temporary worker's camp and storage yard. The location of the project temporary camp will be agreed upon with the local leadership, landowners and contractor.
- *Construction Phase* - All project activities under this phase are supposed to be carried along the tracks, route and access paths within the boundaries of the identified project sites without disturbing or obstructing the neighbors and businesses. To ensure this, the contractors will seal off the site perimeter with corrugated iron sheets or other suitable material during project implementation. In case of trenches, proper barricade has to be applied to warn and protect the people of impending dangers of falling into open pits and trenches. Upon completion of preliminary activities and on-site investigations, actual construction of the project components and facilities will start which will involve:
    - Setting out to demarcate rights of way, work areas, clearing limits. Access paths, detours, bypasses and protective fences or barricades should all be in place before construction begins.
    - Excavation of trenches for water pipe lines;
    - Trench sheeting and bracing to protect collapsible trench side walls;
    - Placing concrete to bases of foundations;
    - Laying of mains water pipes; and
    - Backfilling, disposal of overburden and surface restoration to at least match the condition that existed prior to the water works construction.
- *Demobilization Phase* - Demobilization phase will involve clearing of the project site of all construction and unwanted material. The disposal of any unwanted material will be done by the contractor. The waste materials may include packaging, wood, steel crates, cardboard, wrapping materials, construction debris, boxes, sacks, drums, cans and chemical containers, etc. Damaged areas will need to be restored before commissioning the project. Upon

completion of the contractor's obligations, the contractor will hand over the project to MWE, the client.

- *Operation Phase* - This will involve employment of operators both skilled and unskilled, operation of the water supply system, maintenance of the facilities put in place, etc.

b) Construction Method

The actual choice of construction method and resources will be the Contractor's responsibility as dictated by the site conditions, productivity and construction schedule. The choice has a bearing on the cost implication. In all construction activities safety of operations is paramount. It entails carrying out of construction activities and operation of equipment by experienced personnel under supervision of experienced and qualified staff and use of well serviced construction equipment in good working condition. Safety on site will be managed by close supervision of the contractor's Health & Safety Officer and the Engineer's construction Supervision staff of the site activities with regard to the working environment in accordance with the applicable Environment, Safety, Health and Social Safeguard Policy.

c) Plants and Equipment

Because of the nature of the construction activities that will be undertaken, a number of plants and equipment will be used to execute the assignment by the contractor or the sub-contractor(s) and these will include among the following: Graders, Vibrators /Rollers, Water Trucks, Bulldozers, Front End Loader, Vehicles, Containers, Excavators, Water Pumps, Mechanical Tool Boxes, Civil Plate Compactors, Dump truck, Concrete Mixer, Crane and Compactor.

d) Earthworks

The earthworks including site clearance, general filling and excavation, and trenching can be carried out either by manual labor or mechanical equipment where large quantities are involved.

e) Concrete works

Concrete production is expected to be by the use of concrete mixers and/or manual production for the small works and where use of a mixer may be impractical.

f) Structural Steel

The lifting of heavy structural steel sections will be by cranes. The steel sections will be joined by either bolts or welding.

g) Reinforcement Steel fixing

Various sizes of reinforcement steel bars will be cut to required lengths and bent to design shape either manually or by machines and will be placed and fixed for the works by manual labour.

h) Masonry

All masonry work is to be by manual labor using the necessary hand tools.

i) Pipe laying

Pipe laying is expected to be carried out by manual labor using the necessary hand tools and pipe lifting equipment for the heavy pipes.

j) Electro-Mechanical Installations

All electro-mechanical installations are to be carried by manual labor using the necessary hand tools and mechanical lifting equipment.

k) Implementation Schedule

The main objective is to determine a total duration of the project, which equals a "critical path" of events that determine the total duration. The anticipated implementation schedule is as per Table 35.

Table 35: Implementation Schedule

Activity	Duration (Months)
Tendering Process	4
Tender Evaluation	
Contract Negotiation and Award	
Construction of Works	20
Defects Liability Period	12
Total	**36**

3.4 Quality Assurance

It is the responsibility of the supervising consultant to ensure that the desired quality of work is achieved. The materials supplied for the works should not deviate from those specified. At each stage during the construction process, samples of materials have to be taken to the Materials Laboratory for testing to ensure conformance to the specifications.

4. ESIA METHODOLOGY

4.1 Introduction

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

The requirement for environmental impact assessment in Uganda is set out by the *National Environment Act No. 5 of 2019* and the *Environmental and Social Impact Assessment Regulations of 2020*. This process was guided by the Environmental Impact Assessment (EIA) Guidelines (NEMA, 1997) and the process is schematically presented in Figure 12.

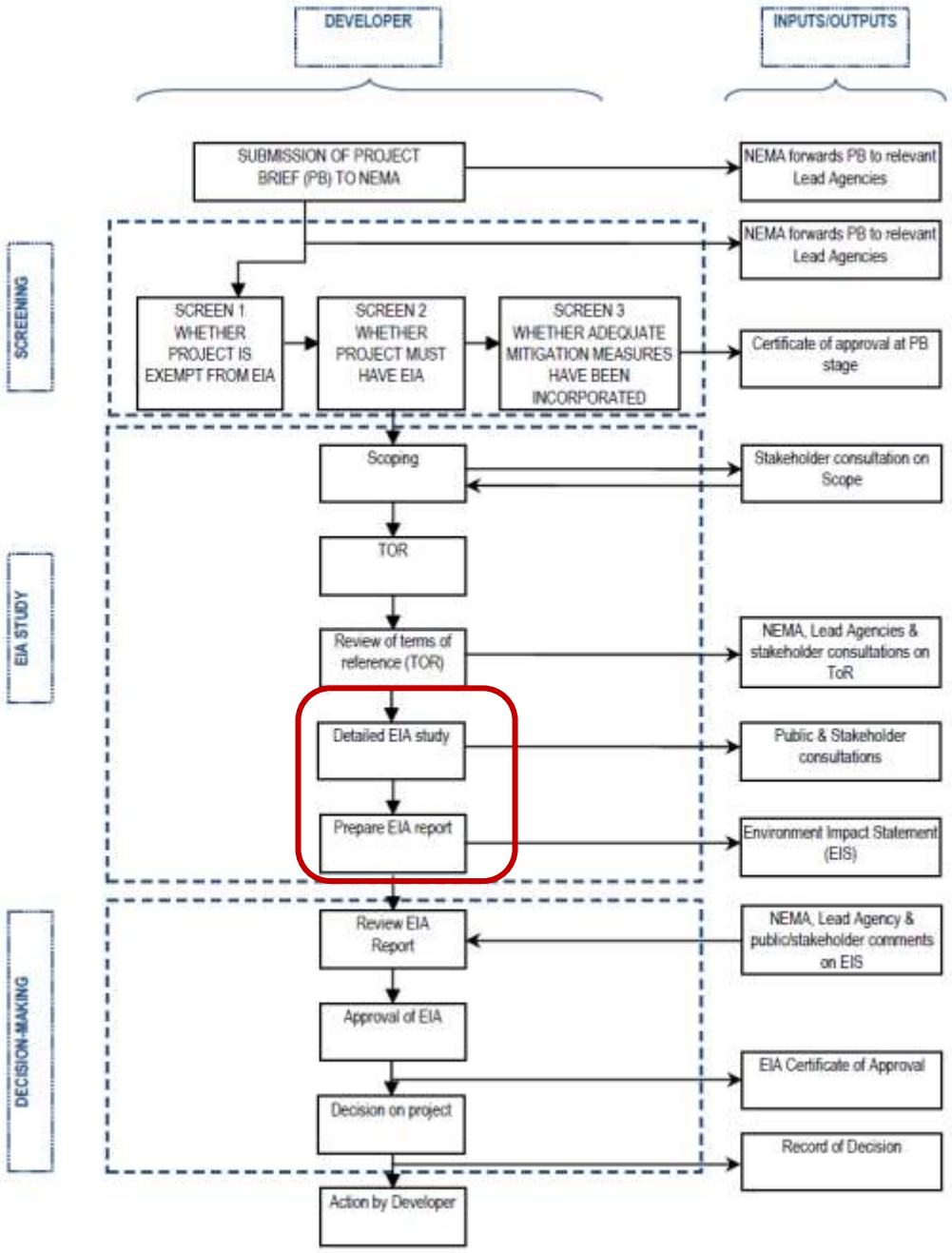


Figure 12: ESIA process that was adopted as provided for under the Laws of Uganda

4.2 Physical Environment

Baseline noise levels and air quality were measured, not only to inform construction contractors about pre-construction conditions existing at proposed sites, but also the first annual environmental audit. Water quality analysis results obtained at the design stage have been adopted in this ESIA report. These were determined through the following actions:

4.2.1 Ambient Noise Assessment

Baseline noise measurements were undertaken at locations around the proposed facility sites with potential receptors. Measurement of ambient noise levels were carried out using a precision integrating sound level meter, with an active range of 0-130 decibels (dB) and complying with IEC 651 and ANSI S4 standards. A Casella CEL-621C digital noise logger will set to record for a sample period

of 10 minutes at each of the selected locations. The assessment procedure involved recording the LA_{MAX} and LA_{MIN} decibel levels. Measurement points were recorded using a GPS receiver and the noise sources together with the ambient environment at each location noted. The obtained results have been compared against the National Environment (Noise Standards and Control) Regulations, 2003. The regulations require that persons to be exposed to occupational noise exceeding 85 dBA for eight hours in a day should be provided with requisite hearing protection.

4.2.2 Air Quality Assessment

Baseline air quality was measured using a pair of digital MX6 iBrid™ portable gas meters (Industrial Scientific-Oldham) and a Microdust 880nm digital aerosol monitor (Casella®). Measurement points or locations were selected basing on presence of potential receptors and an averaging period of 8 hours was used.

For gaseous emissions.

- The equipment was powered on and left in measuring mode for the first two minutes to allow zeroing and self-calibration. This was followed by ten minutes of measurement to allow digital readings to stabilize before they could be recorded.
- Measurements were conducted at each of the selected points to determine whether there would be any gaseous emissions detected.
- Values for Lower Explosive Limit (LEL), Carbon monoxide (CO), Oxygen (O_2), Hydrogen sulphide, H_2S, volatile organic compounds (VOCs) will be noted.

For particulate matter.

- The equipment was allowed for two minutes for zeroing down and thereafter, it captured the samples for five minutes with interval of 10 seconds.
- For every sampled point, a GPS coordinate was noted.

4.3 Biological Environment

4.3.1 Flora

Transect walks were taken along the areas planned for the water supply and sanitation systems and records were made of the vegetation. While some plant species were identified on site, specimens of others were collected and taken for confirmation at the Makerere University Herbarium. Additional information was obtained through consultation with communities on the local names, use and importance of some plant species. An inventory of the impacted vegetation was taken. The International Union for Conservation of Nature's Red List of Threatened Species (IUCN 2022) was utilized for categorization of species. Some of the tools that were used included: Plant press, Secateurs, Ivy tags, Measuring tape, Diameter tape and camera.

4.3.2 Fauna

- *Birds* - Bird species occurrences were surveyed through point count surveys using observations, hearing and consultations during which all species detected and encountered were recorded. Great emphasis was placed on species of conservation importance. Species identification were based on Stevenson and Fanshawe (2002). While some species were categorised according to IUCN (2015). Some of the tools used included: Binocular and camera.
- *Butterflies* - Random sweeping using sweep net were done (Biodiversity Rapid Assessment) and it involved a transect walk through the areas recording all butterfly species encountered on wings. Sample specimens were taken for most of the species, except for those whose identification could be easily confirmed in the field. Opportunistic observations were included

to help build the species list. Each of the butterfly species was assigned to one of the ecological categories (Akite, 2008). Some of the tools used included: insect net and camera.

- *Herpetiles* - Both reptiles and amphibians were surveyed using Visual Encounter Survey (VES) method (Rodda *et al.,* 2007). Visual Encounter Surveys were conducted by observation while walking through a designated area for a prescribed period of time, visually searching systematically along transects for animals. VES involved a search on the ground, trees and grasslands. Herpetiles were surveyed during the day from 08:00 am to 07:30 pm (Spawls *et al.,* 2006). Some of the equipment that was used include: camera and snake stick.

4.4 Social Environment Survey

Key stakeholders were identified at the national, regional, district, Sub County and community level through interviewing experts, brainstorming and document review. Stakeholder identification and engagement is an on-going process that requires regular review and updating. Therefore, the stakeholder list can be updated from time-to-time. The consultant collected and analysed data and held consultations with various stakeholders and other interested and affected parties involved, to ensure that all existing data relevant to the assignment is available to us. We undertook site survey to determine the area of influence and gather information under several key areas such as: (a) Socio-economic conditions in the surrounding communities such as health and infrastructure and (b) Current land use in the proposed project sites. Participatory stakeholder identification was used in identifying and analysing the key stakeholders, including planning for their participation. Therefore, it was the starting point of our participatory processes and provides the foundation for the design of subsequent stakeholder activities throughout this study. Identified stakeholders include:

Table 36: Categorization of Stakeholders to be engaged during ESIA

Category	Stakeholders targeted	Method of engagement	Roles and responsibilities
National	National Environment Management Authority (NEMA); Ministry of Gender, Labour and Social Development (MGLSD)	Key Informant Interviews (KIIs)	-NEMA is responsible for the review and approval of TORs, ESIAs, post-implementation audits and monitoring of approved projects. -Coordinate, inspect, supervise and monitor project activities to ensure that the environment and natural resources are not depleted but managed sustainably. -MGLSD under department of Occupational Health and Safety (OHS) is responsible for inspecting and registering the workplace and monitoring of conditions under which employees on the project are subjected.
Regional	Regional offices of the Ministry of Water and Environment including: Rural Water and Sanitation	KIIs	Construction supervision including the implementation of the proposed ESMP and

	Regional Centres (RWSRCs), Umbrella Authorities (UAs), NEMA, Water Management Zones (WMZs		implementation of the WSPP.
District	District Local Government of Rakai. Specifically, the following offices of Water, Natural Resources, Planning, Health, Production and Community Development and the political wing including the Chairperson LC V and Councillors representing the beneficially areas, NWSC	KIIs	Mobilze support for the project. Monitor social-environmental impacts both during construction and operation phases
Sub County	Sub county Chief, Community Development Officer, LC III Chairpersons	Focused Group Discussions (FGDs and KIIs	Mobilize local communities and key stakeholders to participate in EIA consultations and/or public hearings
Community	Local Council I, Landlords of sites where the water infrastructure will be constructed and any CBOs or local NGOs in the sector	FGDs and KIIs	Develop construction (works) schedules in their respective areas. -Participate in the scheduled meeting regarding the project activities and progress -Identify mitigation measures of the environmental and social issues -Monitor the progress of the project activities Input in the planning and identification of water and sanitation facilities.

4.4.1 Sampling and Selection of Respondents

The sampling process was primarily purposive. The ESIA targeted particular individuals, groups and communities that have a stake in the proposed project. As thus, only such entities as identified in the stakeholder analysis were selected to participate in the consultation process. Key informants at various levels and from different specialties, right from the community were also purposively selected to contribute their views on the impact of the project. This widened the perspectives on the projects, enrich the data collected and ultimately provided deep insights about the knowledge and attitudes of the various stakeholders towards the project.

Socio-economic surveys were conducted to define impacts and to provide a monitoring baseline following an initial desktop data review. The survey used a questionnaire comprised of 81questions aimed at capturing the full range of livelihood Capitals based on the Sustainable Livelihoods Framework.The data was collected via a mixed-method approach incorporating both quantitative and qualitative assessments, as well as an assessment of available secondary resources. Quantitative surveys were conducted for all Project Affected Households (PAHs).

Qualitative data was gathered to provide supporting details for the quantitative data collection surveys. Qualitative data collection was based on KIIs, FGs, and participatory methodologies including village transect walks. Household socio-economic surveys was undertaken alongside the cadastral and asset surveys. The land and asset component measured and described fixed assets for each household including land holdings, land type, buildings, crops, and trees. This information was collected to

inform compensation agreements and to assist in resettlement impact assessments. Details of the household survey are presented in the RAP and Valuation Report.

4.4.2 Study Methods

Stakeholder analysis sought to answer the following fundamental questions: Who are the key stakeholders (primary/secondary)? What are the interests of these stakeholders? How have they been and or will be affected (positively/negatively)? Which stakeholders are most important for the success of the study? How will various stakeholder groups participate throughout the study? The following methods were used for the social environment survey.

i. *Primary data source* - Primary data sources included Focused Group Discussions (FGDs and Key Informant Interviews (KIIs) with local technocrats and leadership[3].
ii. *Key Informant Interview (KII)* - targeted civil servants, political leaders and representatives of the management structures who are responsible for environmental management activities on various levels. Key informants were selected and interviewed on the basis of their roles as leaders, specialized knowledge and experience on the subject under study.
iii. *Focused Group Discussions (FGDs)* – targeted stakeholders at Sub County, Parish and Village levels. FGDs were used as a qualitative approach to gain an in-depth understanding of social issues. The method aimed at obtaining data from a purposely selected group of individuals on the proposed project activities.
iv. *Secondary sources* - These included: existing data, existing environmental data, existing reports/documents, pre- and post- implementation of management/construction decisions, EIA reports and ESMPs in place. Examples of these documents include: Rakai District Development Plan, District State of Environment Report, and Engineering Design Report for Kasese Water Supply and Sanitation System etc.

4.5 Impact Assessment and Evaluation Method

Based on the project details and the baseline E&S status, potential impacts as a result of the construction, operation and decommissioning of the proposed project activities were identified. We therefore proposed an impacts analysis criteria that took into account the magnitude or intensity of impacts based on project activities and sensitivities in the project area that were identified in the environmental and social baseline. Impact characteristics that were considered are described in Table 37 and include:

- Type of impact, whether direct or indirect
- Nature, whether positive or negative
- Duration of impact
- Intensity of impact
- Likelihood of impact occurring
- Spatial extent of area of impact
- Sensitivity of receptor of impact

The first six parameters give a sense of magnitude of impact, which together with sensitivity; result in an overall severity of impact.

[3] Primary sources can be described as 'a first-hand testimony or direct evidence concerning a topic under investigation whose nature cannot be determined without reference to the topic and question it is meant to investigate' or 'primary sources are those items that are original to the problem under study'.

Table 37: Impact Assessment and Evaluation

Criteria	Description
Type of Impact	▪ Direct - An impact that appears immediately as a result of an activity of the project. For example, the loss of vegetation is a direct impact of site clearing. The direct impacts would be experienced mainly during the construction process, and include effects on the physical environment, health and safety of the construction workers including community members within the project area. ▪ Indirect - An impact that is related to the project but that arises from an activity of the project at a secondary level. For example, the demand for supplies and services may cause indirect impacts on the local economy by increasing indirect employment opportunities.
Nature	▪ Positive ▪ Negative
Duration	▪ The lifetime of the impact; this is measured in the context of the life-time of the proposed development. Whether the Impact will be: ▪ Intermittent – not occurring at all times. ▪ Temporary-only for a short period. ▪ Short term - the impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase. ▪ Medium term - the impact will last for the period of the construction phase, thereafter it will be entirely negated. ▪ Long term - the impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter ▪ Permanent
Intensity	▪ Whether or not the intensity (magnitude) of the impact would be high, medium, low or negligible (no impact). An attempt to quantify the impacts of components on the affected environment will be described as using following definitions: ▪ Negligible ▪ Low - where impact alters the affected environment in such a way that natural processes of functions are not affected in any significant way. ▪ Moderate - where the affected environment is altered, however, function and process continue, albeit in a modified manner. ▪ High - where function or process of the environment is seriously altered and disturbed to the extent where it temporarily or permanently ceases.
Spatial Extent	▪ The physical and spatial size of the impact; a description of whether the impact would occur on a scale described as follows: ▪ Site - whether the impact will be within limited locale of the project site / study area affecting the whole or measurable portion of the area. ▪ Local - whether the impact will affect the environment or communities along the border of the study area or in the extended area adjacent to the site or perhaps outside the immediate environment. ▪ Regional - whether the impact extends beyond the study area affecting areas on a regional scale.
Likelihood	▪ The probability or likelihood of the impacts occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The probability that a certain impact will occur on scale described below: ▪ Uncertain - insufficient information to determine its probability. Because the precautionary principle is followed, this increases the significance of the impact. ▪ Improbable - the impact is unlikely to occur. ▪ Probable - the impact could possibly happen, and mitigation planning should be undertaken.

	▪ Highly probable - it is most likely that the impact will occur at some or other stage of the development. ▪ Certain - the impact will take place regardless of any prevention plans, and only mitigatory actions can be relied on to contain the effect.
Sensitivity	▪ Degree of change effected on natural processes or people's livelihoods; the sensitivity of the receptor of the impact to change ▪ Very low ▪ Low ▪ Moderate ▪ High

Table 38 below presents a quantitative format for ranking impacts based on parameters above, summarized as magnitude and sensitivity.

Table 38: Quantitative Rating of Impacts

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

Table 39 below presents the overall impact rating criteria, with illustrations of such impacts.

Table 39: Overall Impact Rating and Description

Overall Impact Rating	**Description of Impact**	**Significance**
Severe	▪ Non-compliance with national policy, environmental and social policies, laws and regulations ▪ Highly noticeable, irreparable effect upon the environment ▪ Significant, widespread and permanent loss of resource ▪ Major contribution to a known global environmental problem with demonstrable effects ▪ Causing mortality to individuals of a species classified as globally or regionally endangered ▪ Major exceedance of water/air quality and noise guidelines representing threat to human health in long and short term ▪ Causing widespread nuisance both on and off site ▪ Extensive property damage or loss, ▪ Widespread effects on livelihoods.	>12
Moderate	▪ Frequent breaches of national regulations, including water/air quality and noise guidelines, wetlands and river banks regulations causing localized nuisance both on and off site ▪ Noticeable effects on the environment, reversible over the long term. ▪ Localized degradation of resources restricting potential for further usage ▪ Sub-lethal effects upon a globally or regionally endangered	6 – 12

Overall Impact Rating	Description of Impact	Significance
	species with no effect on reproductive fitness and/or resulting in disruption/disturbance to normal behaviour but returning to normal in the medium term ▪ Elevated contribution to global air pollution problem partly due to preventable releases ▪ Unplanned immigration flows ▪ Increased traffic in sensitive environments ▪ Increased serious crime rates ▪ Widespread physical resettlement, affecting livelihoods	
Minor	▪ Noticeable effects on the environment, but returning naturally to original state in the medium term ▪ Slight local degradation of resources but not jeopardizing further usage ▪ Disruption/disturbance to normal behaviour of a globally or regionally endangered species returning to normal in the short term ▪ Small contribution to global air problem through unavoidable releases ▪ Elevation in ambient water/air pollutant levels greater than 50% of guidelines ▪ Infrequent localized nuisance ▪ Population increase not expected to stress existing infrastructure	2 – 4
Negligible	▪ No noticeable or limited local effect upon the environment, rapidly returning to original state by natural action ▪ Unlikely to affect resources to noticeable degree ▪ No noticeable effects on globally or regionally endangered species ▪ No significant contribution to global air pollution problem ▪ Minor elevation in ambient water/air pollutant levels well below guidelines ▪ No reported nuisance effects. ▪ Temporary or intermittent changes to livelihoods or life quality aspects	< 2

4.6 Identifying Mitigation Measures and ESMP Preparation

Possible mitigation measures considering all the project implementation phases have been identified and described in detail. Measures and actions to address negative impacts have followed the risk management hierarchy of avoidance and prevent, minimization, mitigation or restore and compensation. Measures proposed follow the Ugandan legislation and those of the World Bank Operational Policies.

The ESMP is well defined with performance indicators, targets and acceptable criteria that can be tracked over defined periods, with estimates of the resources and responsibilities for implementation. The ESMP format is flexible to ensure the integration of project specific mitigation, enhancement and monitoring requirements. The ESMP's scope and level of details is proportional to the number and complexity of the measures required to ensure the project's environmental and social sustainability.

The following components constitute the minimal contents of an ESMP:

a) *Objectives of the ESMP* - This section specify what the ESMP aims to bring the project into compliance with applicable national environmental and social legal requirements and the Bank's safeguards policies and procedures. The other objective of the ESMP is to outline the mitigating/ enhancing, monitoring, consultative and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts, or to enhance the project beneficial impacts. It also addresses capacity building requirements.
b) *Context the ESMP* - briefly describes project activities and major environmental and social components that will likely be affected positively or negatively by the project. It describes and analyses the physical, biological and human conditions prevailing in the project area, highlighting relevant environmental and social issues among others.
c) *Beneficial and Adverse Impacts* - This section focuses on beneficial impacts that can be enhanced to improve the project environmental and social performance as well as on adverse impacts that require mitigation measures to be minimized or compensated.
d) *Enhancement/Mitigation Measures and Complementary Initiatives* - This section proposes feasible and cost-effective measures to address the impacts previously defined, in order to accrue project benefits through enhancement measures or to reduce potentially adverse environmental and social impacts to acceptable levels (mitigation measures).
e) *Environmental and Social Monitoring Program* - A monitoring program aims to ensure that mitigation and enhancement measures are implemented, that they generate intended results and that they are modified, ceased or replaced when inappropriate.
f) *Responsibilities and Institutional Arrangements* **-** The implementation of enhancement and mitigation measures and the completion of the monitoring program require to clearly establish responsibilities among the various organizations involved in project implementation and operation. The ESMP proposes support to the organizations that may have insufficient capacities to fulfil their obligations. This support could be provided through various means including technical assistance, training and/or procurement.
g) *Estimated Cost* - This section estimates the capital and recurrent cost associated with the various proposed measures (enhancement and mitigation), the monitoring program, consultations, complementary initiatives and institutional arrangements.

Table 40 provides a summary template for Monitoring Requirements.

Table 40: Summary Template for Monitoring Requirements

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

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

a) *Surveillance activities* - The surveillance aims to ensure that the proposed mitigation and enhancement measures are effectively implemented during the construction phase.

b) *Monitoring activities* - These activities consist of measuring and evaluating the project impacts on some environmental and social components of concern and to implement remedial measures, if necessary.

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

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

5. ENVIRONMENTAL & SOCIAL BASELINE

5.1 Climate

The project area are in semi-arid climatic zone with orographic and a bimodal average rainfall going up to about 875 mm per year. Rakai district, the host of project RGC, is clustered under Zone CE in the Uganda Meteorological Map[4] as shown in Figure 13. Within this zone there is significant variation irrespective of the amount of rain, thus the pattern of seasonal variation is the same within this Meteorological Zone as illustrated in Figure 4. The climatic representation given in this Section is applicable to the project RGCs since there is little variation in observed climatic conditions in the district.

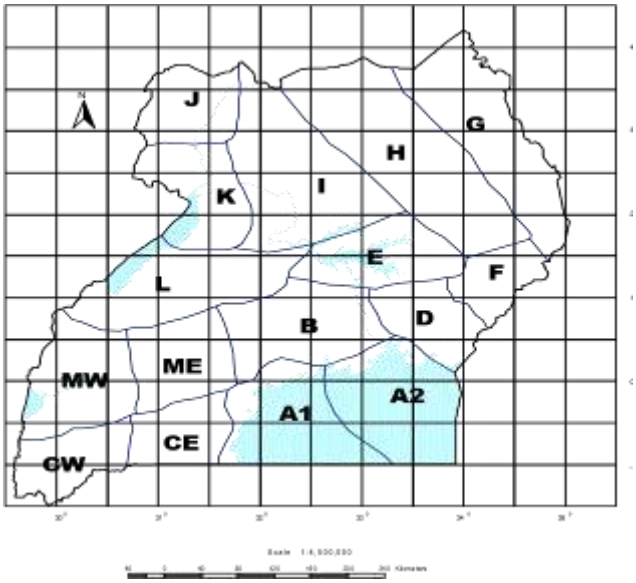


Figure 13: Rainfall Zone in Uganda

Monthly average rainfall for the project area varies between 14 mm in January and 230 mm in August. The mean annual rainfall varies from 1,350mm to 2,125mm. The wet season extends from April to October with peaks during the months of May, August and October. The project area displays fair distributions of rainfall throughout the year.

Two dry seasons occur with the more pronounced one in June to early September, while the other is between December and early March. There is a relatively dry season around January and February, and another in June, July and August. However, these dry periods are occasionally mitigated by a few light rain falls. A principal peak is due around March-April and May, whereas the minor peak is around October and November.

[4] Uganda National Meteorological Authority Historical Rainfall Data Base

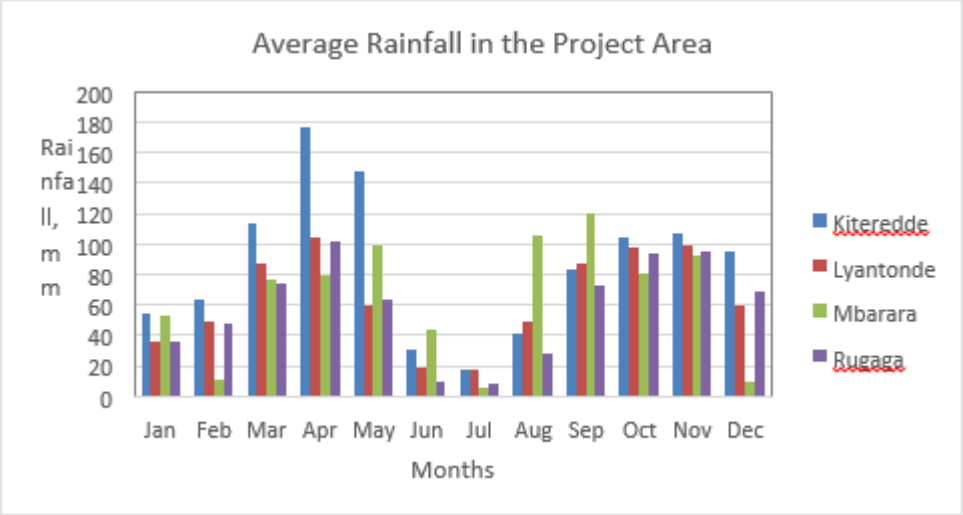


Figure 14: Average Rainfall Pattern in the Project Districts

The average temperature typically varying from 15°C to 27.8°C within the project area. The These are very insignificant variations and hence indicate that there are generally high temperatures within the project area throughout the year.

Relative humidity ranges between 80-90% in the morning and decreases to between 61% and 66% in the afternoons during the months of January and May. From June to August, the morning recordings decrease to around 77% and so, are the afternoon recordings that decrease to around 56% and 57%. The implication is that though the morning recordings are always within reasonable limits to induce rainfall, they normally reduce unfavourably in the afternoons resulting in poor chances of getting rainfall. However, it should be noted that relative humidity is so variable with time and thus liable to change any time in relation to other climatic conditions.

Considering a wet day being one with at least 1.0 mm of liquid or liquid-equivalent precipitation, the wetter season lasts 8.8 months, from about August 28 to May 23, with a greater than 42% chance of a given day being a wet day. The chance of a wet day peaks at 71% on or around April 12. The dry season stretches over a 3.2month period, from about May 23 to August 28. The least chance of a wet day during this time being 13% on or about July 4. The most rain falls during the 31 days centered around April 16, with an average total accumulation of 135 mm. The least rain falls around June 28, with an average total accumulation of 20 mm.

The length of the day within the project area does not vary substantially over the course of the year, staying within 10 minutes of 12 hours throughout. The earliest sunrise is at 6:33 am on November 5, and the latest sunrise is 31 minutes later at 7:04 am on February 12. The earliest sunset is at 6:41 pm on November 1, and the latest sunset is 31 minutes later at 7:12 pm on February 9.

Considering the wide-area hourly average wind vector (speed and direction) at 10 meters above the ground, the windier part of the year lasts for 4.1 months, from May 4 to September 6, with average wind speeds of more than 10.4 mm per hour. The windiest day of the year is July 4, with an average hourly wind speed of 13.1 mm per hour. The calmer time of year lasts for 7.9 months, from September 6 to May 4. The calmest day of the year is November 18, with an average hourly wind speed of 7.5 mm per hour.

5.2 Topography

The landscape of the project area corresponds to Wetlands Pen Plain II. It is part of the mid-tertiary or Buganda surface, which is essentially a plateau land. The same landscape is represented in large parts of East, Central and Southern Africa. The landscape is the result of a long period of quiescence from the end of the Karoo era to early tertiary, during which sub-aerial erosion reduced the plateau land to a very low relief. This almost perfect pine plantation was followed by slow uplift, which commenced in the early tertiary and the consequent dissection by the rejuvenated drainage system. As a result, an elevated and dissected plateau consisting of flat-topped hills or their remnants and intervening valleys was formed.

Today the remnant of this surface are well preserved in the hill areas of the District, with some of the hill ranges rising to between 1402 mAMSL and 1463 mAMSL with some peaks attaining 1520 mAMSL. Such a range in altitude is thought to have been caused by the warping in the late tertiary times and localized arching induced by rift valley formation. However, another most likely cause is the differential resistance of rocks to weathering. The rocks that have given rise to these hills are more resistant to weathering and erosion than the adjacent geological formation so that the difference in height is a product of differential erosion. The North eastern and Western parts of Rakai District are hilly (Rakai highlands) only interrupted by two major lake depressions (Kijanebalola and Kacheera) and occasional wide flat valleys (pseudo-plains). The southern eastern and north western parts of the District comprise almost flat to undulating plains topography. Therefore, Rakai District can be divided into three main topographic zones – the Lake Victoria shores, the North – Eastern and Western hills and the North – Western plains.

The geomorphology of the district renders some areas especially those that are hilly difficult to access and makes service delivery a great challenge. It also leads to soil erosion, accelerated degradation of the infrastructure and flooding of the low areas.

Plate 3: The topographic view of the project area (Kasese RGC)

5.3 Geology and Soils

Over 75% of the project area soils are ferralitic representing an almost final stage of weathering with little or no mineral reserve left. Some "heavy" clay varieties have some fertility but sandy varieties are particularly poor. Other types include lithosols, alluvial and lacustrine sands and alluvial clays. Generally, lithosals and humus loams are the dominant upland components while the grey sandy soils derived from hill wash or river alluvium, grey clays of the valley bottoms and lacustrine sands dominate the lowland component. Lithosols are soils without horizons and thus young and stony or bare rocks. Generally, the soils within the project area can be classified into four soil catenas, four soil

series and peat soils. Taking a rough estimate of the District aerial coverage it will be noted that the Kooki catena is the dominant soil type accounting for over 40% and dominant in most of Kooki County and parts of Kyotera County of the dry land in the District where the project area falls. This is followed by Teloro series about 14% mostly in Buyamba and Lwamaggwa, Bukora series about 8%, Sango series about 4%, Mulembo series. Some of the soils especially in Kooki are loose and often collapse making the construction of sanitation facilities very difficult and more expensive.

Plate 4: Examples of the soils within the project area.

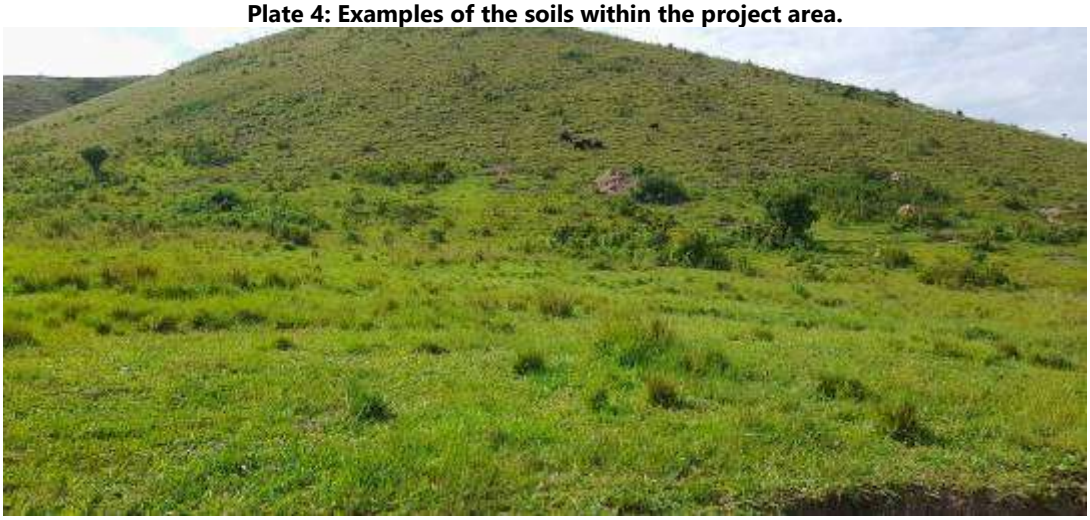


Plate 5: Some of the hills with the geological features in the project area

5.4 Flora

The vegetation of the project area (i.e. borehole, transmission and distribution pipe network) is as varied as the different ecosystems that characterize the area. Three broad categories can be used to classify the vegetation of the district, namely: forests, swamps and savannas. Generally, the project area is dominated with grass species of *Eragrostis sp, Hyparhenia filipendula, Sprobolus africana, Sprobolus pyramidalis*, *Paspalum notatum, Cymbopogon nardus* and *Imperata cylindrica* in some areas. Some small thickets were observed to be sparsely distributed. Bushy habitats constituted of *Solanum mauritianum, Acanthus pubscens, Solanencio angulatus, Eriosema glomeratum, Triumfetta spp, Hyparrhenia spp and Imperata cylindrica, Microglossa pyrifolia, Acalypha spp* and *Alchornea spp*, mixed with several herbaceous weedy species. The bushy marshy habitat is characterized by *Leersia hexandria* and *Triumfetta macrophylla* as the dominant ground vegetation cover with some *Phoenix reclinata*, *Alchornea* and *Measa lanceolata* dominating the woody species layer. Generally, the project areas have a pure savanna woodland type of vegetation characterized by short eucalyptus trees, acacia species and short grass.

Wetlands around the boreholes have developed an adaptive vegetation like shrubs, grasses and *Phoenix reclinata* trees. *Cyperus papyrus* swamps communities are on sites with impeded drainage and have less tree cover with perennial grasses and sedges. The vegetation communities found in these include the *Echinochloa species* , *Sorghastrum, Alchomea cordifolia, Sesbania sesban, Ficus con gensis, Thelypterus extensus, Thelypterus Dentata, Merramia subcordata, Miscanthus species* and *Typha latifolius*, *Typha domingesis* is among dominating species.

None of the flora species in the project area is of conservation concern with regard to IUCN Red list of threatened species.

Plate 6: Some of the vegetation around the production well in the project area.

5.5 Fauna

The drilled boreholes, transmission and distribution pipe network are located in an area that is modified for agricultural activities. Butterflies are increasingly being recognised as valuable environmental indicators, both for their rapid and sensitive responses to subtle habitat or climatic changes and as representatives for the diversity and responses of other wildlife. A number of butterfly species were encountered within the project areas mainly around wetland and forested areas and these included: *Papilio bromius, Papilio dardanus, Lachnoptera anticlia, Metisella orientalis, Ceratrichia flava, Acleros mackenii, Neptidopsis ophione, Salamis parhassus, Junonia Sophia, Sarangesa lucidella*.

Bird Species recorded within the project area included: *Scopus umbretta (Hamerkop), Ploceus pelzelni (Slender-billed Weaver), Moticilla agiump (African pied wagtail), Melocichla mentalis (African moustachad warbler), Lagonosticta rubricate (African firefinch), Turdus piaggiaes (Abyssinian ground thrush), Eupodotis melanogaster (Black-bellied bustard), Francolinus sephaena (Crested francolin), Merops variegaster (Blue-breasted bee-eater), Pyconotus barabatus (Yellow-vented bulbul), Colius macrourus (Blue-naped mousebird).* Most of the above bird species are forest and grassland birds thus live in the forest, forest edge or a degraded forest and in grassland habitats and sometimes in cultivations.

The most common and abundant Mammalian species recorded within the project area was *Rattus* (House rat) followed by *Crocidura olivieri* (African Giant Shrew). The low mammalian species recorded in the project area could be attributed to human disturbance mainly through cultivation, grazing and settlement. Thus, widely distributed and not habitat specific, but very adaptive to a wide range of habitats.

None of the faunal species in the project area is of conservation concern with regard to IUCN Red list of threatened species.

5.6 Noise Levels

There are no cases of noise pollution at the proposed project areas/sites. Thus the project site indicates a generally pristine environment with respect to ambient noise. However, as would be expected due to the increased human activities and construction activities noise levels are likely to increase. Noise levels recorded at selected locations within the proposed project area are presented in Table 41.

Table 41: Noise levels measured at the proposed project sites.

Area	Location	LA_{min} dB	LA_{max} dB	LA_{Eq} dB	Comments
Magabirano BH	0°50'50.75"N, 31°14'14.20"E	30.0	32.5	31.3	Swishing tree leaves, twittering birds and human conversations
Kasese BH	0°50'10.64"N, 31°14'32.13"E	32.0	35.2	33.6	Swishing tree leaves, twittering birds and human conversations
Reservoir tank area	0°49'41.29"S, 31°16'19.28"E	35.4	38.2	36.8	Swishing tree leaves, twittering birds and human conversations

The levels are based on land use Category D (Residential plus Industry or small scale production and commerce) for which daytime and night limits are 60 and 50 dBA, respectively according to the National Environment (Noise Standards and Control) Regulations 2003. All measurements were conducted during daytime.

5.7 Air Quality

The ambient air quality is assumed to be good as there are no major industrial sources of air emissions. The primary sources of air emissions in the area are automobiles (vehicles and motor cycles). Fugitive dust is attributed to vehicular movements along loose surface/murram roads, which dust levels, are exacerbated during dry, sunny and windy periods. Air quality measurements indicated a reasonably clean environment with respect to air quality as presented in Table 42.

Table 42: Results of air quality measurements taken in the project area

Area	Location	*O_2 (%)*	*CO (ppm)*	*VOC (ppm)*	*$PM_{2.5}$ ($\mu g/m^3$)*	Air pollutant
NEMA (Draft Air Quality Standard for Ambient Air)		*19.5-23.5*	*9.0*	*15*	*25*	
IFC, 2007 Standard					*25*	
Magabirano BH	0°50'50.75"N, 31°14'14.20"E	21.0	0.0	0	Max 0.130 Ave 0.053	Dust elevated by wind
Kasese BH	0°50'10.64"N, 31°14'32.13"E	21.0	0.0	0	Max 0.021 Ave 0.210	Dust elevated by wind
Reservoir tank area	0°49'41.29"S, 31°16'19.28"E	21.1	0.0	0	Max 0.000 Ave 0.000	Dust elevated by wind

All the assessed parameters were within the within permissible values in accordance with the NEMA (Draft Air Quality Standard for Ambient Air) and IFC, 2007 Standard. There were no detectable levels of NO, NO_2, CO, H_2S, Cl_2, ClO_2 and SO_2 at all measurement locations.

5.8. Ground Water Resources

Water resources are based on boreholes DWD 60875 and DWD 60890 that have a total test yield of 22.0m^3/within the town. Pumping is to be powered by the grid power and solar system in order to meet the ultimate water demands. Plate 7 and 8 shows the Kasese and Magabirano drilled boreholes respectively.

Plate 7: Kasese water supply production well.

Plate 8: The Magabirano production well as one of the drilled boreholes to support the system.

5.9. Socio-economic Environment

5.9.1 Socio-Economic Baseline Results

A household survey was undertaken as part of the ESIA and RAP where a total of 308 households were surveyed with the vast majority (94.6% of the survey respondents) being head of their households. Results on gender distribution of household heads in the project area established that there were more male headed households (76%) in comparison to females headed households (24%). In Uganda, even though there are more female than male in terms of population, most of the land and property assets are owned by male. This could explain why there are more male respondents than female respondents. Whereas the male own land, women will mostly farm on the land. Women who owned land in the project area either had purchased it with their own money or were widows. According to the 2015-2020 District Development Plan, in Rakai District, many landless potential farmers especially women cannot easily access land because of costs, cultural norms and threats.

The majority of the survey respondents are below 49 years (64%) with 36% above 49 years and 0% below 18 years. According UBOS, majority of the population lies below 45 years of age. Age is one of the important factors in socio-economic analysis and mitigation of project impacts as it helps to measure the dependency ratio in affected households in a given project area. Notably, age can be used as a proxy indicator to establish the physiological status and healthcare needs of a given population.

The majority of the respondents (76.3%) are married, followed by the widows (14.0%), separated (3.2%), Widower (2.9%), Divorced (0.6%), while only (2.9%) of the respondents surveyed are single. This implies that most of the respondents have families that will be affected by the Kasese RGC Water Supply and Sanitation Project. Additionally, it implies that there will be more demand for water after project implementation. 49.7% of the Project Area survey respondents are Protestants, followed by Catholics 40.9% and Muslim 6.2%, 2.9% Born Again Christians among others. The presence of these different religions determines a lot when and how sensitizations and consultations should be carried out within the project area and which religious leaders to be involved.

The majority 87.0% of Project Area households surveyed were born in the project area while 11.4% have lived in the community for ten or more years. This implies that majority of the respondents have knowledge about the project area and can be direct beneficiaries to the Kasese RGC Water Supply and Sanitation Project.

5.9.2 Administrative and Social set-up

Rakai District is comprised of only one County, Kooki in which there are 9 (nine) Sub-counties and one Town Council. The District is the higher local, while the 10 (ten) are the Lower Local Governments (LLGs). The District Council is the highest political authority, headed by the Chairman LC V, while the Speaker presides over the Council meetings. The Council has an Executive arm comprised of five members headed by the District Chairperson. The Chief Administrative Officer heads the administrative and technical wing of the District. A Technical Planning Committee (TPC), comprised of Heads of Departments and Sections coordinates the activities and functions of the District. The Service Departments in the district include: Health, Works and Technical Services, Production and Marketing, Education, Statutory Bodies, Gender and Community Services, Finance, Planning, Internal Audit, Management Support Services and Natural Resources.

5.9.3 Population

The total population of Rakai District as per the 2015 Rakai District Planning Unit was **237,889** composed of **115,975** males and **121,914** females. When the 2014 population census was compared to the 2002 population census results, the population in the district grew by 2.06 % over a period of 12 years. In addition, the 2014 Census indicated that the National total fertility rate was 6.2 % and the total average Household size being 4.4 persons for Rakai District.

Table 43: Population distribution by County/Sub-county and Sex

County	Sub county	Households		Males	Females	Total
		Number	Average Size			
Kooki	Byakabanda	4,057	4.6	9,228	9,257	18,485
	Ddwaniro	7,149	4.6	16,015	17,006	33,021
	Kacheera	5,041	4.7	11,656	12,033	23,689
	Kagamba	7,196	4.7	16,308	17,550	33,858
	Kiziba	4,131	5.0	9,999	10,621	20,620
	Kyalulangira	6,022	4.6	13,478	14,342	27,820
	Lwamagwa	9,494	4.6	21,534	22,663	44,197
	Lwanda	6,427	4.4	14,049	14,558	28,607
	Rakai T.C	1,645	4.2	3,708	3,884	7,592
District		**51,162**	**4.4**	**115,975**	**121,914**	**237,889**

Source: 2015 Rakai District Planning Unit.

The RGCs under consideration for the project in Kiziba Sub-county (Mweruka Town Council) include Kalwanyi, Kasese, Mweruka, Kijwara, Magabirano A and Magibirano B in Mweruka Parish; Ndaga A and Katunga in Ndagga Parish; as well as Kijonjo and Kyema in Rwesinga Parish.

Table 44: Population of the Project RGCs

No.	RGC	Parish	Year 2017			Year 2019		
			No. of Households	Total Population	Household Size	No. of Households	Total Population	Household Size
1	Kalwanyi	Mweruka	109	439	4.03	115	462	4.03
2	Kasese		127	592	4.66	134	623	4.66
3	Mweruka		113	422	3.73	119	444	3.73
4	Kijwara		101	417	4.13	106	439	4.13
5	Magabirano A		119	519	4.36	125	546	4.36
6	Magabirano B		129	672	5.21	136	707	5.21
7	Kobukurura		121	514	4.25	127	541	4.25
8	Ndaga A	Ndagga	129	432	3.35	136	455	3.35
9	Katunga		118	341	2.89	124	359	2.89
10	Kijonjo	Rwesinga	131	627	4.79	138	660	4.79
11	Kyemwa		128	479	3.74	135	504	3.74
Total Project			**1,325**	**5,454**	**4.12**	**1,122**	**5,741**	**5.12**

Basing on the 2014National Population and Housing Census (NPHC), the district which now comprise of Kooki County only is densely populated with a density of 196 people per km^2 which increased from 102 people per km^2 as per 2014 and 2002 NPHC, respectively. Rakai District can be categorized as an ethnically rich district. The dominant tribe is the Baganda followed by the Banyankole. There is also a large number of people of the Rwandese origin and a significant number of other tribes like Barundi,

Baziba and Banyambo people. Notwithstanding the heterogeneity, most of the people in the district can communicate in Luganda making packaging of development messages easier, less costly and more effective.

About 96% of the population is rural, a situation which reflects the basically agricultural nature of the district economy. In this rural environment, settlement pattern varies, depending on a number of factors such as climate, vegetation, water supply, terrain, soil fertility, disease agents etc. The level of Urbanization is determined by the proportion of the population living in gazetted urban areas. The 2014 census defined urban areas to include gazetted cities, Municipalities, and town councils. Basing on NPHC 2014, 93.0% of the population in Rakai District is found in rural areas whereby only 7.0% of the population lives in urban areas. This percentage of urbanization in the district was still low despite the fact that it increased from 4.0% of 2002 NPHC to 7.0% when compared to the National urbanization average of 18.4% which portrays a slow pattern of development. This situation reflects that agriculture is the major activity of the district economy. In this rural environment, settlement pattern varies, depending on a number of factors such as climate, vegetation, water supply, terrain, soil fertility, disease agents hence imposing difficulties to service delivery. The population growth rate of 2.06% is which has a major implication on the demand for social services and places a huge burden on the already limited budget of the sector. It is recommended that the district steps up policies and programmes to manage the population growth. Migration is an important factor that affects both the population size and social economic development. Unlike birth and death (the other two factors that affect the population size of a country) migration, especially emigration is not easy to monitor. This is also true if migrants use non-gazetted entry exit points. It becomes difficult to accurately estimate the district's population growth if the full picture of the migration is not fully ascertained. It is therefore recommended that the legal requirement that all immigrants should register on arrival, should be enforced and monitored.

5.9.4 Economic Activities

The major occupation of the household livelihood in the Project areas is subsistence farming (95.5%) growing crops that include cassava, Irish potatoes, maize, beans, ground nuts, sweet potatoes among others. Being largely peasant farmers, they consume domestically what they produce and sell the surplus in local markets for cash. Other activities include petty businesses in the village and trading centers, operating small kiosk grocery shop, and road side sale of farm products, casual labour and transportation. The main economic activities include peasantry farming, and wide range of livestock rearing of indigenous cattle, pigs and goats all of local breed. There are no significant differences in economic activities among the RGCs/Parishes. The main livestock market (cattle market and abattoir) is located in Rakai while other weekly markets in Lwentulege, Kituntu, Rugando, Kirangira, Kyenwa, Lwebitakuli, Nankondo and Kyemamba trading centres who have also engaged in the same economic activity. Consequently, a number of traders have been attracted to these RGCs. There are only weekly markets (no daily central market) controlled by vendors dealing in vegetables and other consumables where all road side vendors are located. The most grown crops are matooke, maize, sweet and potatoes, beans, cassava and coffee. Industrial growth is mainly agro-related and is slow hinging mainly on maize crop, coffee processing, fish processing, furniture works and carpentry.

The economy is basically reliant on crop production and livestock production. Main food crops include finger millet, maize, beans, bananas, sorghum, sweet potatoes, Irish potatoes, cassava and groundnuts. Coffee is the major cash crop in the district. Fruits and vegetables such as passion fruit, tomatoes, pineapples, onions and cabbage are also grown. Others are fishing and the upcoming fish farming, agro-forestry, sand excavation, and brick making. The huge percentage of the population that is engaged in agriculture implies that people's economic livelihoods are dependent on exploitation of natural resources with all its attendant effects including exploitation and degradation. The surveyed population indicated that bad weather (95.8%) and poor soil quality (1.3%) alongside the ever-rising cost of inputs (2.9%) as the leading factors limiting their HH incomes among others.

Plate 9: Banana as one of the crops grown within the project area

Plate 10: The commercial Centre of the project area of Mweruka Town Council

5.9.5 Land Area and Use

Rakai district now comprising of only Kooki County is approximately 4,989 km^2 with undefined shape from the mountain to the regional road. The geographical location as well as the physical characteristics of Rakai District give it a peripheral shape. In spite of the fact that it does not have an international border, it occasionally gets influx of refugees, spilling over from Isingiro District, in search of pastures and water for their animals, which makes the District exposed to the spread of diseases. The land tenure system among the 782 Project Affected Persons (PAPs) is Customary and is characterized by local customary regulation which applies local customary regulation and management to individual and household ownership, use and occupation of, and transactions in, land. Providing for communal ownership and use of land in which land parcels may be recognized as subdivisions belonging to a person, a family, or a traditional institution. Land is considered as owned in perpetuity. Otherwise, the main activities to which the land is put to use are the small scale farming, cattle keeping and minor economic activities like quarrying and brick making.

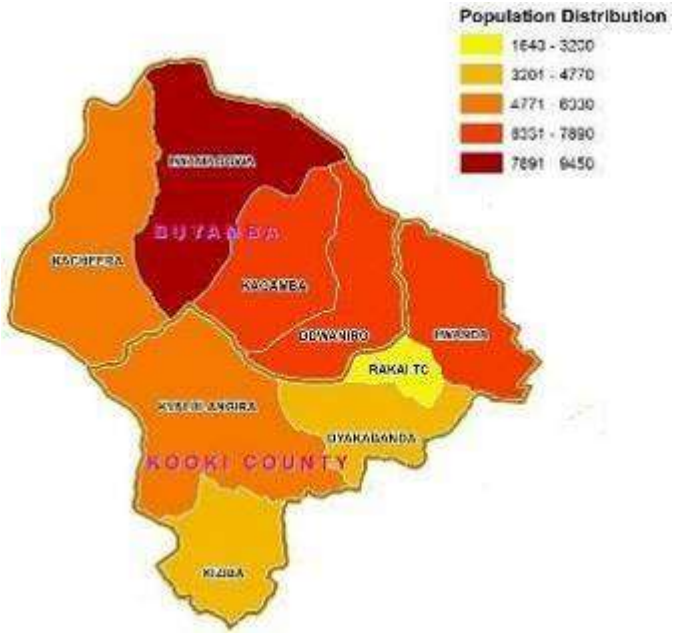


Figure 15: Exploded Map of Rakai also showing Population Density

5.9.6 Land area

This includes areas of seasonally flooded grassland, swamp forest, permanently flooded papyrus and grass swamp plus upland bog. Out of a total district area of 4,898km^2, wetlands (both permanent and seasonal) occupy 1,234km^2. This represents approximately 25.2% of the total land area that is under the wetland system.

The National Wetland Policy and the Sustainable Development Goals state "***to promote the conservation of Uganda's wetlands in order to sustain their ecological and social economic functions for the present and future well-being of the people***". According to the wetland inventory report, inaccessibility to most of the permanent wetlands may be the only one factor that is preventing them from heavy degradation. A case in point is the Sango Bay wetland forest area that also has very sparse population and covers approximately 151 km^2. So far, therefore, there is serious wetland degradation and the rate at which it is increasing is worrying if not checked immediately.

Dumping especially near urban centres has become the order of the day. Swamp reclamation and conversion for agricultural usage is increasing as the weather patterns change towards having more and prolonged droughts. Population growth has also contributed to wetland encroachment as residents and immigrants seek more land for production. Wetland conversion in respect of economic activities has so far reached an alarming stage and spreading very fast. This calls for a concerted effort to curb the misuse before it spreads to uncontrollable levels.

Most abuse is around urban centre of Rakai where construction and cultivation is taking place in various spots of the wetlands near and around the town but this practice is now spreading to the areas around RGCs where people are moving to these quasi-urban settings. The Bukola river catchment is also being converted at high rate for agricultural production. During prolonged drought the wetlands are cultivated and seasonal crops are planted like horticultural crops (cabbages, tomatoes, etc.), potatoes, beans and maize. The overall effect is that the original natural vegetation, flora and fauna are permanently lost. Eucalyptus planting is on the increase and many seasonal wetlands are rapidly being turned into eucalyptus woodlots. In Kooki County the riverine swamps are often drained for the production of sweet potatoes, millet, Irish potatoes and maize cultivation and Eucalyptus tree planting. Long term strategies must therefore be found to combat the threat of wetland degradation, given the inevitable consequences coming as a result of climate change.

5.9.7 Communication and Energy Infrastructure

5.9.7.1 Roads

Kasese RGC is located approximately 45km slightly south west of Rakai Town. Access is through the main road to Isingiro District. The road is unpaved but motorable throughout the year. The adjacent RGCs are connected with poorly maintained unpaved roads that are difficult to navigate during the rainy season. The district has one major paved all-weather road from Kyotera Town to the district Headquarters and this boosted the economic situation of Kooki County as it joins other murram roads managed by both the Uganda National Roads Authority and the district. There is poor road network in the entire Sub-county. This has been as a result of poor road maintenance, lack of management policies, and lack of resources. Poor road network has resulted into low income and children reaching schools late.

Plate 11: One of the community roads within the project area

5.9.7.2 Telecommunications and Postal Services

The project area is well covered with mobile network services such as; Airtel and MTN. The television reception is extremely poor though various FM radios are received. Kasese RGC is connected to the national electricity grid. Communication in the area is good, with the two (2) major mobile phone operators (MTN and Airtel) in Uganda providing services in the area. There are no postal services and the project area and can only access such services in Kyotera Town, some 45km away from the Rakai Town.

5.9.7.3 Energy

There is national electricity grid at Mweruka RGC and some of the surrounding RGCs in the project. Nonetheless many of households are not connected but depend on solar power. Opportunities to attract the agro based small-scale industries in the area are high.

Plate 12: Mweruka Town Council is connected to the national grid

5.9.8 Social Services

Rakai District has over four hundred both secondary and primary schools, the district has two hundred eight four government aided the rest are privately owned and these have built human capacity in terms of literacy levels and employment to our communities. The District has 112 Health facilities of which is the overall goal of the department is to provide good quality services to the people of Rakai district so as to make them attain good standards of health in order to live a healthy and reproductive life. The department's objective is to reduce morbidity and mortality from the major causes of ill health and premature health and disparities therein". Rakai district has 107 Health Units of different categories. Some of them are Government hospitals while others are owned by Non -Government Organizations and Private for Profit (PFP). The distribution is fair, but some of them lack the basic equipment to offer reasonable services. Many rural units require rehabilitation and equipping. Besides diseases, poor nutrition has contributed to worrying situation. Because of cross cutting nature of health issues, there is need for an integrated approach to health. There are various NGOs both Local and International that are involved in AIDS prevention and control in the district. Such activities include blood screening and counselling, medical treatment, home care, pastoral education, health education, AIDS research and orphan support.

Table 45: Development Partners in Rakai District

Development Partners	Location(s) of Operation (sub county)	Type(s) of Support Provided
UNICEF	Entire district	VHT Training, PMTCT and emergency support to Sango Bay camp, Nutrition & EPI programs
World Vision	Kyalulangira, Kiziba, Lwamaggwa, Dwaniiro Sub-counties	OVCs, Sanitation and hygiene, advocacy, integrated outreaches
MARISTOPES	Entire District	Reproductive health

Source: Rakai District Development Plan, 2015-2020

5.9.9 Cross cutting issues

5.9.9.1 Poverty

Poverty is the biggest problem in in the entire Rakai district. Poverty has many dimensions. It certainly involves lack of human and physical basic needs/assets; inadequate material means to acquire food and other necessities. But it also means, the poor is vulnerable to ill health, drought and its

consequences, job loss, economic decline, violence and societal conflict. This is a situation where the poor lack the opportunity to convert their enormous energy and hard work into a higher standard of living, and they systematically suffer from lack of influence and voice to express their situation. Despite impressive social and economic growth reported in Uganda, poverty remains widespread in most parts of Uganda, with 35% of the population reported to be living below the poverty line. Households in poverty do not usually sit idle, waiting for growth of programme benefits to come their way. Rather, they adapt numerous coping strategies that ultimately interact with national policies.

In Rakai poverty is generally perceived differently by the different categories of people. For example, women in fishing communities and urban areas define poverty as the inability to spend on luxurious items. The youth on the other hand consider poverty as lack of skills that can enable them to earn a living or the inability to transform the acquired skills into practice. However, many of them perceived it as the lack of basic goods and services such as housing, clothing, land, productive assets, and markets. This condition is also associated with isolation, powerlessness, physical weakness, weak family institutions and indebtedness. A big proportion of the population is peasants whose livelihood is basically ensured through subsistence crop farming. Majority of the population is involved in agriculture on a small scale using labour intensive technologies, which are greatly vulnerable to the adverse effects of HIV/AIDS and other socio-economic and physical conditions. A few other households live off income generated through livestock keeping, hiring out labour, trading, cottage product, and social support. For many reasons (e.g. lack of labour and the attendant reduced production, high medical and funeral costs, distress sale of assets), HIV/AIDS impacted families tend to have very few opportunities for income earning or saving. The emerging family structure distortions such as child headed and female headed households undermine family income generating mechanisms; affect the nutritional situation and food security of the families, resulting into compromised productivity capacities of the affected families. Labour intensive farming systems employed by the households, with a low level of mechanization and agricultural input are particularly vulnerable to the effects of adverse conditions. Generally, the poverty situation in Rakai district can be assessed in a number of areas and these include Health, Housing and Shelter, Education, Water, Sanitation, Economic environment, Agriculture and food security, Roads and Security.

5.9.9.2 Geographical Inequalities

Poverty in the District varies across Sub-counties with high levels experienced in certain areas. Sub-counties such as Lwamaggwa, Ddwaniro, Kyalulangira and Nabigasa that are prone to poor weather conditions such as drought or little rains usually experience low agricultural productivity. Given that the district is predominantly agricultural with over 70% of the population involved in subsistence farming, it's therefore possible that the district is at high risks of external shocks. The external shocks usually experienced by these sub counties lead to low household income, affecting the revenue base of the district. This consequently affects the capacities of both communities and local governments to contribute towards co-funding for development projects. The district with support from NGOs like World Vision, VI Agro-Forestry and Community Enterprise Development Organization (CEDO) are running food security programmes.

5.9.9.3 Vulnerability

The most vulnerable groups in the sub county are the:

i) Aged: This group is unable to work, illiterate in most cases and are vulnerable to diseases;
ii) PWDs: This group is discriminated from jobs and are illiterate in most cases;
iii) Widows: Loss of property, unemployed, lack money to educate the children and are discriminated in society;

iv) Non-going school youths: Unemployment, lack assets lack skills and are vulnerable to diseases; and v) Orphans: Unemployed or uneducated, have no assets and lack care.

Table 46: Distribution of Service Delivery by RGCs in the Project Area

RGC	Indicators	Action
Kalwanyi, Kasese, Mweruka, Kijwara, Magabirano A and Magibirano B, Ndaga A, Katunga, Kijonjo and Kyema	Low water coverage Poor service delivery Low latrine coverage Poor road network Lack of capacity/skills to invest in viable projects	Sensitization of communities Provision of piped water Health and hygiene sensitization Improve on road network Skills development programs

Source: Rakai District Development Plan, 2015-2020

5.9.9.4 Health

Across all communities, malaria was the most commonly reported illness. Respondents admitted the existence of other diseases such as flu/coughs, but insisted that malaria is the most rampant within their community. Majority of the PAPs had no vulnerabilities except the 31 PAPs identified whom necessary support should be accorded to. These include Widows who are elderly and with limited support (7 PAPs), elderly Males with limited support yet they are the bread winners of the household (17 PAPs). 5 PAPs of the surveyed population had physical disabilities and 2 PAPs were mentally unstable. All these will need extra support during project implementation to ensure the benefit from the Kasese RGC Water Supply and Sanitation Project.

Despite the prevailing common diseases and vulnerability in the project area, several factors were forwarded by the surveyed population as the causes that limit their access to healthcare. 34.2% of the surveyed population attach cost as their highest limitation to access healthcare, while the distance to the healthcare facility affected 42.9% of the surveyed population. Only 2.3% cited the absence of medicine or medical personnel at the healthcare facility among other reasons that limited them from seeking healthcare services. With the implementation of the Kasese RGC Water Supply and Sanitation proposed Project, many people will have at least access to better sanitation as the area develops further for them to equally access better healthcare within reach.

5.9.9.5 Housing and Shelter

Due to poverty, people here, live under very poor conditions. The majority live in temporally shelters. This has greatly impacted on children and women and the consequences have been broken homes, child abuse, defilement coupled with early marriages and poor health.

5.9.9.6 Education

The majority of the respondents had attained up to primary six (P6) level of education (47.1%) These include all respondents that attained between P1 up to P6. 29.2% completed primary seven and attained the Primary Leaving Certificate awarded by the Uganda National Examination body (UNEB). Only 11.0% attained up to secondary level of education (between S1 up to S3) but did not complete the Ordinary Level of education. 6.5% completed the Ordinary Level of education. Only 0.6% completed Advanced Level of education, 1.0% attained a diploma in various fields while 3.6% had no education at all while only 0.3% had attained a certificate in different fields of study either after completing A-Level (Advanced Level of education) or through the other options that are left open to anyone who desires to attain the same. Only 0.6% attained a Bachelor's degree. From the findings, majority of the respondents started education but did not complete primary education. The survey

results align with the national dropout rate according to UNICEF's 2016 Annual Report, which indicates that 33% of students drop out before completing primary school.

The level of education affects the mode of communication in the project area and how implementation of the Kasese Water Supply and Sanitation Project will be done. It is paramount for all engagements with PAPs at the RAP implementation phase be conducted in local languages so that they fully understand the messages being passed on. Additionally, this calls for literacy trainings and support during opening of bank accounts among other RAP implementation activities. Amongst the respondents who discussed factors limiting their access to education, 43.9% cited cost to be their main limiting factor, followed by long distance to education institutions 37.7%, low attitude 9.4%, transport 3.6%, work 3.1% and marriage being the least at 2.3%. It is also imperative to note that in Rakai District girls drop out of school due to teenage pregnancy, sexual harassment and early marriages whereas for boys it is indifference to education. In addition, a significant number of girls help with house hold chores. It's thus important that at the ESIA and RAP Implementation phase, information dissemination should be mostly in local language for ease of understanding the massage.

5.9.9.7 Water and Sanitation

According to the 2015-2020 Rakai District Development Plan, the safe water coverage is 45%, latrine coverage is 76% and good latrine coverage is 64%. Additionally, the greatest distance is approximately 16km from the water source. According to the RAP household surveys, ponds /dams and constitute 98.4% of the main water source for the surveyed population, community boreholes and rainwater constitute 0.6% and the protected springs only 1%. Much as these boreholes are located sometimes as far as 5km from some people, it remains the best alternative for water as shown in the table below;

Distance	Frequency	Percentage
0-1 km	55	17.9
2-3 km	115	37.3
4-5 km	107	34.7
7+ km	31	10.1
Total	**308**	**100%**

Figure 16: Distance people walk to fetch water

The overwhelming majority of survey participants (99%) have access to a pit latrine only, 1% has a flushing toilet. The percentage of survey respondents with access to a flush toilet is aligned with the national rural averages according to the 2016 UDHS. Only 19% of Ugandan households use improved sanitation. Urban households are more likely than rural households to use improved sanitation (27% versus 16%). Eight in ten households use unimproved sanitation: 20% use a shared facility, 55% use an unimproved facility, and 7% have no facility.

The households without any form of sanitation and use neighbors or communal pit latrines are mainly due to the expenses and difficulty involved in the construction of sanitation facilities. Some of the soils in the project area are loose and often collapse making the difficult and more expensive. Therefore, the Kasese RGC Water Supply and Sanitation Project will supplement sanitation efforts by constructing 3 public toilet facilities.

Plate 13: The existing valley dam constructed by World Vision as the only source of water in the area

Plate 14: One of the defunct boreholes within the project area

5.9.9.8 Economic Environment

The high level of poverty in the Sub County has been as a result of a high rate of unemployment and low-income levels mainly by men, women and youth. This has led to land degradation and deforestation as the unemployed struggle to survive, there has also been an increase in spread of disease.

5.9.9.9 Agriculture and Food Security

A poor household is faced with landlessness or has little land that is not productive. In some cases, a poor household rent land and hire or borrow farm implements like hoes and pangas. Such households also lack seeds for planting. A baseline survey conducted by RACA May 2006 in Byakabanda, Ddwaniro, Lwanda, Kyalulangira and Rakai Town Council to assess the livelihood of female headed household revealed that the households owned an average of 0.5 acre of banana plantation; 0.3 acre of coffee, 0.2 acre of eucalyptus. Yet most of the households did not own any other land that could have been redundant. Each household had an average of 2 hoes, but hardly owned a bicycle. This gives an insight of productive assets owned by most of the households in the community. Increased deforestation, overgrazing, vermin's, pests, poor farming methods, lack of farm inputs, and inadequate water for animals has led to poor and low production, malnutrition, low income and high school drop

out because of lack of school fees. Extreme poverty or widespread effects on livelihood caused by agricultural loss and food insecurity can severely impact on the communities. However within the project area, there is no food security in households because of low yield as everything is consumed and sold off to get money to meet other household obligations.

Plate 15: Agriculture as the source of food security in the project area

5.9.9.10 Security

Due to low incomes resulting from high level of unemployment especially the youth, there is a very high level of moral degeneration culminating into insecurity in the area. People have lost lives and property causing a low morale to work thus a setback in personal development at household level.

Plate 16: The Mweruka Police Post near the Town Council Offices

5.9.9.11 HIV/AIDS

Rakai District HIV prevalence rate is 12%, which is very high compared to the National average of 7.3%. This high prevalence rate has contributed to persistent poverty in the district because of its effect on the productive workforce. Among the ultimate effects of HIV/AIDS is the distortion of the institution of the family leading to the emergence of child headed households and female headed households. Other factors at interplay for the formation of child and/or female-headed households are cultural, demographic and social-economic. High mortality rates among adults are threatening

economic and social well-being. Women and children are bearing the heavy burden of nursing the sick and managing households with over-stretched resources. Observations show that when a husband dies of AIDS in a family, the mother is also often living with HIV/AIDS and dies shortly thereafter, leaving children as orphans. This phenomenon has resulted into a lot of child-headed households in Rakai.

Approximately 10.59% of the district population being orphan manifests a high rate of dependency thus further constraining the meagre resources available to households. Majority of the population is involved in agriculture on a small scale using labour intensive technologies (Child Headed Households and Female Headed Households Baseline Survey Report, 2006). The other few households were living off income generated through hiring out labour, cottage products, and external family support. For many reasons (e.g. lack of labour and the attendant reduced production, high medical and funeral costs, distress sale of assets), HIV/AIDS impacted families tend to have very few opportunities for income earning or saving, and survive basically on rudimentary means. The labour intensive farming systems employed by the households, with a low level of mechanization and agricultural input are particularly vulnerable to the effects of AIDS.

5.9.10 Gender Aspects

In Rakai District, issues of gender mainstreaming still require concerted efforts. Women participation in leadership is still hampered by cultural beliefs and perceptions. Most women who have actively participated politically are on affirmative action basis. There are low levels of education among women. The current district top science jobs are dominated by men. Many parents in Rakai do not prioritize girl-child education. Because of disparities and need to empower women, there are a number of partners like the World Vision in Rakai to empower girl child and Women. SGBV is perpetrated against men, women, boys and girls, however, the vast majority of cases reported involve women and girls. Existence of SGBV violates one's rights and slows down progress in achieving sustainable inclusive human development UBOS, (2019). When respondents were asked about the main perpetrators of GBV, 51.7% mentioned male spouses, 40.6% female spouses and strangers as the main perpetrators of gender-based violence. Strangers were also revealed as some of the perpetrators 7.7%. At RAP implementation, collective participation and decision making at the household level needs be encouraged to minimize cases related to gender based violence and domestic related violence.

6. PROJECT NEED AND ANALYSIS OF ALTERNATIVES

6.1 Introduction

This Section evaluates available options to the proposed action, so as to arrive at the most environmentally friendly alternative, which maximizes economic, social and technical benefits resulting into minimal or insignificant environmental impacts. The comparison of alternative was done to evaluate and address the design alternatives that were examined and proposed during the feasibility and pre-design study of the proposed project. Therefore, according to the 2011 EIA Guidelines for water resources-related projects, the following alternatives/options were considered:

a) Project or No Project Alternatives;
b) Technology Selection Alternatives

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

6.2 No Project Alternative

Analysis of the "no project option" as an alternative provides an environmental baseline against which impacts of the proposed action can be compared. This alternative means that the water supply systems will be left in their original states. The alternative ignores all positive impacts likely to be realized in the project area, like the increased access to safe and clean water, livelihood improvement, creation of both skilled and un skilled employment, induced development among others. This option is mostly applicable in situations where the proposed project area is in ecologically or socially sensitive areas and the negative impacts will be of significance and no proper mitigation measures can be formulated to eliminate or minimize the impacts to manageable or acceptable levels. The land on which the water supply system infrastructure will be put is less ecologically sensitive and no households will be displaced. The No Project Option is the least preferred option from both the socio-economic and partly environmental perspective because individuals, institutions, other water users and the business communities would be deprived of increased accessibility to clean and suitable water.

6.3 Project Alternative

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

6.4 Water Supply alternatives

In the design, the design was performed on the basis of the maximum day water demand of 429m^3/day. Identification of potential water sources for both current and future development have been considered. Only one water supply option was foreseen in this project area and that is the ground water supply option since the proximity of the surface water option to the project area is very large hence making it not viable to consider. Ground water and surface water options were considered as further detailed below.

6.3.1 Ground Water Supply

Two boreholes were drilled in Kiziba village; that is; Magabirano and Kasese boreholes. The yields of are 5.1 and 17.5m^3/hr and the required borehole yield is 26.8m^3/hr over an 8-hour pumping regime. Taking into consideration the combined borehole yields of 53.6m^3/hr, an additional borehole of 31m^3/hr was required to supply the piped water system. An analysis of the borehole yield against the maximum day demand was carried out as seen in Table below.

Table 47: Analysis of Available Groundwater vs Demand

Borehole No.	Location (Village)	Well Status	Borehole Yield (m^3/hr)	Pumping Duration (hrs)	Groundwater Supply (m^3/day)	Groundwater Supply Vs. Maximum Day Demand		
						2021	2031	2041
						Water Demand (m^3/day) per Year		
						270	339	429
Supply Vs Demand								
DWD-60875	Magabirano	Newly drilled	5.1	8	40.8	15%	12%	10%
DWD 60890	Kasese	Newly drilled	17.5	8	140.0	52%	41%	33%
Total for All Available Wells (5No.)			**22.6**	**8**	**180.8**	**67%**	**53%**	**42%**
Supply Shortfall (m^3/day)						***-89***	***-158***	***-248***
Supply Shortfall (m^3/hr)						***-11.2***	***-19.7***	***-31.0***
Alternative Pumping Duration								
DWD-60875	Magabirano	Newly drilled	5.1	10	51.0	19%	15%	12%
DWD 60890	Kasese	Newly drilled	17.5	10	175.0	65%	52%	41%
Total for All Available Wells (2No.)			**22.6**	**10**	**226.0**	**84%**	**67%**	**53%**
Supply Excess (m^3/day)						***-44***	***-113***	***-203***
Supply Excess (m^3/hr)						***-4.4***	***-11.3***	***-20.3***
Source: Field Study Estimates								

From Table above the following should be noted:

a) A combined borehole yield of 22.6m3/h over an 8-hour pumping regime was able to satisfy the ultimate year (2041) demand of 429m3/day since there will be a shortfall of 31m^3/h;

b) An alternative pumping regime of 10 hours per day (based on a combined solar and grid electricity) was still not be sufficient from 2031 to meet the ultimate year demand and will require drilling a new well of 20m^3/h and putting it online before this year (2031) is reached; and It was thus recommended that a new borehole of approximately 20m^3/h (given the geology of the area that hardly delivers boreholes with higher yields than 20 m3/h) be sited and drilled in the construction stage to augment the existing supply owing to the fact that demand for water connections will increase in the event that implementation stage is completed.

6.3.2 Point Water Sources

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

6.3.3 Surface Water Sources and Rainwater Harvesting

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

Plate 17: The only open valley dam that was constructed by World Vision as the source of water for people currently.

In conclusion on the ground or point water or surface water alternatives, the surface water source of open dams/streams is not safe for the human consumption as they are shared with livestock. Point water sources within the project area are also not feasible has they are intermittent and only reliable during rainy seasons. This leaves the groundwater sources in the form of production wells (Kasese and Magabirango as the viable source of water for the piped water supply system for Kasese RGC.

7. STAKEHOLDER ENGAGEMENT

7.1 Introduction

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

Stakeholder meetings were held at Rakai District, Kiziba Sub County (currently Mweruka Town Council). The consultation process ensured that their concerns were captured and have been addressed during ESIA. These include stakeholders freely expressing their concerns on the project's environmental and social risks, impacts and mitigation measures. A wider intensive consultation process was carried out during the Environmental and Social Assessment.

Informal conversational interviews, observations, FGDs and KIIs were the key data collection methods applied. The consultation process ensured that their concerns were captured and addressed. In general, the majority of stakeholders supported the project and found it to be beneficial.

7.2 Objectives of Public Disclosure and Consultations

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

The specific objectives of the Consultations were;

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

Stakeholder consultations and public participation during the ESIA process were conducted in line with the requirements of the National legislation and regulations. According to the National Environment (Environmental and Social Assessment) Regulations, 2020, Part III under section "*Procedure for*

Undertaking Scoping and Environmental and Social Impact Study", Sub-section 16; "*Stakeholder consultation during the environmental and social impact study"*, stakeholder consultation is crucial during the ESIA study.

7.3 Stakeholder identification and analysis

7.3.1 Stakeholder Identification

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

The following aspects were considered when identifying and prioritizing stakeholders for this ESIA:

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

7.3.2 Stakeholder analysis

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

Table 48: Stakeholder Matrix

Group	Stakeholder	Description and key attributes
Funder	World Bank	✓ To ensure that the Banks Safeguard Operational Policies have been observed and implemented as appropriate. ✓ Support the project with funding and implementation support.
National Level Stakeholders	Ministry of Lands Housing and Urban Development (MoLHUD)	✓ Approves all reports presented by the consultant regarding valuation
	Ministry of Gender, Labour and Social Development (MoGLSD)	✓ Protection of human rights and vulnerable social groups. ✓ Occupational and community health and safety of workers. ✓ Approval and monitoring of the social safeguards ✓ Approval of permits like workplace permits, OHS
	Ministry of Water and Environment (MWE)	✓ Overall mandate to monitor, assess and regulate water resource ✓ Monitor and guide the use of wetlands for sustainability and other water bodies within the

		project areas ✓ Approval of the Water abstraction permits ✓ The implementer of the proposed Project ✓ Overseeing and monitoring the proposed project activities
	NEMA	✓ Regulation of the environmental aspects of the project(s). ✓ Legally mandated to handle certain critical environmental issues ✓ Provide the necessary permits and approvals for quarries, borrow pits and other auxiliary sites ✓ Work closely with the project team to handle all matters related to environmental protection ✓ Overall clearance of ESIA and other project briefs about the project facilities. ✓ Monitor and supervise the ESIAs compliance
Local Governments	District (Rakai District Local Government)	✓ Mobilize various stakeholders including the communities/beneficiaries ✓ Monitoring and supervision support for the implementation of the projects. ✓ Offer security to the project team (RDCs Office) ✓ Review the ESIA and give comments (Environment and Community Development Offices)
	Kiziba/Mweruka Sub Counties (Technical and political staff)	✓ Make decisions that may affect the project, ✓ Offer support and supervision of the project ✓ Help in the identification of the location of the water and sanitation facilities.
	Local Councils	✓ Mobilize communities ✓ Offer support in the planning, implementation and operation of the project ✓ Offer support in the identification of the locations of the water and sanitation facilities ✓ Monitoring of the projects ✓ Provide social justice to vulnerable communities ✓ Incorporate information about the project in their teachings, gatherings/meetings for acceptance especially regarding water and hygiene-related information.
Different Community groups,	Traders, landlords, tenants, business people, affected persons (Landowners who offered land for the pro-poor facilities' installation)	✓ Develop construction (works) schedules in their respective areas. ✓ Participate in the scheduled meeting regarding the project activities and progress ✓ Identify mitigation measures of the environmental and social issues ✓ Monitor the progress of the project activities ✓ Input in the planning and identification of water and sanitation facilities.

7.4 Stakeholder engagements

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

7.4.1 Formal meeting with the Stakeholders

The project had an inception workshop where all the stakeholders were invited as a start meeting to inform all the stakeholders about the project. MWE organized the meeting to inform all stakeholders about the project, its objective, the intended activities, the project extent, and the related studies to be undertaken, including the RAP and ESIA, water-related studies, source of water among others. The main object was to solicit, potential impacts and possible mitigation measures and also solicit initial community responses. The stakeholders were able to express comments and queries during this meeting as seen in the minutes under table 29.

7.4.2 Key informant interviews

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

Plate 18: Consultants engaging the Mweruka Town Mayor and his committee at the Town council offices

Key informants at National level included staff from MoGLSD and Regional MWE officers and below were the issues raised and responses by the Consultant;

Table 49: Stakeholder engagement at National level

Stakeholder	Views and concerns	Response
MoGLSD, March 22, 2022	**Health and welfare:** ▪ Welfare provision based on gender ranging from accommodation and sanitation facilities. All employees should have written documentation of their contracts (explaining their salary/ wage, time-off duty etc.) ▪ HIV/AIDS services should be extended to the employees through provision of contraceptives and allowing them to optionally share among themselves.	MWE will ensure that the Contractor has all that lined up in the ESMP and comply to these standards
	Health and safety considerations: ▪ Personal Protective equipment should be provided based on the risk assessed. ▪ Safety (occupation & community) during construction should be observed. Risk assessment should be done, mitigation measures addressed and protection explained for preparedness. ▪ The contractor should construct sanitation facilities to cater for labour force to be employed different from public toilets planned for the communities.	The Contractor to provide PPE, sanitary facilities and clear signage at the construction sites. MWE to ensure the contractor complies.
	Community engagement: ▪ The redress mechanism plans should be in place to address challenges among workers, workers to community. A committee should be formed therein having natives of the area especially LC chairperson to bridge the gap between workers and community.	The designs for the sanitary facilities will be gender segregated and cater for vulnerable groups. GRM will be in place at all levels (National, District, Sub county and village)
	Employment: ▪ The employment policy of the country should be followed; contracts, payment mechanisms, appointment letters should be in place. Children	These (employment and VAC) will all be captured in the contractor's ESMP and MWE to ensure the contractor complies.

	should not be employed.	
MWE Regional offices RWSCR, NEMA and Wetlands) on 31st March, 2022	The meeting also confirmed that most of the boreholes around Rakai district are highly mineralized. Therefore, mitigation measures should be put in place before development of the Kasese WSS.	The developer (MWE/RWSSD) will put up measures to ensure the water is free of minerals during construction.
	Develop Water Source Protection Plans and ensure that they are implemented during the commencement period of the project such that the implementation activity takes place alongside the project so as everything is finalized at the same time and this will reduce on the man power required.	These have been developed for all the Sources for the 2RGCs in the region (Lwentulege and Kasese)
	Ensure to develop sanitation/ solid waste management plans and clearly indicate the dumping so as to prevent issues of leachates and salts flowing to water sources and pollution of the environment due to improper solid waste handling.	This will be incorporated in the ESMP
	The developer should not negate their responsibility of managing the entire ecosystem. They must work closely with the catchment management committee and wetland committee to ensure the catchments or the wetland are effectively managed and conserved without causing more harm.	This was noted and will be referred to the MWE for action
	The ministry has a policy of up to 3% of the project budget of any water intake/ source project to be used for the implementation, preparation of the source water protection and the developer should note this in the BOQs.	This will be forwarded to DWD as a recommendation.

Plate 19: The consultant engaging the councilors of Mweruka Town Council

7.4.3 Community Meetings

Consultations at community level targeted leaders from Kibaale Town Council, Kibanda and Kiziba Subcounty Leaders, and people to be affected by land acquisition for the borehole sites, reservoir sites, access roads, and sanitation facilities sites and land owners along existing community access roads along which the transmission and distribution pipes will be laid. The affected communities/PAPs were mobilized with support from the local leaders.

The meetings were conducted in the relevant local languages such as Luganda, Runyankore, and Kinyarwanda to cater for any linguistic barriers that would deter the opportunity to participate.

Table 50: Schedule of local community consultations

Subcounty	Parish	Villages	Venue	Date
Kiziba	Mweruka	Kalwaayi	Mweruka Church of Uganda	2 July 2022
		Kasese		
		Kayolo		
		Kijwaala		
		Kiziba		
		Kobukulula		
		Kyajjumba		
		Magabirano A		
		Magabirano B		
		Mweruka		
		Nyanja		
Kiziba	Ndagga	Katunga	Ndagga Church of Uganda	2 July 2022
		Kyamigongo		
		Ndaga A		
	Rwakakara	Kiyonza		
		Kyemwa		
Kibanda	Magabi	Kiyonza	Kiziba Town	2 July 2022

Subcounty	Parish	Villages	Venue	Date
Kibaale Town Council	Kigumba Ward	Kyakasese B Cell	Council Offices	

Communities were sensitized about the project to ensure the participation and active involvement of the local community members in the baseline survey and subsequent water interventions. Mobilization of the communities was done through the chairpersons of the respective villages. Both women and men attended these meetings and a number of issues were raised. All the community meetings were conducted in local and understandable language.

Plate 20: Stakeholder meeting held at the Kasese production well site with community members

Plate 21: Stakeholder meeting held at Mweruka Church of Uganda with community members

Plate 22: Stakeholder meeting held at Ndagga Church of Uganda with community members

7.5 Key findings from stakeholder consultations

In relation to the proposed project, the main findings from the engagements and public participation were largely categorized into two parts; the envisaged impacts (Both negative and positive) and general concerns on the project. The main findings from the engagements are presented below;

Table 51: Stakeholders' views from the local community consultations

Views/Comments/Questions	Team's Responses
• Will structurers be compensated for in case the pipe is affecting them?	• Efforts have been made to minimize physical displacement as much as possible. However, in case any structure is found to be affected, the same will be compensated by the Government of Uganda through Ministry of Water and Environment based on the Valuation Report upon being approved by the Chief Government Valuer
• Will water be free of charge or there will be some charges incurred	• No, however the utility tariff charged will be affordable and somewhat similar to that charged in other areas. The charges usually ensure the sustainability of the project
• We request for Jobs for the local communities during construction phase of the project	• The request is noted. And as already witnessed, our project coordinator is from the project area.
• Given that this is a development project, why do we have to pay utility charge for water usage	• We pay for utilities to enable operation and maintenance activities and for continuity and sustainability of the project.
• Where is the source of the	• This water source will be a borehole within our

Views/Comments/Questions	Team's Responses
water?	community, the source has been tested and found to be safe and reliable to sustain the project for a desired period based on population growth statistics
• Given that the proposed distribution pipe is only on one side along the access road, will the community on the other side be able to get service lines	• The utility service provider will be responsible for installation of water service lines after application for water connection by a customer. Therefore, the community on the opposite side of the distribution pipe will also be connected to water upon fulfilment of the prerequisites
• How much are you paying for our crops?	• Compensation will be based on what one is likely to lose but more importantly on the Rakai district compensation rates approved by the Chief Government Valuer
• Will public stand taps be established in addition to service line extensions to private individuals	• Yes, they will. The specific locations will be determined upon application at the project implementation.
• Will service line connections to private individuals be free of charge or there will be some charges incurred	• No, however the charge will be affordable and somewhat similar to that charged in other areas. This is for the benefit of both the project implementer's and the end users to ensure sustainability
• Will the charge be much fair for those who are sacrificing their land for the project?	• A uniform unit charge will be applied. However, connection fees may vary since for you the pipe will be much closer to your home
• Will payments come before or after the project has started?	• The MWE will ensure that people are paid before construction phase. However, there are always remnant cases due to several reasons thus construction will proceed when some people have not yet been fully paid but still in process.

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

7.6 Feedback from All Stakeholders Engaged

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

Table 52: Comments and concerns during the community stakeholder engagements

SN.	POSITION	COMMENTS	How issues will be/were addressed
1.	Chairperson LCIII, Kiziba Sub county	▪ We are happy we are going to receive safe water which will reduce on water borne diseases ▪ The water in the dry season has been costing sh. 1000 – 2000 ▪ Issues with children being abused in the course of walking long distances looking for water will be solved/reduced ▪ He requested that the project be extended to other parishes so as the whole Sub County is covered ▪ Expect the locals to be given jobs so as they are liberated from poverty. ▪ Expects a reservoir and taps to be constructed, and in that people will be liberated from sharing water with animals as it has been at the dam.	▪ The cost of water will be determined by the water authority using a standardized tariff. ▪ The issue of extending the project to other parishes is tagged to availability of funding as well as water source option. ▪ The procured contractor will be required to hire locals as a way of job creation within the project area.
2.	Town Mayor Mweruka Town Council.	▪ We have been waiting for this project anxiously ▪ Our area is hilly and people on top of the hills don't have access to water at all ▪ The main source of water in the area is water tank harvesting system and some families who cannot afford harvesting water suffer	▪ The Kasese WSS project will ensure that community members have access to safe water within their yards. Public standposts will also be provided as a pro-poor strategy for accessing water services
	Deputy Major; Mweruka Town Council	▪ The project is welcome in the area ▪ People are really suffering because of water ▪ Have been involved from the project inception stages	▪ All the key stakeholders for this project have been involved from inception for successful implementation and sustainability of the project.
	Councillors at the Town Council	▪ The Ministry should really implement the project because water is a challenge ▪ Involve the local leaders in the implementation. ▪ Jobs should be given to locals especially for trenching	▪ The project will be implemented as the funding is available ▪ Local leaders and all the stakeholders within the project area will be involved ▪ The Contractor for the project is required to provide jobs to the locals.
	Chairman LC I Chairperson;	▪ The project is welcome and timely ▪ Residents are suffering because	▪

	Magabirano cell	water is a serious issue in the area ▪ The ministry should hurry to implement the project	
3.	Community members	▪ They expect employment opportunities ▪ Taps should be spaced and distributed in all the cells.	▪ Employment opportunities will be provided for. ▪ Public standposts will be provided for in different cells.
		Qn. Is water going to be for paying, or it will be for free of charge? Ans. A small amount of money agreed by the district, sub county and representatives of the water user committee will be paid.	
		Qn. If I want water in my compound? How much do I pay? Ans. The amount charged will depend on the distance (in Km) between the main pipe to your home.	
		If I reside very far from the centre and I don't have the ability to extent water my home. How do I benefit from this project?	
		During the rainy season, the area around the borehole floods how are you going to do about that?	

All the stakeholders consulted supported the project on the basis that it would induce development in their area/district and lead to the establishment of more related projects. However, it was mentioned that the developer should be able mitigate all project related negative impacts such as waste generation, noise, destruction of crops during trench digging and pipe installations and any other negative impact as would be realized as seen in the Minutes from the stakeholder meetings.

7.7 Public Disclosure and Consultation Plan

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

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

Like stakeholder identification, public consultations and information disclosure is a continuous process throughout the ESIA exercise. KIIs and FGDs were utilized for PCDP. A scoping exercise was undertaken on 9th February and then the consultative meetings on 18th May 2022 at Kiziba Sub County (currently Mweruka Town Council) and were aimed at disclosing key project information (such as changes in the water source etc.) and to generate a master list of Stakeholders to be consulted. Key stakeholder concerns were also identified so that they could be considered in the implementation of the project. Key issues identified are outlined in Table 52 above.

7.8 Grievance Redress Mechanism

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

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

7.8.1 Community Grievance Redress Mechanisms

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

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

Depending on the nature and the severity of the complaint/s, the GRC in consultation with the Project Affected Persons (PAPs) or Complainant, shall identify and decide on an approach for grievance

resolution. Where appropriate, complainants shall be given the choice of selecting an affordable approach with which they are comfortable and confident and that is beneficial to them. For construction-related complaints, it will be the Contractor's responsibility to address them. Usually these kinds of complaints are described as environmental and social impacts and include issues related to dust, flooding, blasting (noise, vibration, and evacuation), lost access, and dangers to life, damage caused to public roads from heavy machinery, deteriorating water quality and quantity, damage to property and crops, soil erosion, workers' misbehaviour, defilement/child abuse, and others. The project GRMs will have other measures in place to handle sensitive and confidential complaints, including those related to Gender based violence, Sexual Exploitation and Abuse/Harassment (GBV, SEA/SH), Referral pathways based on the survivor centred approach will be incorporated in the GRM processes and disseminated in the stakeholder engagement plan. Existing legal and administrative structures will be contacted to resolve grievances of a criminal nature.

7.8.2 Workers Grievance Redress Mechanism

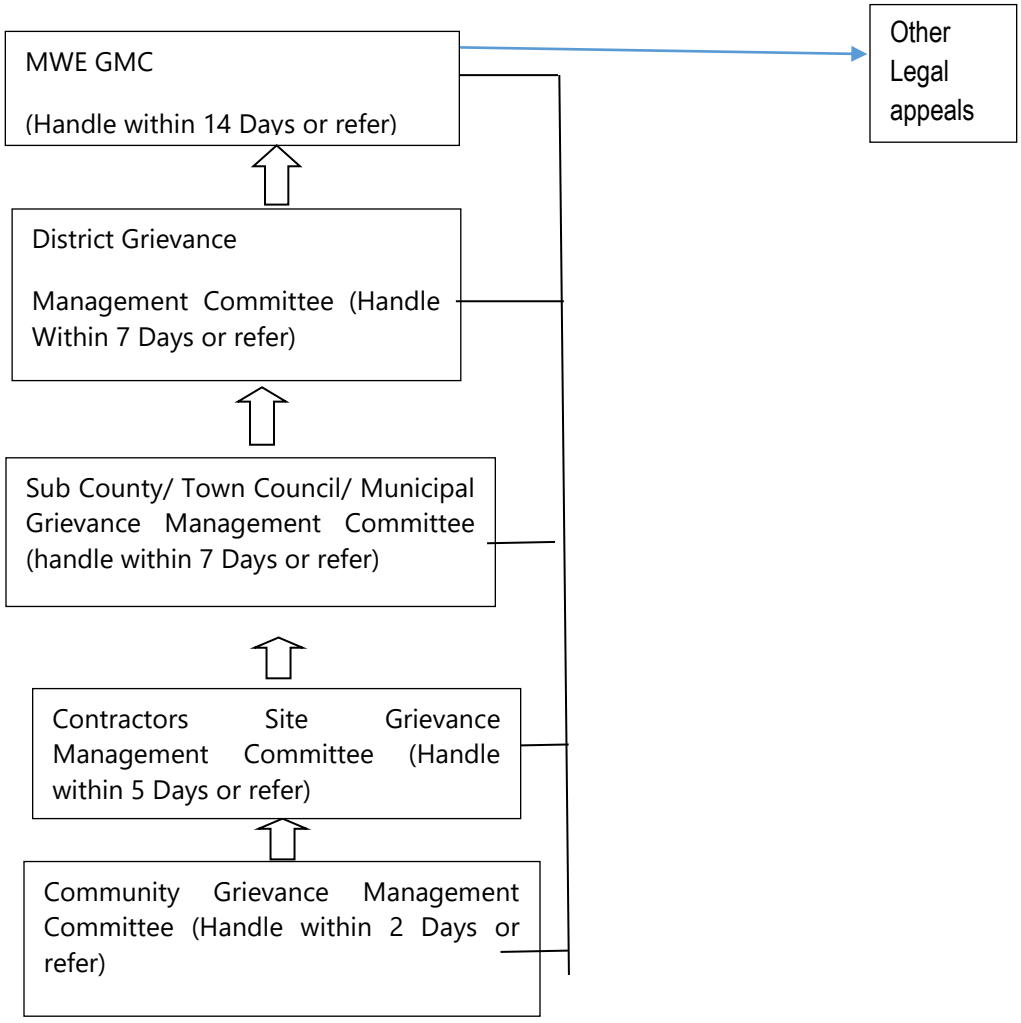
In accordance with the Employment Act (2006), the MWE/RWSSD shall ensure that the Contractor has provided contracts to all workers and has established a GRM and grievance redress committee with workers' representation. It is the responsibility of the Contractor(s) to ensure that Workers GRMs and with redress and appeal processes and institutions is in place and shared with MWE/RWSSD before the commencement of the Construction Phase.

The steps in grievance handling for the PAPs and the community in general are outlined in Table 53 below and once received, all grievances will be responded to in a maximum of 19 days.

Table 53: Grievance handling steps

#	Step	Responsibility
1	Receive Grievances and Provide PAPS with a Grievance Acknowledgement Form	MWE, RAP Implementation Consultant, and GMCs
2	Grievance Registration and Acknowledgement	MWE, RAP Implementation Consultant, and GMCs
3	Grievance Sorting and Logging in database and tracking system	MWE, and RAP Implementation Consultant
4	Grievance Assignment	MWE
5	Grievance Processing and Feedback (19 days)	MWE, RAP Implementation Consultant, and GMCs
6	Corrective Actions, Grievance Follow Up and Closure	MWE

Flow of Appeals or Referral of Grievances and Timelines



8.ANTICIPATED ENVIRONMENTAL AND SOCIAL IMPACTS

8.1 Introduction

Key potential E&S impacts of the project for each stage of the proposed project cycle are assessed in this chapter and an Environmental and Social Management Plan (ESMP) is provided in the Chapter 9. Prediction and analysis of possible positive and negative impacts of construction works for the water system are discussed. Impact analysis involved determination of nature of impact, its magnitude, extent, duration of potential impacts. For the proposed development, potential positive and negative impacts were identified both for the construction phase and operation phases. Throughout this report, impacts have been characterized as:

a) "Positive" when they;
   - Enhance socio-economic welfare e.g. health, employment,
   - Enhance quality of existing environment.

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

An improvement and increase in potable water supplies and sanitation may generate interrelated improvements in health, economic and social welfare of the community. However, in addition to the many possible beneficial impacts, adverse impacts may arise from these improvements. The impact of potable water supply and sanitation on health depends on the quality and quantity of the piped water supply; the proportion of population covered; and the utilization of the water and sanitation facilities by the population. In this chapter, prediction and analysis of possible positive and negative impacts of construction and operation of the water pump station, Sanitation facilities, Office block and the reservoirs is presented, with main focus on the proposed construction of the pump station at the motorized borehole. Table 52 below provides a summary of the Positive benefits that will be realised as a result of implementation of this project.

Table 53: Positive Impacts of the Proposed Project

No.	Impact	Remarks
1.	Increased access to clean water	▪ Reduction in the current water shortages. ▪ Improvement of water quality. ▪ Reduction of the time spent and distance travelled to fetch water, which would signify an improvement in the general living conditions of the people. ▪ Improvements in public and household sanitation. ▪ Awareness of personal hygiene. ▪ Overall improved health conditions for the beneficiary population. ▪ Income generating activities for the poor will increase as result of availability of reliable supply of water in public places e.g. commercial water service providers.
2.	Employment opportunities and	▪ The use of appropriate labour-intensive methods for some of the construction activities (e.g. construction of the pump station, office

	increased household incomes and revenues	block and Reservoir) would present employment opportunities for local people and generate direct income benefits to local households. ▪ Some people will be employed in the digging of the transmission and distribution networks, sand and stone quarries, and sale of earth materials to the proposed project and in the service sector around the project site.
3.	Income to material/ equipment suppliers and contractors	▪ Earth materials needed for construction, for example, aggregate (stones and sand) will be obtained from quarry operations. ▪ Number of equipment and materials (such as gravel, bricks, plumber, steel reinforcement and cement for civil works) will be sourced locally within Rakai district and the neighbouring districts.
4.	Increased Public Revenue / Taxes	▪ People who have never worked on such projects would acquire such skills, which they would use to seek employment in future. ▪ The Project would provide grassroots management opportunities for the local people to both be involved in the management of the water supply and protect their local environment.
5.	Boost to the local Economy	▪ Provision for direct employment opportunities to the workforce thus contributing towards alleviation of poverty and income generation for the local community; ▪ Stimulation of business activities related to contracting works for local entrepreneurs (sub-contractors); ▪ Providing trading opportunities for local communities and other small enterprises in the area; ▪ Providing opportunities for provision of basic and other services for the contractors and immediate community. The project will consider employment of locals.
6.	Gender Benefits	▪ The expected reduction in water collection distances and timeswould lead to a reduction of Gender-Based Violence (GBV) that women and girls experience while walking long distances to fetch water. It may also reduce conflict/fights that often occurs at water sources due to big crowds. ▪ It will mean more opportunities for girls to attend schools and more time for women to engage in other economically and educational beneficial activities and also more time for women to take care of their families including caring for the sick and elderly.
7.	Health Benefits	▪ Direct health benefits of the project to the affected population will result in a reduction in the incidence of water-related diseases particularly diarrhoea, typhoid, intestinal worms, skin and eye problems, and dysentery and cholera. ▪ Loss of productivity resulting from sickness related to water-borne diseases and expenditure on related medical care will therefore reduce.
8.	Improved service delivery	▪ The proposed project would result in bringing improved water and sanitation services closer to the people.
9.	Eradication of poverty and improved livelihoods of the local people	▪ The proposed project would result in an increase in the volume of water for production which could result in improved livelihoods of the local people. ▪ Water is indispensable for survival and improving the quality of life – for health (drinking, eating and bathing) and for economic

		development (agro-processing and business). The project would, therefore increase productive activities through reduced sick days and time saved in fetching water.
10.	Combat HIV/AIDS, malaria, typhoid, and other diseases	▪ The awareness campaigns for public health, hygiene and sanitation particularly targeted at women and girls would be widened to include measures for tackling HIV/AIDS and other diseases such as schistosomiasis and diseases related to excreta contaminated water and poor hygiene (cholera, typhoid, and diarrhoeal diseases).
11.	Ensure environmental sustainability	▪ Implementation of catchment and water source protection measures would ensure reliability to the water source.
12.	Develop a global partnership for development	▪ The Project would provide opportunities for the GoU through MWE/DWD to aim at achieving the Sustainable Development Goals (SDG) specifically SDG 6.
13.	Increase in investment in the area standard of living	▪ MWE/DWD will invest heavily in the construction and operation of the Kasese RGC water supply system 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 safe piped water.
14.	Develop a global partnership for development	▪ The project will provide opportunities for the GoU and in particular the Ministry of Water and Environment to work together to achieve the Sustainable Development Goals (SDGs) specifically SDG 6 and 12

8.2 Positive Impacts during Construction Phase

The anticipated positive impacts of the construction phase are discussed below.

a) Employment opportunities

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

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

Impact Enhancement

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

b) Income to material/ equipment suppliers and contractors

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

Enhancement measure

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

c) Acquisition/improvement of skills

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

Enhancement measures

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

d) Increased Public Revenue / Taxes

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

e) Impacts on Local Capacity

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

f) Boost to the Local Economy

The workforce will get most of their food and other necessities from the surrounding area and this will provide a market for the local agricultural producers, and craft producers and other small businesses (local

shops). This will in turn increase the incomes of the local people, which can be invested in other (productive) activities and be used for paying school fees, medical expenses and other domestic needs. The project will stimulate local economic activities by:

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

g) Capacity Building

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

Enhancement Measures

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

8.3 Positive Impacts during Operational Phase

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

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

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

b) Educational enrolment and attendance

Construction and Operation of the water system will lead to considerably increased and consistent access to safe water for the project host communities. In relation to increased provision of potable water supply, time savings are the most immediate and easily measured benefits although its magnitude will depend on the conditions prevailing before the construction of the piped water supply. Consequently, time spent on searching and waiting for water by women and children will be saved. This will enable children, especially the girl child to regularly and attend schoolregularly, while mothers will

get more time to prepare their children for school. Assuming other factors are available (such a scholastic material, teachers) school attendance and performance will improve.

c) Acquisition of new skills

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

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

d) Improvement in household economic status

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

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

Enhancement measures: Water supply should be set taking into consideration the different levels of users. The users should also be educated to avoid wasteful use of the resources.

e) Employment opportunities

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

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

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

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

g) Attainment of the Sustainable Development Goals; SDGs

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

h) Increase in investment in the area

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

i) Environmental sustainability

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

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

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

8.4 Negative Impacts during Construction

a) Land acquisition for infrastructure and loss of structures/property

This is likely to be a moderate impact of the proposed project. It includes permanent land acquisition for the construction of the water source intake (Motorized borehole), office block, pipeline network and trenching to the detriment of land owners. The land-take would be permanent where all the project components would be constructed and temporary along the pipeline network. However, both the transmission and distribution lines would be confined to the road reserves where possible. The Kasese RGC Water Supply and Sanitation Project will require a permanent land take of 1.0839 acres and an Easement corridor of 21.8393 acres. A census was conducted to cover all potentially affected persons who will be affected by the land take for the proposed water supply system (Transmission Lines, Distribution lines and Reservoir) in the Project Area traverses 2 Town Councils and 1 Sub counties, 4 Parishes and 18 Villages / cells and with a total of 782 PAPs. A census was conducted for each of the infrastructure in order to establish their number, types, size and quantity of affected assets.

The construction contractor may require land for construction of lay down areas, and camps during the construction phase. In addition, unintended damage to crops and structures may occur. MWE shall ensure that this land and any impacted assets are compensated for in accordance with the provisions of this RAP. Overall, the proposed project in Kasese Town Council will cause minor resettlement impacts and these are related to those earning a living or residing in places where permanent land take will be required for the reservoirs, and water treatment plant. There are some permanent structures, land, as well as economic activities, that will be disrupted, especially at the intake, transmission route and reservoir areas.

The Project will not impact any residential or commercial structures but for fixtures i.e. 34 fences belonging to 33 PAHs will be affected. The asset survey indicates that these structures are within the 3 metres of the easement corridor. However, the PAPs have sufficient land remaining outside the easement corridor to enable them to relocate their affected stuff on their existing plot but outside the easement corridor. The Project Permanent Land Restrictions (Easement for Transmission and Distribution Pipes) will affect 34 fences of varying construction materials running 1,110.8 metres.

The Project Permanent Land Restrictions (Easement for Transmission and Distribution Pipes) will affect 7 Properties owned by 6 religious institutions. The religious institutions only have land and crops (bananas and eucalyptus) affected and not buildings.

The Project Permanent Land Restrictions (Easement for Transmission and Distribution Pipes) and Permanent Land Acquisition will affect 3 education institutions properties. The schools will only have land, crops and a fence affected. Note that no classrooms or buildings related to education will be impacted.

It is expected that Mweruka Town Council donate about 0.0494 acres for the construction of public toilets proposed at the Mweruka Market in Mweruka village and in Kalwaayi village.

The Project Permanent Land Restrictions (Easement for Transmission and Distribution Pipes) will affect 11 Properties owned by 11 associations. The religious institutions only have land and crops (bananas and eucalyptus) affected and not buildings.

Mitigation Measures

- The district and local authorities in Sub County have already been engaged together with the local land lords and they agreed with communities whose land will be used for the proposed project construction (Consent forms were signed and they have been attached to this report; **see appendix IV).** No grievances were reported and are envisaged.
- Land owners that require compensation (where possible) as project affected persons should be compensated before commencement of the project activities.
- MWE shall ensure that this land and any impacted assets are compensated for in accordance with the provisions of this RAP. However, upon payment of cash compensations, PAHs should be given sufficient time to relocate these fixtures.

b) Loss of crops and vegetation cover and top soil

The existing vegetation and top soil will be cleared to give way to the construction process on all sites i.e. the borehole, water tank, pumping stations and pipeline network areas. The study team discovered that the project area will 1.0839 acres as permanent land take and therefore limited flora of significant impact will be affected. However, clearing of this vegetation will lead to permanent loss of vegetation cover and likelihood of soil erosion due to removal of top soil. The project activities are likely to destroy vegetation with subsequent loss of some shrubs and grasses from the area of operation albeit on a small scale. This is

likely to cause loss of habitat and disturbance to faunal communities in the affected sites but at an insignificant level.

A corollary livelihood impact resulting from the loss of household land is the loss of crops and fruit trees planted on that land. There are also impacts related to loss of timber trees and woodland areas. The Project will impact 2,797 banana clumps at various stages of maturity, the majority being in Mweruka parish. The Project land take will result in the loss of 63 fruit trees, the majority of which are mangoes, followed by guava and pawpaw. The majority of the affected fruits are in Mweruka parish and the least in Kigumba ward. The Project will impact 534 timber-productive trees, most of which (150) are eucalyptus followed by shrubs and acacia. The majority of these affected trees are in Ndagga parish followed by Mweruka Parish, with the minority being in Magabi Parish. The details on the trees, banana plants and other project-affected perennial crops are provided in the RAP and valuation report.

Mitigation Measures

- After construction, there should be landscaping and re-vegetation. The premises will be planted with vegetation/grass and ornamental trees.
- The water source should be fenced off to reduce on going agricultural activities around the borehole to avoid pollution entering the boreholes especially when it rains heavily.
- Minimize vegetation clearance by clearly demarcating work areas.
- Provide environmental awareness training to all employees.
- Rehabilitate all disturbed areas.
- MWE shall ensure that this land and any impacted assets are compensated for in accordance with the provisions of the RAP.

c) Fauna

Disturbance or loss of protected/endangered animal species/communities and their habitat due to construction activities (noise, dust, fumes, pollution, vehicles) at the borehole, water tank, pumping stations and pipeline network areas.

Mitigation / Enhancement Measures

- Minimize vegetation clearance to the project specific site.
- Protect water resources from pollution.
- Protect soils from contamination.
- Rehabilitate all disturbed areas.
- After construction, there should be landscaping and re-vegetation. The premises will be planted with vegetation/grass and ornamental trees.

d) Provide environmental awareness training to all employees. ***Increase susceptibility to Soil Erosion***

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

Mitigation / Enhancement Measures

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

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

e) Effects of Poor Solid Waste Management

Waste will be generated from the construction sites. The waste to stream from the construction sites will include Cement bags, timber and pipe cuttings empty water bottles, food remains from the construction workers and other forms of waste. If not well managed, the area could be prone to nuisance from foul smell, breeding of vermin and vectors, and lead to outbreak of diseases. Extent of this impact will be local to areas where waste is dumped or their immediate neighbourhoods. The impact intensity is assigned low due to the lack of a well streamlined waste management system in Rakai. The sensitivity of receptors is assessed as 'low' given that similar activities have and are taking place in the area and that an experienced contractor will be hired. This gives rise to minor impact significance.

Mitigation Measures

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

f) Generation of Noise

Due to the nature of the construction process, noise levels will fluctuate in line with the combination of machinery or equipment being used at any one time. Noise and vibrations will mainly result from use of equipment like excavators and including bulldozers, graders and dump trucks during site preparation and construction activities. However, noise levels will also vary depending on time and distance as the construction spread progresses along the pipeline route thus the local residents will

not, therefore, be continually exposed to the noise levels for extended periods. Construction traffic associated with the pipeline construction will be routed via main roads and along the ROW as far as is possible. Some minor roads will have to be used for access to the pipeline spread itself and some new access roads will be created.

The increase in traffic movements on minor roads may cause a noticeable increase in daytime noise levels through small villages; this effect will be localised and temporary, and will, for the most part, be restricted to the construction phase of the project. A number of roads will require repair prior to use for construction vehicle access. These repairs will help to reduce noise levels generated by such access, and other vehicular movements. Due to the intermittent and short-term nature of the activities, the intensity of impact is assessed as low and sensitivity of the receptors as medium, given that most of the proposed routes for the water pipelines are located in relatively noisy mixed residential and commercial areas of the project area and its neighbourhood. Roadside pipe laying activities (such as dust, noise, potential for accidents especially at night), access to schools, markets, shops, etc. night time safety, storage of excess excavated materials on road side, storage of pipes and supplies during pipe laying, equipment parking, etc. are envisaged however, the impact is assessed to be much lower than the construction site limit of 85 dB (A) including the receptor sensitivity.

Mitigation strategies:

- Contractor will ensure that equipment is properly maintained and fully functional in accordance with the manufacturer's recommendations.
- The contractor should ensure that noise levels emanating from machinery, vehicles and noisy excavation and construction activities are kept at a minimum for the safety, health and protection of people in the nearby areas. This will be done through regular monitoring of noise levels.
- Regular maintenance, monitoring and, where necessary, the use of silencing equipment will be employed with the aim of reducing noise emissions.
- The selected contractor will be required to submit detailed information on the noise levels which will be generated by the specific methods and equipment proposed and to identify actions required to minimise the noise impact.
- Pumps, generators and other mobile equipment will be sited as far as practicable from housing and other noise sensitive locations, work will not be carried out Sunday during service time or hours.
- During periods of inactivity, equipment will be switched off whenever possible. A limited number of construction activities may have to continue on a 24-hour basis. These include horizontal direction drilling, pipeline cleaning and hydrostatic pressure testing which are relatively low noise activities.
- Conduct noise monitoring and use of PPE where levels are beyond the recommended threshold.

g) Increased siltation of the aquatic habitats

Some of the excavated sediments from the project site and the construction spoils emanating from the excess excavated material and construction debris are likely to increase siltation especially in the nearby seasonal swamp ecology if not managed well and therefore affecting the associated aquatic habitat.

Mitigation / Enhancement Measures

- Ensure that the site is at all times drained adequately and surface run off is directed appropriately to avoid water logging of adjacent area and of the undulating drainage channel in the Sub County.
- Pursuant to Section 23(1) of The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, No. 3/2000 (under section 53 of the National Environmental Act NO.5 of 2019), the 100m protection strip is administered by NEMA and the developer shall apply for a permit from NEMA in order to undertake planting, to reduce erosion; and improve the biodiversity of the area by re-establishing indigenous grass/ tree

species on site especially at the water sources/boreholes. Any replanting will be undertaken in consultation with the District Environment Office (DEO) and District Forestry/Natural Resources Office.

- The project proponent will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion.

h) Increased incidences of diseases

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

Mitigation / Enhancement Measures

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

i) Visual intrusion

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

Mitigation / Enhancement Measures

- The contractor should maintain as much as possible the existing landscapes and plant trees and vegetation to enhance the visual aspect.
- Rehabilitate all areas disturbed by construction and landscape with trees, grass and shrubs
- Keeping the site tidy including managing spoil/soil from excavations by spreading excavated soil

j) Increased accidents and occupational hazards

Implementation of the project will definitely increase volume of human and motor traffic in the project area. The increase in human and motor traffic will be aggravated by the transportation of construction materials, water pipes and other equipment required in the construction of the water supply facilities. This is likely to result in a higher risk of accidents and occupational hazards occurring in the area of operation. Factors that may exacerbate this situation are inadequate appropriate working gears for project workers including the helmets, overalls, boots and gloves. Accidents could cause considerable ecological damage, financial loss and harm to human life. While largely reversible, some impacts such as loss of human life are irreversible. The receptor sensitivity is considered high given that such impacts may be irreversible once they occur. The impact intensity is considered to be low since MWE will procure a qualified contractor who is aware of OHS measures.

Mitigation / Enhancement Measures

- The primary measure to mitigate OHS impacts is prevention which entails identification of risks and instituting pro-active measures to avoid them. In part this can be achieved by following GIIP or national guidelines. For unavoidable risks, personal protective equipment (PPE) should be provided to workers.
- Orient all staff on safe work practices and guidelines and ensure that they adhere to them.
- Training staff on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences.
- Regular safety drills to constantly follow on various possible incidences.
- Use signage to warn staff and/ or visitors that are not involved in work of dangerous places.
- Develop evacuation procedures to handle emergency situations.
- Provide adequate OHS protective gear for all laboratory staff.
- Implement lock-out-tag-out (LOTO) procedures to address electrical safety risks
- Deploy only certified staff to undertake specialized tasks such as electrical work.
- Traffic guides and signs should be utilized to avoid accidents on busy roads and junctions especially with vehicles transporting materials.
- Promptly notifying serious and severe incidents and accidents (no later than 24 hours or immediately after learning of the incident or accident

k) Sourcing of Construction Materials

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

Mitigation Measures

- The Contractor should liaise with local authorities to ensure that materials such as sand and gravel are only taken from quarries and borrow pits with the necessary environmental permits.
- Prepare separate Project Briefs as required by the National Environment Act (2019) for all new sites where materials like sand and stones are to be extracted/sourced.

l) Archaeological / Historical Sites / Cultural Sites

Throughout the consultations with the locals and local leaders, no known archaeological or historical sites exist on the proposed project routes, and proposed construction sites. Therefore, no impacts on any features of importance to national heritage are expected. The Asset survey indicates that the Kasese RGC Water Supply and Sanitation Project **will not impact any graves**, however, the activities of the Kasese RGC Water Supply and Sanitation Project have the potential to trigger OP 4.11 Physical Cultural Resources. During excavation works for Project infrastructure, there might be chance finds. The objective of OP 4.11 is to avoid, or mitigate, adverse impacts on cultural resources from World Bank Funded Development Projects. Annex VI provides a Chance Finds Procedure on Physical Cultural Resources Management.

Mitigation measures

- Although no archaeological features were observed or known to exist at the proposed project sites and on transmission routes & sites, the Contractor shall ensure that key members of his staff are briefed. Any such features that may be found that were not apparent on surface investigation will be reported by the project management and appropriate procedures followed to hand them over to the

authority responsible for national heritage and antiquities; reference is made to the chance find procedure in annex VII

m) Groundwater Quality

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

Mitigation measures

- The borehole should be covered and sealed so that dirt, flooded water, sand and other debris cannot fall in.
- The boreholes should have a raised concrete apron around its base to prevent dirty water seeping back into the hole.
- Do not develop pit latrines close boreholes. Recommended distance between a toilet and boreholes is 50m to minimize chance of ground water contamination.
- Dispose of all waste in an approved disposal site.

n) Risk of Accidents within the community

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

Mitigation measures

- Best transport safety practices will be adopted with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public by: employing safe traffic control measures, including road signs and flagmen/traffic guides to warn of dangerous conditions and children crossings; and setting speed limits on all access roads in the project area will be 30km/h for light vehicles and 20km/h for heavy vehicles.
- Service ducts installed by the road contractor will be used where applicable to avoid cutting through roads that have just been upgraded.
- All workers, including sub-contractors and casual labour, will undergo an environmental, health and safety induction before commencing work on site. This will include a full briefing on site safety and rules.
- The affected communities will be informed of the timing and duration of the construction activities across access roads and any uncertainties or potential for change and also sensitised on the dangers of construction sites and the need to keep away.
- Identifying optimum routes from pipe storage areas to the ROW to avoid sensitive receptors such as schools and hospitals, wherever possible and putting in place journey management plans.
- Restrictions on hours of driving (including night time restrictions where sensitive receptors may be affected) and timing of vehicle movements to avoid busy periods in urban areas, particularly the start and end of school and the working day

- Control over routes used by vehicles to avoid construction traffic using inappropriate roads and other road users gaining access to the pipeline spread and access roads.
- Ensuring adequate vehicle maintenance to ensure that vehicles do not produce significant emissions and that all safety features including brakes, lights etc. are in good condition.
- Promptly notifying serious and severe incidents and accidents (no later than 24 hours or immediately after learning of the incident or accident

o) Social Misdemeanour by Construction Workers

While most workers may originate from the local community where they have families, there might be others from distant places and working away from their families. With some disposable income to spend, this might induce illicit sexual relationships, with attendant risk for spread of HIV/AIDS. Irresponsible sexual relationships in project communities can break families and heighten risk of contracting HIV/AIDS. Illicit sexual relationships can be short-term but have long-term and irreversible effects.. The concentration of workers in the villages, in migration of people from different regions as well as occasional payment in wages may lead to behavioural influences which may increase the risk spread of diseases thus exposing the workers or other members of the surrounding community to the hazard of infections that include HIV-AIDS and sexually transmitted diseases. Similarly, labour influx of job seekers is associated with social vices which can disturb the social order and even lay the ground for escalation of HIV/AIDS cases whose impacts are likely to be prolonged in prevalence. The sensitivity is however very high as these poor communities would struggle to cope with the challenges of being HIV positive. The impact intensity is however low due to the low number of workers (about 40, with priority hiring of non and semi-skilled labour from project villages) expected on the project. The Code of Conduct for Contractors shall be signed by contractor upon award of contract and copies displayed for workers to view. In addition, a Code of Conduct for workers must also be signed by each project worker, and adhered to by the contractors. It ought to be translated into predominant local language of the workforce. Labour influx in the project community is likely to increase HIV/AIDS due sexual relations between project workers and the local community; workers taking advantage of young girls in the community due to high poverty levels and vulnerability, teenage pregnancies and dropping out of school etc. Violence Against Children (VAC) such as potential use of child labour; sexual relationship with underage children, teenage pregnancies, school drop outs etc. Conflict in the community/families (social cohesion and disruption) due to project workers engaging in sexual relationships with married women in the community etc. is also anticipated.

Regarding GBV, may be experienced, for example, an increase in intimate partner violence (IPV) when compensation schemes that share funds equally among husband and wife at the household level do not provide adequate sensitization and safety measures to reduce potential for increased tensions due to females receiving funds. This also refers to other GBV-related risks incurred as a result of project implementation that do not adequately consult women and adolescent girls in the community about safety and security issues related to the delivery of water and sanitation services. However, the impact intensity is ranked as low because of the low number of workers who would be exposed to incomes that can encourage irresponsible behaviour. The overall significance is ranked as ***Moderate.***

.

Mitigation measures

- As a contractual obligation, contractors shall be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc.) to implement during project execution.

- A sensitisation programme for the would-be affected local communities will be conducted prior to commencement of and during the project implementation and the following issues should be included i.e. HIV/AIDS, VAC, GRM in place and conflict management.
- A code of conduct (appropriate to behaviours in workplace and with respect to relations with local community) will be developed and approved by MWE which will be signed by all workers on the project.
- Local workers will preferentially be employed, paid directly through their banks and access to bars by workers from outside the project area in the local communities controlled.
- All construction workers shall be orientated and sensitized about responsible sexual behaviour in project communities.
- Ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project implementation.
- The Contractor should have a ***"No sexual harassment"*** policy and mainstream it to ensure strict adherence to established mechanisms to avoid the emergence of these challenges.
- MoWE should ensure that social safeguards personnel are recruited as part of the project implementation personnel to supervise contractors and to continuously engage communities.
- Report and follow up with Uganda Police on all matters of criminal including sexual offences.
- Contractor to prepare and implement a Gender Action plan to include at minimum, in conformance with local laws and customs, equal opportunity employment, gender sensitization.

8.5 Negative Impacts during the Operation Phase

i) Water quality and pollution

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

Mitigation Measures

- The borehole should be covered and sealed so that dirt, water, sand and other debris cannot fall in. Transmission and distribution pipes should also be covered underground to reduce exposure.
- The boreholes should have raised concrete aprons around their bases to prevent dirty water seeping back into the hole.
- The drilled borehole areas should be raised well-head by building earthworks to prevent the flooded water, dirt and other debris to accumulate around them.
- Conduct regular water quality tests and analysis for raw water to inform the treatment options.
- Prepare and implement a water source protection plan (WSPP).

ii) Water quantity and yield

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

Mitigation / Enhancement Measures

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

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

iii) Water supply system failure

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

Mitigation / Enhancement Measures

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

iv) Pollution of water due to cutting of pipes.

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

Mitigation / Enhancement Measures

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

v) Noise from Generators

Operation of the generators to boost the pumping of water for some hours will generate moderate levels of noise which may be a nuisance to the neighbouring communities and this must be handled appropriately.

Mitigation / Enhancement Measures

- Installation of solar system instead of the generator
- Regular servicing, maintaining and monitoring of the generators

- Switching on the generators for few hours just to boost the pumping of water but to always use the solar systems.

8.6 Environmental Impacts of Decommissioning

After the water system infrastructure has attained its lifetime, it will either be rehabilitated or decommissioned to return the affected area to a natural environment similar to that which would have existed prior to construction. However, some of the structures/facilities may still have other beneficial uses such as: run-off control, recreation, and water supply among others. Therefore, prior to destroying the structure it is crucial to know whether the structure can be reused through refurbishment of the structures and equipment. Decommissioning of the water system can have negative impact on environment of the area from the release of built up sediments into the neighbouring ecosystems. There will be changes in the quality of the seasonal swamp (physical and chemical characteristics). These will include:

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

Mitigation / Enhancement Measures

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

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

Tables 55, 56, 57 and 58 below presents a summary of an evaluation of the above envisaged impacts as a result of the implementation of the project.

Table 54: Identified Environmental and Social Impacts during Design Phase

Item	Environmental and Social Component	Potential Negative Impacts	Potential Mitigation Measures	Impact Rating before Mitigation	Impact Rating after Mitigation
D1.	Groundwater Resources	Local lowering of water table levels, due to abstraction of groundwater for the water supply system.	▪ Undertake a hydrological study of boreholes to determine water table depths, borehole yields and local use of groundwater.	Moderate	Minor
D2.	Groundwater Quality	The groundwater could become polluted as a result of pit latrines and indiscriminate waste disposal practices.	▪ Avoid prospecting in areas that are prone to flooding, waste disposal sites and pit latrines.	Moderate	Minor
D3.	Soils	Soil erosion/damage due to survey activities and vehicle tracks. Soil contamination from oil and diesel spills.	▪ Minimize number of tracks. ▪ Use right angle intersections & use bunding. ▪ Avoid seasonally marshy areas & floodplains.	Minor	Negligible
D4.	Flora	Disturbance or loss of endangered plant species or communities (terrestrial, wetland, aquatic) due to survey activities.	▪ Discourage any wanton destruction of vegetation and habitats beyond the designed project works.	Minor	Negligible
D5.	Fauna	Disturbance or loss of protected/endangered animal species/communities and their habitat.	▪ Minimize vegetation clearance. ▪ Protect water & soils from pollution.	Minor	Negligible
D6.	Noise	Noise generated by survey activities, especially vehicles, pump testing activities	▪ Working hours should be restricted from 7am – 6pm.	Moderate	Minor
D7.	Air quality	Dust from vehicle movements.	▪ Avoid excessive vehicle movements. ▪ Limit vehicle speeds on unsurfaced tracks to 20kph.	Moderate	Minor
D8.	Health and safety	Risk of accidents and ill health as a result of the project.	▪ Hold safety talks with workers before work. ▪ Promptly notifying serious and severe incidents and accidents (no later than 24 hours or immediately after learning of the incident or accident	Moderate	Minor

D9.	Public nuisance	General nuisance such as noise, waste and dust.	▪ Minimize number of workers at site.	Moderate	Minor

Table 55: Environmental and Social adverse/negative impacts during Construction Phase

Item	Environmental and Social Component	Potential Negative Impacts	Potential Mitigation Measures	Impact Rating before Mitigation	Impact Rating after Mitigation
C1.	Land acquisition for infrastructure	The land-take would be permanent where all the project components would be constructed and temporary along the pipeline network. However, both the transmission and distribution lines would be confined to the road reserves where possible	▪ The district and local authorities in Sub County have already been engaged together with the local land lords and they agreed with communities whose land will be used for the proposed project construction (MoUs/Consent forms signed as attached see **appendix III**). No grievances were reported and are envisaged. ▪ Compensation (where possible) to land owners as project affected persons.	Moderate	Minor
C2.	Loss of vegetation cover and top soil	The existing vegetation and top soil will be cleared to give way to the construction process on all sites. This is likely to cause loss of habitat and disturbance to faunal communities in the affected sites but at an insignificant level.	▪ After construction, there should be landscaping and re-vegetation. The premises will be planted with vegetation/grass and ornamental trees. ▪ The water source should be fenced off to reduce on going agricultural activities around the borehole to avoid pollution entering it especially when it rains heavily. ▪ Minimize vegetation clearance by clearly demarcating work areas. ▪ Provide environmental awareness training to all employees.	Moderate	Minor

			▪ Rehabilitate all disturbed areas.		
C3.	Increase susceptibility to Soil Erosion	Increased soil erosion is likely to occur in the vicinity of project sites during the construction of the water source points, pump stations, installation of the water pipe reticulation and other related construction works. The site earthworks will reduce soil stability and hence make the soils aggregated and more susceptible to erosion especially during the rainy season.	▪ The sites will be hoarded off to intercept any eroded material and any soil material will remain within the site. ▪ The project proponent will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. ▪ Use proper techniques for trenching and shoring	Moderate	Minor
C4.	Increased siltation of the aquatic habitats	Some of the excavated sediments from the project site and the construction spoils emanating from the excess excavated material and construction debris are likely to increase siltation especially in the nearby seasonal swamp to the motorized borehole and therefore affecting the associated aquatic habitat.	▪ Ensure that the site is at all times drained adequately and surface run off is directed appropriately to avoid water logging of adjacent area and the undulating drainage channel	Moderate	Minor
C5.	Effects of Poor Solid Waste Management	Waste will be generated during the construction of the WSS. The waste stream from the construction will include cement bags, timber and pipe cuttings, empty water bottles, food remains from workers onsite and other forms of waste. If not well managed, the area could be prone to nuisance from foul smell, breeding of vermin and vectors, and lead to outbreak of diseases.	▪ Waste collection bins will be provided at strategic positions at the sites for temporary waste storage. ▪ The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes. ▪ The proponent will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA/KDLG/ Sub County. ▪ Burning of waste on-site shall not be allowed.	Moderate	Minor
C6.	Increased	The increase of people involved in the	▪ The contractor should liaise with the	Moderate	Minor

	incidences of diseases.	project activities is likely to increase the incidences of diseases in the area. Consequently, there will be potential risk of contracting sexually transmitted diseases (STDs) especially the Human Immuno-Deficiency Virus/Acquired Immuno-Deficiency Syndrome (HIV/AIDS) among the program workers and the local communities. This will be increased due to influx of people seeking for employment.	District and Sub County CDO to mobilise communities during the recruitment process to reduce on influx of people who are unskilled. ▪ The contractor should emphasise equal opportunities for both men and women. ▪ The Contractor should, in conjunction with local health authorities, undertake to educate and sensitise the workforce on communicable diseases such as cholera, STDs and HIV/AIDS. ▪ Condoms must be made available to the workforce		
C7.	Visual intrusion	This will mainly arise from the erection of service reservoir tanks on the high altitude (hills). In addition, visual intrusion will occur where project activities are likely to create disfigured landscapes in the project area especially where the construction activities will result in deposition of large spoils and digging of the trenches.	▪ The contractor should maintain as much as possible the existing landscapes and plant trees and vegetation to enhance the visual aspect. ▪ Rehabilitate all areas disturbed by construction and landscape with trees, grass and shrubs.	Minor	Negligible
C8.	Increased accidents and occupational hazards	Implementation of the project will definitely increase volume of human and motor traffic in the project area. The increase in human and motor traffic will be aggravated by the transportation of construction materials, water pipes and other equipment required in constructing the water supply facilities. This is likely to result in a higher risk of accidents and occupational hazards occurring in the area of operation.	▪ The contractor should ensure that workers are provided with adequate personal protective wear to mitigate injuries such as gloves, helmets, overalls and gumboots. ▪ Traffic guides and signs should be utilized to avoid accidents on busy roads and junctions especially with vehicles transporting materials ▪ Fence all construction sites. ▪ Place warning signs. ▪ Enforce maximum traffic speeds to 20kph ▪ Promptly notifying serious and severe	Moderate	Minor

			incidents and accidents (no later than 24 hours or immediately after learning of the incident or accident		
C9.	Sourcing of Construction Materials	Sourcing of materials such as sand, gravel bricks/blocks and timber if not well regulated and controlled can have a significant impact in the points of sourcing.	▪ The Contractor should liaise with local authorities to ensure that materials such as sand and gravel are only taken from quarries and borrow pits with the necessary environmental permits.	Moderate	Minor
C10.	Occupational Health and Safety Risks for the Workforce	Construction traffic, excavation machinery, blasting of rocks and trenches may pose accident risk to workers either when equipment is operated by inexperienced workers or when in a poor mechanical condition or falls into the trenches.	▪ All construction workers will be oriented on safe work practices and guidelines and ensure that they adhere to them. ▪ Training will be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences. All must fully be aware and mentally prepared for potential emergency. ▪ Regular drills will constantly follow on various possible incidences. This will test the response of the involved stakeholders. Such drills will keep them alert and they will become more responsive in the case of incidences. ▪ Signage will be used to warn staff and/ or visitors that are not involved in construction activities of dangerous places. ▪ Promptly notifying serious and severe incidents and accidents (no later than 24 hours or immediately after learning of the incident or accident	Moderate	Minor

C11.	Social Misdemeanour by Construction Workers	▪ While most workers may originate from the local community where they have families, there might be others from distant places and working away from their families. With some disposable income to spend, this might induce illicit sexual relationships, with attendant risk for spread of HIV/AIDS. ▪ Labour influx in the project community such as increase in irresponsible activities that may increase HIV/AIDS due sexual relations between project workers and the local community; workers taking advantage of young girls in the community due to high poverty levels and vulnerability, teenage pregnancies and dropping out of school etc. ▪ Violence Against Children such as potential use of child labour; sexual relationship with underage children, teenage pregnancies, school drop outs etc. ▪ Conflict in the community/families (social cohesion and disruption) due to project workers engaging in sexual relationships with married women in the community etc.	▪ Framework (responsible staff, action plan, etc.) to implement during project execution. ▪ A sensitisation programme for the would-be affected local communities will be conducted prior to commencement of and during the project implementation. ▪ A code of conduct (appropriate to behaviours in workplace and with respect to relations with local community) will be developed and approved by MWE which will be signed by all workers on the project. ▪ Local workers will preferentially be employed, paid directly through their banks and access to bars by workers from outside the project area in the local communities controlled. ▪ All construction workers shall be orientated and sensitized about responsible sexual behaviour, GBV, Violence Against Children, HIV/AIDS etc. in project communities. ▪ Contractor(s) will maintain a complaints redress mechanism for all complaints that will arise from the interaction between construction workers and the communities within the project sites/areas including a record of how these complaints have been addressed.	Moderate	Minor
C12.	Archaeological / Historical Sites	Throughout the consultations with the locals and local leaders, no known archaeological or historical sites exist on the proposed project routes, and proposed	▪ The Contractor shall ensure that key members of his staff are briefed. Any such features that may be found that were not apparent on surface	Minor	Negligible

		construction sites. Therefore, no impacts on any features of importance to national heritage are expected.	investigation will be reported by the project management and appropriate procedures followed to hand them over to the authority responsible for national heritage and antiquities.		
C13.	Groundwater Quality	The groundwater could become polluted as a result of construction activities, pit latrines and indiscriminate waste disposal practices.	▪ The borehole should be covered and sealed so that dirt, water, sand and other debris cannot fall in. ▪ The boreholes should have concrete aprons around their base to prevent dirty water seeping back into the hole. ▪ Do not develop pit latrines close to boreholes. ▪ Dispose of all wastes in an approved disposal site.	Moderate	Minor
C14.	Fauna	Disturbance or loss of protected/endangered animal species/communities and their habitat due to construction activities (noise, dust, fumes, pollution, vehicles)	▪ Minimize vegetation clearance. ▪ Protect water resources from pollution. ▪ Protect soils from contamination. ▪ Rehabilitate all disturbed areas.	Minor	Negligible

Table 56: Operation Phase Adverse/Negative Impacts

Item	Environmental and Social Component	Potential Negative Impacts	Potential Mitigation Measures	Impact Rating before Mitigation	Impact Rating after Mitigation
OP1	Water quality and pollution	The quality of water recommended is that which is physically, chemically and bacteriologically safe for human consumption. When not thoroughly treated, water could be a source of water related diseases which could affect the	▪ The borehole should be covered and sealed so that dirt, flooded water, sand and other debris cannot fall in. Transmission and distribution pipes should also be covered underground to reduce exposure. ▪ The boreholes should have raised concrete	Moderate	Minor

		project communities, thereby causing an epidemic in the area. Transmission of water can also result into pollution and pollution entering the boreholes	aprons around their bases to prevent dirty water seeping back into the holes. ▪ The drilled borehole areas should be raised well-head by building earthworks to prevent the flooded water, dirt and other debris to accumulate around it		
OP2	Water quantity and yield	This could be due to declining groundwater recharge and over pumping. The project sites are prone to suffering from rapid land use change (deforestation, soil erosion, etc.) thus the recharge of the ground water supplying the borehole may be affected in the long run.	▪ Get involved with Water source catchment protection and management planning that could improve land management and restore groundwater recharge. ▪ Encourage contour ploughing, mulching and other agricultural practices that increases soil water retention and percolation into the underlying aquifer. ▪ Reduce the amount of water being taken – if demand in the area is growing then look at developing new water sources. ▪ Keeping records of how much is being pumped (either volumes or number of hours for which the pump is being used per day). Find out if sudden drops in level correspond to pumping activity.	Severe	Minor
OP3	Water Supply System failure	Insufficient cost/funding for operation and maintenance would lead to poor maintenance of the system which eventually could lead to frequent breakdowns of the water supply system and consequent shut down, which further could require major and costly rehabilitation. Other sources of failure in the water system could be due to sabotage (possibly by the water vendors who envisage loss of livelihoods), illegal connections which could result in decreased water pressure, and vandalism	▪ Payment for water supply services is the only way to keep the service running continuously and therefore tariffs would be designed to ensure financial viability. Cost recovery would be achieved through service fee payments. ▪ Put in place a water user committee to oversee the operations of the water system. ▪ Fence off the areas like water abstraction points, pump houses, water storage reservoir tanks and other water supply structures like the community taps like	Moderate	Minor

		(theft of water system parts)	kiosks to mitigate trespass and sabotage		
OP4	Water pollution due to cutting of the pipes	Digging and construction of water facilities within close vicinity/on the water transmission network could result in pollution and loss of water	▪ The developer should hire services of security guards to monitor and guard the water supply system facilities. ▪ Sensitization and awareness about the dangers of vandalizing the water supply system facilities should be done especially by the local leaders. ▪ Legal and applicable punitive measures like arrests and prosecution should be taken to those caught vandalizing the water system facilities in order to curtail and to serve as an example to those who would want to engage themselves in such acts.	Moderate	Minor
OP5	Noise levels from Generators	Using of generators to boost the pumping of the water at the pumping stations may lead to moderate noise levels around the project area	▪ Installation of solar system instead of generator ▪ Service the generators regularly to minimize on the noise. ▪ Switch on generators only for few hours to boost on the pumping hours but always use the solar systems	Minor	Negligible

Table 57: Decommissioning Phase Adverse Impacts

Item	Environmental and Social Component	Potential Negative Impacts	Potential Mitigation Measures	Impact Rating before Mitigation	Impact Rating after Mitigation
DC1	Surface Water Quality	Pollution of water bodies from erosion of unconsolidated materials, contaminated soil, wastes (solid and liquid), etc. As a result of demolition activities.	• Rehabilitate all areas e.g. grass/tree planting. • Take samples of the runoff water into the receiving water body nearby and ensure free pollution. • Remove all contaminated soil identified	Moderate	Minor

			and dispose of it in an approved site. • Close any waste disposal facility on site and make provision for drainage in such a way as to prevent future pollution.		
DC2	Flora	Disturbance or loss of plant species or communities (terrestrial, aquatic) due to dust fall-out onto leaves and soil, dump erosion.	• Rehabilitate or stabilize all cleared areas using indigenous vegetation until handover of the site.	Minor	Negligible
DC3	Fauna	Disturbance or loss of animal species/communities and their habitat due to the lack of rehabilitation etc.	• Rehabilitate or stabilize all cleared areas using indigenous vegetation where possible.	Minor	Negligible
DC4	Soils	Re-use of soils in rehabilitation and re-instatement of pre-project capability.	• Replace subsoil and overburden first and then cover with saved topsoil. Do not use heavy equipment to replace topsoil because this can cause compaction.	Minor	Negligible
		Soil erosion from denuded areas and demolition activities.	• Maintain erosion protection works. • Rehabilitate or stabilize all disturbed areas.	Minor	Negligible
DC5	Topography	Reinstate the topographic profile.	• Backfill, contour and landscape.	Minor	Negligible
DC6	Air quality	Dust from un-rehabilitated sites and demolition activities.	• Avoid dusty activities e.g. loading and dumping on windy days & monitor dust emissions.	Minor	Negligible
		Odours from waste dump.	• Avoid activities that can lead to pilling of wastes in the project area. • Dispose of all the wastes in gazetted sites	Minor	Negligible
DC7	Noise and vibration	Noise generated by demolition equipment and earth moving equipment	• Prescribe noise reduction measures if appropriate e.g. restricted working and transport hours and noise buffering.	Minor	Negligible
DC8	Health and safety	Risk of accidents and ill health as a result of the project	• Fence all unsafe and dangerous areas & monitor environmental health (air quality, water quality).	Minor	Negligible

			• Promptly notifying serious and severe incidents and accidents (no later than 24 hours or immediately after learning of the incident or accident		
DC9	Aesthetic and amenity values	Improvement of the visual impact of the site on scenic views.	• Rehabilitate with trees, grass and shrubs where possible. • Consult with the local community and tourist industry.	Minor	Negligible

Note:

- Mitigation measures were designed in order to avoid, reduce, mitigate, or compensate for adverse environmental and social impacts and inform the ESMP.
- Closure and decommissioning of the project was identified as a key issue. An environmental management plan is developed during the assessment and it prescribes procedures for closure and post-operation to ensure that the environment is restored as much as possible to its original state.

9. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

9.1 Introduction

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

Table 59 presents management plan with specific mitigation measures to be implemented during Design, construction, operation and Decommissioning phases of the proposed project.

9.2 Role of the Ministry of Water and Environment

The developer will be responsible for ensuring:

- Disclosure and adoption of the ESIA to guide project implementation.
- Implementation of the approval conditions provided by NEMA (approval certificate), and permits from lead agencies including DWRM (Ground Water Abstraction Permit), MoGLSD, (Workplace Inspection Certification), MWE, NEMA (Environmental Management).
- Costs related to complying with the Environmental and Social Safeguards as applicable to the construction and operation of the Water Supply System will be met by the developer.
- Implementing and complying with the conditions of the ESMP forms part of the conditions of appointment of all Consultants and Contractors throughout the life of the project;
- Appointing Independent environmental experts to audit the implementation of, and compliance with, the ESMP and monitoring plan, as well as the NEMA Approval conditions on an annual basis; and the independent environmental Compliance audits, together with other relevant monitoring information made available to the public, throughout the life of the project, summarized in lay person's terms and in a culturally accessible manner.
- Training and awareness creation in environmental and social management and the mitigation of impacts are provided to MWE Project staff, to ensure they are aware of their responsibilities and are competent to carry out their work in an environmentally and socially responsible manner

9.3 Role of Relevant Lead Agencies

Agencies such as NEMA, WMD, MGLSD, RDLG, Office of CGV, will be involved in the various phases through the life of the Project as proposed in the ESMP. The responsibilities of each respective agency will be those that are within their mandate, and as such, no extra costing has been included in the ESMP since it is expected that their annual operational budgets will be made to include the required

works for this Project. For this reason, MWE should regularly update the respective lead agencies with the Project progress, and challenges and opportunities presented during the implementation of the project.

9.4 Role of Construction Supervision Consultants

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

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

9.5 The Role of the Contractor.

- During sites preparation and construction, the contractor will be responsible for ensuring compliance with all relevant national legislation and World Bank Safeguards Operational Policies including adhering to all environmental and socio-economic mitigation measures specified in this ESIA.
- The contractor will also be responsible for managing the potential environmental, socio-economic, safety and health impacts of all contract activities whether these will be undertaken by themselves or by their subcontractors.

- The Contractor should prepare Environmental, Social, Health and Safety Action Plans to comply with the above requirements.
- Conduct day-to-day implementation of the ESMP.

9.6 The Monitoring Team

It is recommended that a core team of people preferably headed by the Rakai District Natural Resources/Environment Office, District Water Office and composed of other officials from DWD and respective local environment committees will carry out monitoring activities. The monitoring team will start its work during the site preparation and construction process and continue throughout the operation phase and should ensure that the proposed mitigation measures are implemented as suggested and recommended in this EIA study. The monitoring team will most particularly check for the following issues among others:

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

The activities of this team are not a substitute to the obligations of the Contractor and Supervision Consultant.

9.7 Environmental and Social Monitoring Plan.

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

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

Environmental Management and Monitoring Plan is presented below under Table 58.

Table 58: Environmental Management and Monitoring Activities and Criteria

Ref. No	Affected Environment	Mitigation Measures	Objective to Address Impact	Indicators	Monitoring Activity	Project Phase	Responsibility	Freq.	Mitigation Cost (UGX)	Monitoring Budget (UGX)
M1.	Ground water Resources	▪ Water source catchment protection and management planning that could improve land management and restore groundwater recharge. ▪ Encourage contour ploughing, mulching and other agricultural practices that increases soil water retention and percolation into the underlying aquifer. ▪ Reduce the amount of water being taken – if demand in the area is growing then look at developing new water sources. ▪ Keeping records of how much is being pumped (either volumes or number of hours for which the pump is being used per day). Find out if sudden drops in level correspond to pumping activity.	To minimise on the Local impact of lowering water table levels, due to abstraction of groundwater for the system	Changes in Ground water level	Hydrological study of boreholes to determine water table depths, borehole yields and local use of groundwater	Pre and post construction	MWE	Quarterly	-	5,000,000
M2.	Ground water quality	▪ The borehole should be covered and sealed so that dirt, water, sand and other debris cannot fall in. ▪ The boreholes should have concrete aprons around their base to prevent dirty water seeping back into the hole. ▪ Do not develop pit latrines close to boreholes. Dispose of all wastes in an	To minimise on the impact of ground water pollution	% of water tests parameters that meet the water quality standards	Water Quality Testing	Throughout project period	MWE	Quarterly	-	4,000,0000

Ref. No	Affected Environment	Mitigation Measures	Objective to Address Impact	Indicators	Monitoring Activity	Project Phase	Responsibility	Freq.	Mitigation Cost (UGX)	Monitoring Budget (UGX)
		approved disposal site.								
M3.	Soils	▪ Use right angle intersections & use bunding and avoid seasonally marshy areas & floodplains ▪ Replace subsoil and overburden first and then cover with saved topsoil. ▪ Do not use heavy equipment to replace topsoil because this can cause compaction.	To minimise on the Soil erosion/damage due to survey activities and vehicle tracks.	% of soil cover replaced	Field observations	Decommissioning	Contractor and MWE	Quarterly	-	2,000,000
M4.	Flora	▪ Mark endangered tree species and avoid cutting ▪ Minimize vegetation clearance and protect water & soils from pollution ▪ Rehabilitate or stabilize all cleared areas using indigenous vegetation until handover of the site.	To prevent disturbance or loss of endangered plant species or communities due to survey activities	% of trees conserved and restored	Field surveys	Pre-construction and Decommissioning	Contractor /MWE	Quarterly	-	3,000,000
M5.	Land acquisition	▪ Prepared and sign MoUs/Consent forms with land owners before construction activities ▪ Compensation (where possible) to land owners as project affected persons.	The land-take would be permanent where the water intakes, office block, pump stations and reservoirs would be constructed and temporary along the pipeline network	% of RoW aquired % of PAPs compensated	Review of RAP implementation reports and field engagements with PAPs	Pre and Construction	MWE	Daily	Presented in the RAP	3,000,000
M6.	Water quantity and yield	▪ Implementation of a water source protection plan	To improve on the water	-Water level	Water quantity and	Construction	MWE	Lump sum	60,000,000	3,000,000

Ref. No	Affected Environment	Mitigation Measures	Objective to Address Impact	Indicators	Monitoring Activity	Project Phase	Responsibility	Freq.	Mitigation Cost (UGX)	Monitoring Budget (UGX)
		(WSPP)	quality from the water source	changes -% of water tests parameters that meet the water quality standards	quality monitoring					
M7.	Loss of vegetation cover and top soil	▪ After construction, there should be landscaping and re-vegetation. The premises will be planted with vegetation/grass and ornamental trees. ▪ The water source should be fenced off to reduce on going agricultural activities around the borehole to avoid pollution entering it especially when it rains heavily. ▪ Minimize vegetation clearance by clearly demarcating work areas. ▪ Provide environmental awareness training to all employees. ▪ Landscaping and re-vegetation after construction and fencing off all the sites.	To minimize on the loss of vegetation cover and top soils along the project sites	% of vegetation cover conserved % of vegetation cover restored	Review of reports, field verification and observation	Construction	Contractor	Daily	-	2,000,000
M8.	Increase susceptibility to soil erosion	▪ The sites will be hoarded off to intercept any eroded material and any soil material will remain within the site. ▪ The project proponent will also ensure that proper landscaping and vegetation	To reduce on incidences of soil erosion at project sites	Level of stability of the soil	Soil conservation reports and field observation/ verification	Construction	Contractor / MWE	Quarterly	-	2,000,000

Ref. No	Affected Environment	Mitigation Measures	Objective to Address Impact	Indicators	Monitoring Activity	Project Phase	Responsibility	Freq.	Mitigation Cost (UGX)	Monitoring Budget (UGX)
		restoration is carried out to further reduce the possibility of soil erosion. ▪ Use proper techniques for trenching and shoring ▪ Soil conservation measures								
M9.	Increased siltation of aquatic habitats	▪ Draining sites adequately and directing surface run off appropriately to avoid water logging of adjacent area	To reduce on the impact of siltation in the nearby seasonal aquatic habitats	Turbidity level of water	Water quality tests	Construction	Contractor	quarterly	-	covered
M10.	Incidences of communicable diseases	▪ Educating and sensitising the workforce on communicable diseases such as cholera, STDs and HIV/AIDS and provision of Condoms to the workforce.	To prevent cases of potential disease risks within the project area	Number of Incidents of communicable diseases reported	Review of Clinical records	Construction	Contractor / MWE	Daily	5,000,000	1,000,000
M11.	Air Quality	▪ Provision of adequate and appropriate personal protective equipment (PPE) and air quality monitoring. ▪ Dust suppression by water, observe 30km/hr and covering of construction materials in transit	To minimise dust nuisance and exhaust pollution	% of air parameters that meet standards	Air quality tests	Construction	Contractor	Monthly	6,000,000	1,000.000
M12.	Construction Material Sourcing	▪ Liaise with local authorities to only source materials from legally registered suppliers	To regulate and control the impact in the points of sourcing materials.	No of legally authorized material	Review of documents and field inspections	Construction and decomissioning	Contractor	quarterly	-2,000,000	2,000,000
M13.	Noise Levels	▪ Proper scheduling of work ▪ Provision of PPE, Equipment and vehicle servicing and noise barriers	To minimise noise disturbance to communities	% of sites with permissible noise levels	Noise measurement	Construction	Contractor	Monthly	6,000,000	1,000,000

Ref. No	Affected Environment	Mitigation Measures	Objective to Address Impact	Indicators	Monitoring Activity	Project Phase	Responsibility	Freq.	Mitigation Cost (UGX)	Monitoring Budget (UGX)
M14.	Occupation Safety & Health	▪ Inspect all equipment to ensure that they are in good working condition. ▪ Barrier tape and warning signs will be used, install safety signage, fence off the area. ▪ First aid services in place ▪ PPE usage enforced ▪ Promptly notifying serious and severe incidents and accidents (no later than 24 hours or immediately after learning of the incident or accident	To ensure Health and Safety at the site / Premises	No of OSH incidents recorded and managed	Review of reports and field observations	construction	Contractor / MWE	Daily	4,000,000	1,000,000
M15.	Community Health	▪ Implement community health awareness and service provision ▪ Promptly notifying serious and severe incidents and accidents (no later than 24 hours or immediately after learning of the incident or accident	To prevent spread of diseases and occurrence negative incidents	No of health programs implemented and no of incidents recorded	Review of reports, incident tracking and field visits	Construction	Contractor	Quarterly	5,000,0000	2,000,000
M16.	Misinformation of the project	▪ Prepare a comprehensive Stakeholder Engagement Plan (SEP	To minimize the risk of misinformation due to failure to engage stakeholders	No of stakeholders engaged	Review of reports, minutes and field visits	Construction	Contractor	Monthly	5,000,000	3,000,000
M17.	Risk of GBV and violence against children (VAC)	▪ Implement GBV and child protection action plan and enforce codes of conduct for SEA, SH, GBV and VAC	To prevent GBV abd VAC cases on the project	No of GBV and VAC cases recorded and managed	Review of reports and field visits	Construction	Contractor and consultants	Monthly	4,000,000	3,000,000
M18.	Risk of delayed	Implement grievance	To mitigate	% of	Review o	construction	Contractor	Monthly	4,000,000	3,000,000

Ref. No	Affected Environment	Mitigation Measures	Objective to Address Impact	Indicators	Monitoring Activity	Project Phase	Responsibility	Freq.	Mitigation Cost (UGX)	Monitoring Budget (UGX)
	management of grievances for workers and community	management, mechanisms for workers and community	project induced grievances	grievances managed for workers and community	reports and field visits		and consultants			

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

CONCLUSION

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

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

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

- Soil erosion
- Destruction of vegetation and crops,
- Increased noise nuisance by construction works and equipment,
- Increased sediment loads into the downstream beyond water sources
- Improper disposal of generated waste
- Improper management of construction waste,
- Land loss and damage to property,
- Land pollution, waste and drainage problems,
- Landscape and land use impacts
- Loss of vegetation and soil degradation especially at the construction sites and trenching activities for the pipelines,
- Occupational health and safety risks for the workforce,
- Risk of accidents
- Social misdemeanor by construction workers (e.g. conflicts due to influx of labour in the project community such as increase in irresponsible activities that may increase HIV/AIDS due sexual relations between project workers and the local community; workers taking advantage of young girls in the community due to high poverty levels and vulnerability, teenage pregnancies and dropping out of school etc., Violence Against Children such as potential use of child labour; sexual relationship with underage children, teenage pregnancies, school drop outs etc. Conflict in the

community/families (social cohesion and disruption) due to project workers engaging in sexual relationships with married women in the community etc..

A RAP was also undertaken and elaborated to address all compensation issues that are anticipated and an ESMP has also been presented in the preceding Chapter to ensure positive impacts are enhanced while negative impacts are mitigated. Physical Resettlement issues are not anticipated.

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

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

- Undertake Annual Environmental Audits and submit reports to NEMA.
- Conduct regular water quality tests and analysis for raw water to inform the treatment options.
- Maintaining good house-keeping through the duration of the construction phase.
- Screening unsightly aspects from public view including excavations (where practical), construction material storage areas, waste storage areas and ablutions.
- Erect fencing around construction sites to act as screens minimizing the effect of wind in generating dust emissions.
- The re-vegetation of all areas of natural vegetation with indigenous species that have been disturbed as a result of construction activities and maintain the 200m buffer zone.
- Designation of construction materials and fuel storage areas.
- Effective control of waste and containment of storm water especially during rainy season.
- Implement dust suppression measures (use of water) when appropriate.
- Train workers on issues of HIV/AIDS, social cohesion and disruption and Violence Against Children should not be permitted.
- Adhere to Occupational Health and Safety Act, 2006 provisions e.g. monitoring noise levels and provision of protective equipment to staff.
- At least 75 % (subject to availability) local labour from Rakai district should be used and 95% (subject to availability and skills levels) local contractors should be used.
- The Developer (DWD) monitors compliance together with stakeholder wide monitoring group comprising technical staff from local government institutions.
- Fencing is recommended in order to prevent contamination of the water source and for security of hydraulic structures and installations for the pump station.
- Prepare and implement a water source protection plan for the catchment area of the water sources.

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

REFERENCES

1. Akite, P (2008) Effects of anthropogenic disturbances on the diversity and composition of the butterfly fauna of sites in the Sango Bay and Iriiri areas, Uganda: implications for conservation, Afr. J. Ecol., 46 (Suppl. 1), 3–13
2. Detail Engineering Design Report for Kasese RGC Water Supply and Sanitation System, April 2022.
3. GoU (1995). The Constitution of the Republic of Uganda.
4. IUCN (2015). The IUCN Red List of Threatened Species. Version 2015.1. www.iucnredlist.org.
5. Ministry of Water and Environment (2011). Environmental Impact Assessment Guidelines for water resources related projects in Uganda.
6. MWE (2018). Environmental and Social Management Framework for the Integrated Water Resources Management and Development Project (IWMDP-P163782), February 2018.
7. MWE (2018). Resettlement Policy Framework for the Irrigation Development and Climate Resilience Project, February 2019
8. NEMA (1997). Environment Impact Assessment Guidelines, 1997
9. NEMA (2020). The National Environment (Waste Management) Regulations, 2020
10. NEMA (2002). The National Environment (Noise) Regulations for Uganda.
11. NEMA (2019). The National Environment Act, No.5 of 2019.
12. NEMA (2020). Environment and Social Impact Assessment Regulations, 2020
13. Rodda, G. H., Campbell, E. W, Fritts, T. H. & Clark, C. S. (2007). The predictive power of visual searching. Herpetological Review, 36, 259–64. Russell, Dick. "Health Problem at the Health Care Industry." The Amicus Journal Winter 2000: 34-39.
14. Spawls, S., Howell, K. M. & Drewes, R. C (2006). Pocket guide to the Reptiles and Amphibians of East Africa. A & C Black, London.
15. Stevenson T. and Fanshawe J. (2002) Birds of East Africa. T & A D Poyser Ltd.
16. Taylor, R.G., and Howard, K.W.F., 1999a. The influence of tectonic setting on the hydrological characteristics of deeply weathered terrains: evidence from Uganda: Journal of Hydrology, v. 218, p. 44-71. Journal of Hydrology, v. 218, p. 44-71.
17. WB/IFC (2007). Environmental, Health, and Safety Guidelines for Water and Sanitation.
18. WB (2015). World Bank Safeguard Policies. Retrieved May 25, 2015, from Environmental and Social Safeguard Policies.
19. IFC. (2006). Performance Standard 4 Community Health, Safety and Security. Washington, D.C: World Bank Group.
20. IFC. (2012). IFC Performance Standards on Environmental and Social Sustainability. Washington, D. C: World Bank Group.

ANNEXES

Annex I: NEMA Approved Letter for Terms of Reference

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA House
Plot 17,19 & 21, Jinja Road.
P.O.Box 22255, Kampala, UGANDA.

Tel: 256-414- 251064, 251065, 251068
342758, 342759, 342717
Fax: 256-414-257521 / 232680
E-mail: info@nemaug.org
Website: www.nemaug.org

NEMA/4.5

13th May, 2022

The Permanent Secretary,
Ministry of Water and Environment
P.O. Box 20026,
KAMPALA.

Attn: Eng. Olwenyu Lamu

Tel: +256 7414505942
Email: ps@mwe.go.ug; nmalizah@yahoo.com

RE: APPROVAL OF THE SCOPING REPORT AND TERMS FOR UNDERTAKING AN ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF THE SOLAR PIPED WATER SUPPLY AND SANITATION SYSTEM FOR KASESES RURAL GROWTH CENTRE (RGC) IN KIZIBA SUB-COUNTY, RAKAI DISTRICT - EIATOR 8464

This is in reference to the Terms of Reference (TOR) for carrying out the Environmental and Social Impact Assessment (ESIA) for the above-mentioned project, which was submitted to this Authority on 19th April, 2022, for consideration. This Authority has finalised the review and grants formal **APPROVAL** to undertake the Environment and Social Impact Assessment (ESIA).

Please, note that approval of the Scoping Report and TOR, does not grant permission to start implementing any of the proposed project activities, before a decision is made by this Authority.

In addition, you are advised to consider certain key aspects during the conduct of the ESIA and preparation of the ESIA report, as outlined below.

(i) Provide detailed description of all project components including location and GPS coordinates for the water sources and other key project infrastructure. In addition, indicate the size (diameter and length) of the transmission and distribution networks.

(ii) Undertake comprehensive hydrological studies and baseline analysis of water quality for the water sources to determine potential impact of the project on the area hydrology and other baseline characteristics.

Page 1 of 2

(iii) Develop a comprehensive water source protection plan that be implemented to ensure that the water source is protected during construction and operation of the project. Append the plan to the ESIA report.

(iv) Evaluate the risks associated with the project and emergency preparedness options in case of breakdown of the system.

(v) Undertake comprehensive consultations with the all relevant stakeholders especially the local communities in the rural growth centres of Magabirano, Kasese, Kiziba, and Rakai District Local Government, Ministry of Gender, Labour and Social Development, including persons potentially affected by the project in respective growth centres. The views/concerns of stakeholders consulted should be well documented and lists of persons consulted appended in the ESIA report.

(vi) Include in the ESIA report, a comprehensive analysis of alternatives to the proposed location of project components and routing network, project design and technology, equipment among others.

(vii) Append clear and legible, authentic copies of land acquisition and ownership documents and/or resettlement action plans for the temporal or permanent acquisition of land or the project.

(viii) Indicate the actual project capital cost including **costs of works, machinery/equipment and land where applicable, evidenced by a copy of certificate of valuation issued by a qualified and certified valuer** in accordance to regulation 18 (1) of the National Environment (Environmental and Social Assessment) Regulations, S.I 143/ 2020.

(ix) In accordance to regulation 49 (2) of the National Environment (Environmental and Social Assessment) Regulations, S.I 143/ 2020, you will be required to pay a non-refundable administration fee of thirty percent (30%) of the total fees payable at submission of the Environmental and Social Impact Statement, to the Authority.

This is therefore to recommend that you carry out the ESIA study for the proposed Solar Piped Water Supply and Sanitation System for Kaseses Rural Growth Centre in Kiziba Sub-County, Rakai District taking into account the guidance provided above.

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

13/05/2022

Patience Nsereko
FOR: EXECUTIVE DIRECTOR

Annex II: Stakeholders Engagement Plan, Feedback and Participants Attendance Sheets

The stakeholder engagement and consultations were guided by the following agenda.

1. Opening prayer from a volunteer
2. Welcoming remarks and recognition of leaders present by the chairman LCI, who then invited the team from Bright Technical Services to share the package / news they carried for the gathering.
3. BTS Presentation provided information on the following aspects:
   i) The developers
   ii) Project Background
   iii) Project Location
   iv) Project Description
   v) Ongoing Activities
   vi) RAP Process
4. Question and answer session
5. Closure by the top-ranking political or technical leader present

RECORD OF STAKEHOLDER CONSULTATIONS AT DISTRICT AND COMMUNITY

Stakeholder	Issue/comment	Response
DRDC	Emphasis should be put on your equipment's to ensure they are safe. Asked for the roadmap of the project to implementation level for ease of monitoring. For how long are you here?	The equipment's we have now are manageable and we shall ensure that we improvise for the safety of our survey equipment. But this is noted and will be shared with the implementing partner to take note of We are here for about two weeks for multiple data collection.
V/Chairman LCV	We welcome this project with all hope and pray that it will come through as soon as possible. Kiziba has never seen piped water. Our people are eager and receptive to this project because it's long overdue	We appreciate your cooperation and support sir. We are at the RAP study stage and once it's completed, the reports will be shared with MWE for further management. The contractor at the implementation stage will be guided to use local

Stakeholder	Issue/comment	Response
	Employment opportunities for our people please	labour and, on many occasions, they are more cost friendly compared to External Labour
Deputy CAO	Kindly consider expanding on the coverage of the project because our people are badly off and children sometimes miss school due scarcity of water	This is noted Sir, Lets first handle this phase and most probably and extension is much easier once this phase is finalized
V/C LCV	Please consider our schools especially those in the hills	The design team, catered for such institutions and they will be served.
Hon. Councilor	Hope compensation will be a reality. Most times project promise to compensate people but that does not happen and this demotivates the people.	This is one among the many reasons why we are conducting this exercise.
Hon. Councilor	Engage the LC chairpersons when conducting your exercise for ease of identifying land owners.	The team is supposed to get in touch with the local leaders before beginning the survey works. (Data collection)
Total Number of attendees 11		

RECORD OF STAKEHOLDER CONSULTATIONS AT COMMUNITY

Date & Venue	Target Community / Villages	No. of participants		Views/Concerns/Questions	Response
		Female	Male		
2 July 2022	Kalwaayi Kasese	24	47	Will water be free of charge or there will be some charges incurred	No, however the utility tariff charged will be affordable and somewhat similar to that charged in other areas. The charges usually ensure the sustainability of the project

Date & Venue	Target Community / Villages	No. of participants		Views/Concerns/Questions	Response
		Female	Male		
Mweruka Church of Uganda	Kayolo Kijwaala Kiziba Kobukulula Kyajjumba Magabirano A Magabirano B Mweruka Nyanja			Will structurers be compensated for in case the pipe is affecting them?	Efforts have been made to minimize physical displacement as much as possible. However, in case any structure is found to be affected, the same will be compensated by the Government of Uganda through Ministry of Water and Environment based on the Valuation Report upon being approved by the Chief Government Valuer
				How will People uphill get water?	Our design team already catered for such people. There are several Reserve tanks uphill that will enable people access water.
				We request for Jobs for the local communities during construction phase of the project	The request is noted. And as already witnessed, our project coordinator is from the project area.
				Given that this is a development project, why do we have to pay utility charge for water usage	We pay for utilities to enable operation and maintenance activities and for continuity and sustainability of the project.
				How much am I going to get if you cut down my tree	District compensation rates will be used for computation of compensation for trees and perennial crops.
	Katunga	16	27	Where is the source of the water?	This water source will be a borehole within our community, the source has been tested and found to be safe and reliable to sustain the project for a desired

Date & Venue	Target Community / Villages	No. of participants		Views/Concerns/Questions	Response
		Female	Male		
2 July 2022 Ndagga Church of Uganda	Kyamigongo Ndaga A Kiyonza Kyemwa				period based on population growth statistics.
				Given that the proposed distribution pipe is only on one side along the access road, will the community on the other side be able to get service lines	The utility service provider will be responsible for installation of water service lines after application for water connection by a customer. Therefore, the community on the opposite side of the distribution pipe will also be connected to water upon fulfilment of the prerequisites
				When and where exactly will the pipeline be laid?	Surveyors will come to this village in the following weeks and demarcate the exact pipeline route as well as place tags in the route in the presence of their local leader.
				In case the line affects the compound, will it be compensated?	Yes, all affected property will be compensated for.
				There was an inquiry from the community if compensation will be done before the project commences.	Yes, all PAPs will be compensated before the project commences. However, there could be people with varying reasons for delayed compensation payment.
				Will service line connections to private individuals be free of charge or there will be some charges incurred	No, however the charge will be affordable and somewhat similar to that charged in other areas. This is for the benefit of both the project implementors and the

Date & Venue	Target Community / Villages	No. of participants		Views/Concerns/Questions	Response
		Female	Male		
					end users to ensure sustainability
Kiziba Town Council Offices	Kiyonza Kyakasese B Cell	16	6	Will communities pay for the water after it is installed?	Yes; for purposes of having a sustainable project, water will be paid for but at a subsidized price. What I can assure you is that the cost will be very much affordable compared to the cost of jerrycan now within this area.
				How much are you paying for our crops?	Compensation will be based on what one is likely to lose but more importantly on the Rakai district compensation rates approved by the Chief Government Valuer
				In case one is not affected by the proposed pipe line, will he or her get access to the water?	Yes, this project is for the entire community and not just those who are likely to be affected in a certain way.
				Will the charge be much fair for those who are sacrificing their land for the project?	A uniform unit charge will be applied. However, connection fees may vary since for you the pipe will be much closer to your home
				Will payments come before or after the project has started?	The MWE will ensure that people are paid before construction phase. However, there are always remnant cases due to several reasons thus construction will proceed when some people have not yet been fully paid but still in process.

Date & Venue	Target Community / Villages	No. of participants		Views/Concerns/Questions	Response
		Female	Male		
				Will public stand taps be established in addition to service line extensions to private individuals	Yes, they will. The specific locations will be determined upon application at the project implementation.

Scanned Attendance Sheets

MINISTRY OF WATER AND ENVIRONMENT-RWSSD 4/3/22

REGISTRATION SHEET

ACTIVITY Inception Report Presentation – GRGCs – Western & Bitya and Nyamwamba [illegible]

S/N	Name	Title	Contact/Email Address	Signature
1	Eng. David Batega	PE	bategaeda1@gmail.com	
2	TUMWSIIME JOHNBOSCO	Engineer Civil	tumwsiimejohnbosco12@gmail.com	
3	Eng. Carolyn Kasura	SE	ckasiira@gmail.com	
4	Mugeiga Kato	Senior SOC	mugeigakato@gmail.com	
5	Cath Namyalo	SEHO	cnamyalo@gmail.com	
6	Catherine Mukomuzo	Senior Sociologist	Cattymoza@yahoo.co.uk	
7	Nakaggwa Jamiah	Social Scientist	jnakaggwa@gmail.com	
8	Nabalongo Jackline	Sociologist	jacklinenabalongo@gmail.com	
9	Samuel Senfuma	Hydrogeologist	marksamuel@gmail.com	
10	Jonan Kayima	Social Safeguards Specialist	jonankayima@yahoo.com	
11	Eng. collins Yekaazamukama	Senior Engineer	yekazac@gmail.com	

4/3/22

MINISTRY OF WATER AND ENVIRONMENT-RWSSD

REGISTRATION SHEET

ACTIVITY Inception Report Presentation - GRGC - WESTERN & BITSYA AND NYAMUGASANI WSS

S/N	Name	Title	Contact/Email Address	Signature
1.	NAKAJUBI BRIDGET	SOCIOLOGIST	0786023754	[illegible]
2.	Eng Kenneth Musabe	Engineer - Bright Technical services	kmusabe@gmail.com 0772543346	[illegible]
3.	Brayan W MATOVU	SS + RS - BTS	0701 66262 brayan@gmail.com	[illegible]
4.	Alozius Gonza	Valuer BTC	0701478636 alozius@gmail.com	[illegible]
5	Dr. Eng. Alex Kahuliza	Engineer Bright Tech. Service	0772438572 akahuliza@gmail.com	[illegible]
6	Joseph Baliruddembe	Sociologist	0779597666 baliruddembe.jb@gmail.com	[illegible]
7	Edrida Mwesigye	Principal SS		[illegible]
8.	Eng. OLWENY HAMU	AC - R&D	0772-453395 / holweny@yahoo.co.uk	[illegible]
9.	PIUS KAHANGIRWE	TL ESIA WSPPs	0774636856 kpius@gmail.com	Pius
10.	Eng. Ronald Kato	Principal Engineer	0704345425 / ronaldkato@yahoo.com	[illegible]

STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR KASESE PIPED WATER SUPPLY SYSTEM IN KIZIBA SUB COUNTY; RAKAI DISTRICT.

Date: 18TH/05/2022

NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	Twinomujuni Penina		0771609433	Penina
2.	Shabamukama Abas		0787853189	Abas
3.	Tukoirwe Sam		0702155709	
4.	Mugabi Evidadi		0757108031	
5.	Gibanjungwa Alex		0708506229	
6.	Kabajunizi Edvina		-	Edvina
7.	Nalule Florence		-	Florence
8.	Ainembabazi Jackline		-	Ainembabazi
9.	Bukabeeba Bonny	Peasant	0708884393	
10.	Natukunda Komunduni			Komunduni

0772353189
91

KASESE

STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR KASESE PIPED WATER SUPPLY SYSTEM IN KIZIBA SUB COUNTY; RAKAI DISTRICT.

Date: 18th/05/2022

NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	TWINOMUGISHA KENETH	Care taker	0709899712	Keneth
2.	Mubangizi Joseph	Secretary	0752541087	Mubangizi
3.	Kinkuhaire Rossette	member.	0759018640	Rosset.
4.	Kiiza Sam[illegible]	C/P. LC1	0706394357	[illegible]
5.	Buyamanya Paskari	MUWONIKO		Paskari
6.	Kugonza Sarah	member	0756275834	Kugonza
7.	Kakooza Apollo	c/man WUC		Kakooza
8.	Tushemerirwe Dinaverco	member.		Dina
9.	Kabyaki erabu	member	0775332712	erab
10.	Bindu JUDITH	member	0709047544	BJ

STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR KASESE PIPED WATER SUPPLY SYSTEM IN KIZIBA SUB COUNTY; RAKAI DISTRICT.

Date: 18/05/2022.

NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	NUWABIINE FRANK	Via C/Person LCIII	0704254359	
2.	NYAMANYA JAMES	LC III chairperson	0772887267	
3.	TUMUSIIME KEDRESS	COUNCILLOR NYANJA WARD FORPAC	0782561259	Tumusiime
4.	NANYONJO HAJIARA TUNGYE	KALWAYI WARD FOR HEALTH	0787551456	Nanyonjo
5.	TWESIGYE MUZAMIRU	SECRETARY FOR FINANCE NKOMA TC	0758023864	
6.	KANABI FRED	TOWN CLERK	0772994756	
7.	NAMULINDWA MARGRET K	Councillor LC V	0785152961	
8.				
9.				
10.				

STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR KASESE PIPED WATER SUPPLY SYSTEM IN KIZIBA SUB COUNTY; RAKAI DISTRICT.

Date: 18/05/2022

NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	[redacted] Jackson	chairperson LC III	0772846546	
2.	Ssekiwunga Isaac	secretary water management committee	0754732569	
3.	Karimukiza Living	Defence	0781157839	Living
4.	Nuwamanya CLEB	DEFENCE	0741032125	CLeb
5.				
6.				
7.				
8.				
9.				
10.				

STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR KASESE PIPED WATER SUPPLY SYSTEM IN KIZIBA SUB COUNTY; RAKAI DISTRICT.

Date: 18th/05/2022

NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	NYAKYANZI SIKORA	FARMER	-	Sikora
2.	KASANDE BEATRESS	FARMER	-	Kasande
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

11

REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT

Consultancy services for preparation of environmental and social impact assessment (ESIA), environmental and social project brief (EPB), resettlement action plan (RAP) and source protection plans (SPP) for (i) large solar powered piped water supply systems and sanitation facilities in Bugwara and Kabamba in Kagadi district, Kikoora and Mwitazinge in Kakumiro district, Kasese and Lwentulege in Rakai District and (ii) Bitsya and Nyamugasani water supply systems in Buhweju and Kasese districts respectively

STAKEHOLDER CONSULTATIONS - ATTENDANCE LIST PLACE: RAKAI Date: 9TH FEBUARY 2022

REF	NAME	DESIGNATION	TELEPHONE NO / E-MAIL	SIGNATURE
01	MUWANGA FRANCIS	DWO	0701995757	[signature]
02	KAMYA EDWARD	DCAO	0775336422	[signature]
03	KALUNGI RICHARD. R	Law Office	0759719475	[signature]
04	MATUMBWE BARNABAS	ADWO/M	0772057613	[signature]
05	Simon Sseruhto	DISO	0712966674	[signature]
06	Sekamwa · K. Samuel	C/P LCV	0772414223	[signature]
07	Catherine Mulomoza	Senior sociologist	0772660024	[signature]
08	Cate Namyalo	SEN/RLUSA	0775171504	[signature]

BRIGHT TECHNICAL SERVICES LTD
Civil Engineers and Project Managers

REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT

Consultancy services for preparation of environmental and social impact assessment (ESIA), environmental and social project brief (EPB), resettlement action plan (RAP) and source protection plans (SPP) for (i) large solar powered piped water supply systems and sanitation facilities in Bugwara and Kabamba in Kagadi district, Kikoora and Mwitazinge in Kakumiro district, Kasese and Lwentulege in Rakai District and (Ii) Bitsya and Nyamugasani water supply systems in Buhweju and Kasese districts respectively

STAKEHOLDER CONSULTATIONS - ATTENDANCE LIST PLACE Rakai Date 9TH FEBRUARY 2022.

REF	NAME	DESIGNATION	TELEPHONE NO / E-MAIL	SIGNATURE
09	NAKAGWA JAMIRAH.	SOCIOLOGIST. RNGSD/MWE	[illegible] 0772062814	[signature]
10	TUMWESIME JOHN BOSCO.	Engineer, Civil RNGSD/MWE.	[illegible] 0784-130-953.	[signature]
11	DAVID SSEMPALA	VALUER/BTS	0702 480993	[signature]
12.	JONATHAN KAYUMA.	SOCIALOGIST/BTS.	0753 603235	[signature]

BRIGHT TECHNICAL SERVICES LTD
Civil Engineers and Project Managers

F-1

RECORD OF ATTENDANCE

MEETING REFERENCE: STAKEHOLDER Engagement

VENUE: RAKAI DISTRICT **DATE:** 01-~~JULY~~ JULY-2022.

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	DAVID SSEMPALA	M	BTS.	VALUER	0701575905		
2	KAMYA EDWARD	M	ATG RAKAI	DCAO	0775336422	Kamyaeddy 6@gmail.	
3	SERUWAGI FAIZO	M	RAKAI	D/RDC	0781293065		
4	BALIKUDEMBE JOSEPH	M	Bright Technical		0701859666		
5	BWANIKA ISMAIL	M	RAKAI	~~DT~~ Vice C/P	0750068962	Bwanikaismail@gmail.com	
6							
7							
8							
9							
10							
11							
12							

M = 5

RECORD OF ATTENDANCE

F-6 (24)

MEETING REFERENCE: RAKAI STAKEHOLDERS ENGAGEMENT

VENUE: KIZIBA TOWN COUNCIL **DATE:** 02/07/22

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	DAVID SSEMPALA	M	BRIGHT T.S	VALUER	0701575903		[signature]
2	BANZA Emma H.	M	BRIGHT T.S	L. SURVEYOR	0779238240		[signature]
3	TAYEBWA GERALD	m		GISO KIZIBA TC	0775152748		[signature]
4	BIRAWABAREMA RICHARD	m		DST Councillor	0787349507		[signature]
5	Nyehumbize Amos	M	Nyakabanga	c/Person LCI	0782320151 0750320131	[illegible]@gmail.com	[signature]
6	Kamukama Cyril	m		c/Person LCI	0753766319		[signature]
7	Bakwatanise Augustine	m		Sec for Educ & Health	0780897604		[signature]
8	Tumwijukye Issa	M		C/personLCI	0754143045		[signature]
9	Siiza Nazalio	m		councillor	0757045686		[signature]
10	Makintu Florence	F		V/mayor	0701699032		Makintu
11	NIAMWIZA JOVAT	F		Speaker Kiziba TC	0702791602		[signature]
12	Kyarimpa Jasp	F		Councilor	0759723472		[signature]

M-9
F 3

RECORD OF ATTENDANCE

MEETING REFERENCE: RAKAI STAKEHOLDERS ENGAGEMENT

VENUE: KIZIBA TOWN COUNCIL **DATE:** 02/07/22

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	NINSIIMA BRITON	M	KIZIBA TOWN COUNCIL	MAYOR	0707409797	britonbush@gmail.com	[signature]
2	NAMULINDWA MARGRET	F	KIZIBA TOWN COUNCIL	COUNCILLOR LCV	0778515296	[illegible]@gmail.com	[signature]
3	NASSUUNA JESSICA	F	RAKAI	SEC FOR HEALTH	0753788537	nassuunajessica@gmail.com	[signature]
4	BUKAWIKA ISMAIL	M	RAKAI	VICE C/P	0705758389	buwaikaismail@gmail	[signature]
5	SEGIRINYA DEO	M	LIVE	C/MAN	0752766373		Deo
6	Chujja Blasio	M	Kwalhacwa LCI	C/man	0754035590		Chujja
7	Charimpa Meres	F	Rwenshinga		075591445		Charimpa
8	MBAHAMIIRE CYRIL	M	RWIBALE WARD	C/MAN LCII	0701085341		[signature]
9	Sendege Jimmy	M	Bright Technical Ser.	Sociologist	0703999194		[signature]
10	BALIKUDDEMBE JOSEPH	M	Bright Technical Services	Sociologist	0701859166		[signature]
11							
12							

M - 7
F - 3

F - 16

RECORD OF ATTENDANCE

MEETING REFERENCE: RAKAI STAKEHOLDER ENGAGEMENT KASESE RGCs

VENUE: NDAGGA CHURCH OF UGANDA DATE: 02/07/22

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	Sgt Banyanga m	M	Ndagga. A		078411[illegible]58		[signature]
2	Nikurinda Bright	M	Ndagga A	farmer	0709233825		[signature]
3	Komuzinho Godfrey	M	Ndagga		0705658640		[signature]
4	Twesigye Benn.	M	Ndagga		0755600830		[signature]
5	D. Kasa	M	Ndagga				D. Kasa
6	Tukamushaba	M	Ndagga		0761460877		[signature]
7	Nyabirano Yolakam	M	Ndagga		0772524693		Nyabirano
8	Akandwanaho mg God	M	Ndagga Kayinga	Omutiingi	-		[signature]
9	Pio Matayi	M	Ndagga A				[signature]
10	BYARUHANGA JAMADAH	VCP. M	KAYINJA LCI	farmer	0709053062		[signature]
11	Namulema Remigio	M	Kaluaga	C.M.I	0781920207		Namulema
12	Bangi Agustino	M	Ndagga		0752073632		BANGYI

M - 12

RECORD OF ATTENDANCE

MEETING REFERENCE: RAKAI STAKEHOLDERS ENGAGEMENT KAKESE RGCs

VENUE: NDAGGA CHURCH OF UGANDA. **DATE:** 02/07/22

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	TUSHEMERIRWE DIVINA	F	KASABYA		0780688992		duina
2	JARARU ABUDU DIDAS	m	NDAGGA A.		0757115661		[signature]
3	Kahindo tadeho	M	NDagga B		0785683753		kahindo
4	BISHANGA THOMAS	m	KAMICHORA		0756673061		Thomas
5	MUHWEZI AUGUSTINE	M	NDAGGA A.		0755052992		Muhwezi
6	NAMUGGA PROSSY	F	NDAGA A		0778533988		Ndmugga
7	Juuko Lentelio	M	Kyamugongo		0703670897		JUUKO
8	BEINENAAMA BONIFACE	M	Ndagga 'A'		0777556609		[signature]
9	TURUHASINGURA LAURENCE	M	Ndagga (A)		0709141735		Laurence
10	TR Bwesigye Stephen	M	Ndagga A.L.C		0774327995		[signature]
11	Bangwengirimad	M	Ndagga ALC		-		DBA
12	CHRISTMAS ALEX	M	Ndagga 'A'		0760718450		[signature]

M-10
F-2

RECORD OF ATTENDANCE

MEETING REFERENCE: RAKAI STAKEHOLDER ENGAGEMENT KASESE RGC, Community Engagement

VENUE: Ndagga C.U **DATE:** 02/07/2022

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	Kachumpa Evelin Ko	M	NDAGGA.A.	Farmer			Kachumpa
2	ARIHO Isaac	M	NDagga A.	P.	0778961643		ARIHO
3	MBABAZI Fred	M	KASAMBYA		0706398946		Fred
4	MAGANDA PAUL	M	KATUNGA		0756-809218		
5	Mary Kyibamutura	AF	KAMICYOLA		—		Kyibamutura
6	NAKABUBI Cissy	F	KAMICYOLA		—		Cissy
7	KYOMUGISHA Vanjeo	F	KYAMIGONGO				Kyomugisha.
8	Tilhiriruwe Penina	F	Ndagga A		0773657348		Tilhiriruwe
9	Tumuhigue Eduth	F	Ndagga A		07		—
10	Grabahirwe Irene	F	Ndagga A				
11	Kyazire Faibe	F	Ndagga A -		—		
12	Nyangoma Raina	F	Ndagga B				

M - 4
F - 8

RECORD OF ATTENDANCE

MEETING REFERENCE: RAKAI DISTRICT STAKE HOLDER ENGAGEMENT. (MINISTRY OF WATER PROJECT)

VENUE: NDAGGA CHURCH OF UGANDA **DATE:** 02/07/2022

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	DAVID SSEMPALA	M	BRIGHT. T.S	VALUER	0701575903		[signature]
2	TWINUKYE ATANAZIO	M	NDAGGA 'A'	Youth councillor	0702014864		Twinukye.
3	NIWARIMPA ERICK	M	NDAGGA, B,	C/PERSON LCI	0702470820		[signature]
4	Gumoshabe Gerald	m	Ndagga. D.	C/P LCII	0709030974		[signature]
5	NINSIIMA JUDITH	F	Ndagga A	councillor	0709559902		[signature]
6	Nakachwa catherine	F	Katunga L.C	Councillor	0780154411		Nakachwa
7	NASSUUNA JESSICA	F	RAKAI	SEC FOR HEALTH	0753788537	nassuuna jessica @gmail.com	[signature]
8	Ntegyerize Simplisio	m	Rakai	councillor LCS	0752725169		[signature]
9	MUZEEYA JACKSON	M	KYZIBA S/C	CP LC3	0772846546		[signature]
10	RWANIKA ISMAIL	M	RAKAI	Vice C/P RAKAI	0705758389		[signature]
11	KYOMUHANJI ROVHI	M	RAKAYINJA	C/P women	0784381509		KYOMUHAIR
12	Turyahabwe	M	dogg	[illegible]	—		Hora

M - 9
F - 3

RECORD OF ATTENDANCE

MEETING REFERENCE: RAKAI DISTRICT STAKEHOLDER ENGAGEMENT AT VILLAGE LEVEL

VENUE: NDAGGA C.O.U **DATE:** 02/07/2022

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	Kyomulangi Gladins	F	Ndagga A	Peasant.			
2	Tumuoine Flora	F	Ndagga B	"			
3	Kyalumpa Hellen	F	Ndagga A	"			
4	Rwaygolore Jamy	m	Kamicora	Omulimi	0755444211		Jak T.
5	Balikuddembe Joseph	M	B.T.S	Sociologist	0701859666		[illegible]
6	BANZA Emma H	M	B.T.S	Surveyor	0779238240		[illegible]
7	Ssendege Jimmy	m	B.T.S	Sociologist	0703999194		[illegible]
8							
9							
10							
11							
12							

F - 3
M - 4

RECORD OF ATTENDANCE

(71)

MEETING REFERENCE: RAKAI DISTRICT STAKEHOLDER ENGAGEMENT KASEKE RGC

VENUE: Mweruka C.O.U DATE: 02/July/2022

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	SSEMUGUZI Jimmy	M	MWERUKA	Teacher.	0709155718		[signature]
2	BAKUDAALE SSALI	M	MWERUKA	"	0705104355		[signature]
3	ISYEKWASO Moses	M	MWERUKA	LEADER	0771047422	[illegible] moses	[signature]
4	Nteza Batesta	m	Kiziba	Ch mulimi	0755070924		[signature]
5	Busulwa vincent	m	Kiziba	Boda	0706881408		[signature]
6	Muhindo Janet	F	Kiziba	Farmer	0772548089		
7	kanyesiise Opaga	m	mweruka		075653659		
8	Kokushaba Edina	F	Mweruka	oteri	0753778371		Edina
9	Lukwago Vallencia	M	Mweruka	Engineer	0755035583		[signature]
10	Male Fabiyano	F	Kiziba	mulimi	0754544233		F. male
11	MWESEMBEZI EDSON	M	KIZIBA.	Educ.			[signature]
12							

M - 8
F - 3

RECORD OF ATTENDANCE

MEETING REFERENCE: RAKAI DISTRICT ~~AGE~~ STAKEHOLDER ENGAGEMENT

VENUE: NWERUKA TOWN **DATE:** 02-JULY-2022.

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	DAVID SSEMPALA	M	BRIGHT.T.S	VALUER	0701575905		
2	BANZA EMMA.H	M	BRIGHT.T.S	SURVEYOR	0779238240		
3	SSENDEGE JIMMY	M	- do -		0774106389		
4	BALIKUDEMBE JOSEPH	M	BRIGHT Technical	Senior Ecologist	0701859666		
5	BUKENYA ISMAIL	M	RAKAI	Vice C/P RAKAI	0750068962	0703713389	
6	NASSUNA JESSICA	F	RAKAI	SEC FOR HEALTH	0753788537	nassuna jessica@gmail.com	
7	Namuliudwe Margret	F	District councillor	Rakai district	0778515296		
8	Nuwabine Frank	M		Vice C/P LCIII	0734253514	0704254359	
9	NUWAMANYA JAMES	M	NWERUKA T/C	MAYOR	0772887267	jimmynuwamanya92	
10	NASSAZI JULIET	F	NWERUKA	MUNICIPAL	0776245345	Nassazi Juliet	NASSAZI
11	NAKAYIZA ROSE	F	NWERUKA	MUNICIPAL	0781498965	NAKAYI	ROSE
12	Nalukwago prossy	F	nwerwka	mutuze	0789668815	Nalukwago	prossy

M - 7
F - 5

RECORD OF ATTENDANCE

MEETING REFERENCE: RAKAI DISTIST STAKEHOLDER ENGAGEMENT

VENUE: MWERUKA TOWN **DATE:** 02-JULY-2022

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	NDYABAHIKA WILLIAM GEORGE	M	MAGABIRANDA BAUHINGH	PESEANT	0755591117		[signature]
2	BUKABZEBA BONNY	m	KASESE	PESEANT	0708884393		[signature]
3	KATIITI BAZIRIO	m	MAGABIRANO	Peasant	0755878366		BK
4	BYAMUKAMA DILIANO	M	KASESE	PEASANT	0756599525		Byamukama.
5	NANTONGO BETTY	F	KUWALA	PEASANTT	0750465744		Nantongo
6	MALE FRED	M	MWERUKA	PEASANT	0779498399		mala
7	SSANGO HERMAN	F	MWERUKA	Peasant	0772898452	-	[signature]
8	Butamanya Paskali	M	Kasese	peasant	-----		Butamanya
9	Katebemberwa Kelen	m	magabirano	Bisinence man	0758069376.		Katebemberwa
10	Ahimbisiibwe God	m	magabirano	Peasant	0787775942		God.
11	Tabaaro max	m	Kasese	musomesa	0704240987		[signature]
12	Mugumya Ronard	m	Magabirano A	peasant	0706269824		[signature]

F – 2

M – 10

RECORD OF ATTENDANCE

MEETING REFERENCE: RAKAI DISTRICT STAKE HOLDER ENGAGEMENT

VENUE: MWERUKA TOWN **DATE:** 02/JULY/2022

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	KISEKKA OSCAR	M	Mweruka Ward	Chairperson LCII	0705621702	Kisekkaoscar4@gmail.com	[illegible]
2	Ngabirano lawrence	M	Magabirano ward	Secretary LC	0757048034		Lawrence
3	IDDI KATWIRE	M	MWERUKA WARD	NRM C/m Mweruka LC	0772-380-350	MWESIDDI@...	[illegible]
4	Nsimiire Joseph.	M	Kasese	Chairman LC1	0757047198	[illegible]	[illegible]
5	Tushabe Rozet	F	Kaseese	Cimanr	0761066524	Tushabe	Rozet
6	Bagiritima Kereya	F	Nyaja	V/P	0783924208	Kereya	
7	AINOMUHANGI KAREYA	F	KASESE	MENBA	0754730768	AINOMUHANGI	Kereya
8	MTIRIZE Benison	M	Kasese	member	0771752895	MTIRIZE	BenSon
9	Luwaga Sidulko	M	Kiziba Kasala	Kasala	0789623651	Luwaga	Sidulko
10	kakoza	M	kasese	Menba	0788020517	kakoza	Apora
11	Mbanja Simons	M	Kaluwa	Umone	0705730083		[illegible]
12	Ntale Steveni	M	Mwankin	Mukumi	0757837287		Nte

M - 9
F - 3

RECORD OF ATTENDANCE

MEETING REFERENCE: Rakai District Kasese RGC Community Engagement

VENUE: Mwenika C.o.U DATE: 02/07/2022

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	ABDUNOOR MUNANA	M	MINSEREKA T.C	NELDEL	0700719101		[signature]
2	Birimmye Daniel	M	Kizibe	Chief Adviser	0701671986		[signature]
3	KAYONDO TOTAL	M	Kisuula	C/MN	0787533366		Kayondo
4	Ssembalinva Denis	M	Kiziba	C/man L.C I	0700730735		[signature]
5	Nakalika Jackline	F	Mwenika	Sec	0708877874		Jackline
6	Kato Kalevu	M	MwenIK	Member	0752438954		[signature]
7	Walugembe Kuzayiri	M	mwenika	chapati	0700449804		[signature]
8	Nakayiza Rose	F	mwelukA	Milimi	0781498965		Rose
9	MUWEREZA HANNINGTON	M	Mwenika	Gen. Sec. LC II	0782410348		[signature]
10	ZANIKA ELIZABETH	F	NYANZA	SEC	0709755010		Ezanika
11	Tibayungwa Alex	M	Nyanja	Member	0708506228		Alex
12	AKANYIJUKA DIDAS	M	magabirano B	Seeritary	0755591183		[signature]

M - 9
F - 3

RECORD OF ATTENDANCE

MEETING REFERENCE: RACAI DISTRICT KASESE RGC Community Engagement.

VENUE: Mwenka C.o.u **DATE:** 02/07/2022

#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	Namwanje Devota	F	Mweruka	Counsallior	0706660039	—	Namwanje
2	KUKUMBA BOAZ	M	KIZIBA	SPEAKER	0774666413	Kukumbaboaz@gmail	[illegible]
3	Namugala Noelina	F	Kiziba	Counsil	0775668760	Namugala	Namugala
4	[illegible]	M	NYAJAN	C/MAN	0706294357		[illegible]
5	TWINOMUGISHA KENETH	M	NYANJA		0709899712		[illegible]
6	Nsimire Goreti	F	magabirano'A		0751377283		Nsimire
7	Nalubega Jane	F	Malwagi	Nabakyala	0750990085		Jane
8	Ndibukirwa Rose	F	Mweluka	Famer	0708874981		Rose
9	Nakate Aisha	F	kiziba	muwanika	0783971230	Nakate	Aisha
10	Ntegamiso Rose	F	magabirano.A	Famer	0759549310	Ntegamiso	Rose
11	Karungi Scandine	F	magabirano A	Famer	0750769269		[illegible]
12	TUSIIGYE JOHN	M	KIZIBA	TEACHER	0702290345		[illegible]

M - 4
F - 8

RECORD OF ATTENDANCE

MEETING REFERENCE: CONSULTATIVE MEETING WITH LEADERS

VENUE: RAKAI DISTRICT HQUATERS **DATE:** 5th/07/2022

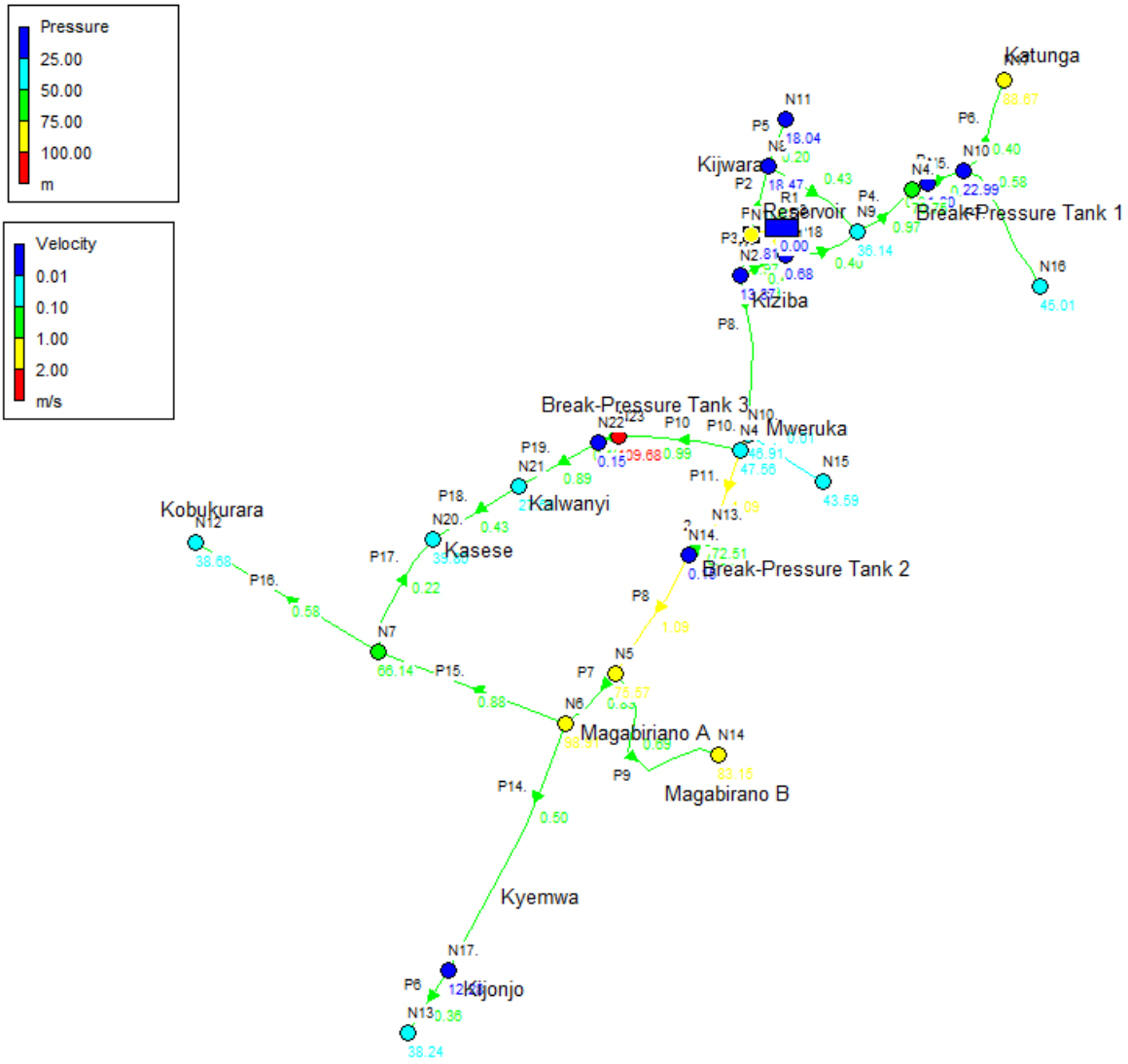
#	NAME	SEX (F/M)	ORGANIZATION	DESIGNATION	TEL CONTACT	EMAIL	SIGNATURE
1	KIZZA YAKOBO	M	RAKAI	Speaker Lwentuluge	0781201637		
2	KYOHEIRWE HARRIET	F	RAKAI	Deputy Mayor	0781411998		Kyheirwe
3	MBAINE ISREAL	M	RAKAI	SEC. FINANCE	0772868094	Mbainelsreal@gmail.com	
4	BUSANIKA ISMAIL	M	RAKAI	vice C/P	0750068962	Busanikaismail@gmail.com	
5	BALIKUDEMBE JOSEPH	M	Bright Technical Services	Senior Sociologist	0781859666		
6							
7							
8							
9							
10							
11							
12							

M 4
F 1

Annex III: Land Ownership Documents

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

Annex V: Epanet Schematics for Kasese RGC Model



Annex VI: Water Quality Analysis Results

Kasese Borehole (DWD 60890) Water Quality Test Result

NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY-BUGOLOBI.

P.O. Box 7053, Kampala
Tel. 041257548/341144 Fax: 041 255441
E-mail: waterquality@nwsc.co.ug

CERTIFICATE OF ANALYSIS

CLIENT: Royal Techno Industries Ltd
ADDRESS :P.O.BOX 23009,Kampala
TEL:256-414-220573

Serial No:ES /2018/4833
Sampled by: Client
Type of container: plastic
Sample source: Borehole water.

Date Sample received: 4- 09-2018 Date of Report:05-09-2018

Table of analytical results

Parameters	Units	Location;: Kasese Parish: Kiziba S/c: Kiziba District : Rakai DWD; 60890	National Standards for Natural portable water
WS Sample Nr	-	K2229/2018/C	
pH	-	6.75	5.5– 9.5
Conductivity	µs/cm	190	2500
Turbidity	Ntu	7.0	25
Total dissolved solids	mg/l	154	1500
Total Alkalinity: (as $CaCO_3$)	mg/l	78.0	500
Magnesium : $Mg2^+$	mg/l	4.80	100
Calcium ;Ca2+	mg/l	8.20	150
Hardness: total as $CaCO_3$)	mg/	44.0	600
ron:total	mg/l	0.038	0.3
Total suspended solids	mg/l	0	0.0
Chlorides-Cl^-	mg/l	18.0	250
Nitrate-N	mg/l	0.0	45
Bi-Carbonates:as $CaCO_3$	Mg/l	78.0	500
Colour	Ptco	26	50
Sulphates:SO_4^{2-}	mg/l	12	400
Fluoride :F^-	Mg/l	0.08	1.5

Remarks;
The sample showed satisfactory physio-chemical characteristics of the source ,which was commensurate with the National Standards for natural portable water .

ANALYSED BY: Robinah Muheirwe
AUTHORISED BY:MANAGER, Central Laboratory Services.....
APPROVED BY:SENIOR MANAGER, Water Quality Management Department.....
NB: The NWSC certificate of analysis by no means constitutes a permit to any person or undertaking to conduct business

NATIONAL WATER & SEWERAGE CORPORATION
P.O. Box 7053 Kampala, Uganda
EXTERNAL SERVICES

Magabirano Borehole (DWD 60875) Water Quality Test Result

NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY-BUGOLOBI

P.O. Box 7053, Kampala.
Tel. 04125754S/341144 Fax: 041 255441
E-mail: waterquality@nwsc.co.ug

CERTIFICATE OF ANALYSIS

CLIENT: Royal Techno Industries Ltd

ADDRESS :P.O.BOX 23009,Kampala

TEL:256-414-220573

Ref No:LS 109/inv/2018/478

Sampled by: Client

Type of container: plastic

Sample source: Borehole water.

Date Sample received: 17-08-2018 Date of Report:20-08-2018

Table of analytical results

Parameters	Units	Village;: Magabirano Parish: Mweruka S/c: Kiziba District : Rakai DWD: 60875	National Standards for Natural portable water
WS Sample Nr	-	K2219/2018/C	
pH	-	6.63	5.5– 9.5
Conductivity	µs/cm	180	2500
Turbidity	Ntu	7.0	25
Total dissolved solids	mg/l	132	1500
Total Alkalinity: (as $CaCO_3$)	mg/l	74.0	500
Magnesium : $Mg2^+$	mg/l	3.60	100
Calcium ;Ca2+	mg/l	7.80	150
Hardness: total as $CaCO_3$)	mg/	52.0	600
Iron:total	mg/l	0.032	0.3
Total suspended solids	mg/l	0	0.0
Chlorides-Cl^-	mg/l	20.0	250
Nitrate-N	mg/l	0.0	45
Bi-Carbonates:as $CaCO_3$	Mg/l	74.0	500
Colour	Ptco	23	50
Sulphates:SO_4^{2-}	mg/l	08	400
Fluoride :F^-	Mg/l	0.05	1.5

Remarks;
The sample showed satisfactory physio-chemical characteristics of the source ,which was commensurate with the National Standards for natural portable water .

ANALYSED BY: Robinah Muheirwe
AUTHORISED BY.....MANAGER, Central Laboratory Services

APPROVED BY:.....SENIOR MANAGER, Water Quality Management Department

NB: The NWSC certificate of analysis by no means constitutes a permit to any person or undertaking to conduct business

NATIONAL WATER & SEWERAGE CORPORATION
P.O. Box 7053 Kampala, Uganda
Tel: +256631315115/715
SIGN:.....
DATE: 20/8/18
EXTERNAL SERVICES

Annex VII: Chance Finds Procedure on Physical Cultural Resources Management

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

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

Annex VIII: Grievance Redress Mechanism

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

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

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

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

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

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

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

I. The need for maintain a Grievance Register

There should be Grievance Register which would record all the grievances, complaints and issues the

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

II. Recording of the complaints into the Grievance Register

The following steps are to be followed when the complaints will be received: Receipt of complaint (a verbal or in written) will be received by the Community Liaison Officer or any other officer (a member of the Grievance committee).

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

III. Formation of a Grievance Committee

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

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

The composition of Grievance Committee is depicted below:

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

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

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

Key interventions include:

- Setting up of a Functional Grievance Committee;
- Addressing employee's and affected persons (PAPs) grievances in all project phases.

V. Grievance Redress Procedure

The Grievance Redress Committee will receive a written grievance or complaint. Preferably these should be those, which the Reconciliatory Committee has failed to handle. This Committee will dispense grievances/complaints as described below;

Legal Redress

If the complainant feels dissatisfied with the administrative arbitration decision by the Grievance Redress Committee (GRC), the complainant will then seek legal redress in courts of law. If the complainant is not satisfied with the decision made above, he or she may lodge an appeal to the civil court.

VI. Proposed Process of Grievance Management

The ESMP recommends the following process, which should be adopted by the project support team:

a) Lodging Complaint

The Grievance Management Coordinator/Officer will receive complaint from the PAP in the local language and complete a Grievance Form, which will be signed by the leader of the Local Grievance Management Committee and the PAP/complainant. This will then be lodged in the Grievance Log/Register provided by the Grievance Management Coordinator/Officer.

b) Determining Corrective Action

If in their judgment, the grievance can be solved at this stage and the Grievance Management Coordinator/Officer and a representative of an NGO/CBO will determine a corrective action in consultation with the aggrieved person. A description of the action; the time frame in which the action is to take place; and the party responsible for implementing the action will be recorded in the grievance database.

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

c) Meeting the Complainant

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

d) Implementation of corrective Action

The Project or its Contractors/Operators within the agreed timeframe will undertake agreed corrective actions. The date of the completed action will be recorded in the grievance database.

e) Verification of the Corrective Action

To verify satisfaction, the aggrieved person will be approached by the Grievance Officer to verify that the corrective action has been implemented. A signature of the complainant will be obtained and recorded in the log and/or on the consent form. If the complainant is not satisfied with the outcome of the corrective action additional steps may be undertaken to reach agreement between the parties. If additional corrective action is not possible alternative avenues maybe pursued.

f) Action by Local leaders and Contractor(s).

If the Grievance Co-ordinator and NGO/CBO representative cannot solve the grievance, it will be referred to relevant parties such as local leaders, District Officers, NEMA, Valuer and MWE, for consultation and relevant feedback provided.

g) Action by Grievance Redress Committee (GRC).

If the complainant remains dissatisfied and a satisfactory resolution cannot be reached, the complaint will be handled by the Grievance Redress Committee. A dedicated Grievance Committee will be established to assess grievances that arise from disputes. This will include the following members: -

a. MWE Chair,
b. IWMDP Project Coordinator,
c. Resettlement Officer/Social Scientist Secretary,
d. Project's Environmental Focal Point,
e. The Chair of the local community (LC I Chairman),
f. A member of a recognized non-government organization, A Community Leader.

This committee must have a quorum of at least two thirds persons. Decisions will be reached by simple majority. The Grievance Committee should be constituted for as long as no more grievances are lodged. Once the Grievance Committee has determined its approach to the lodged grievance, this will be communicated to the Grievance officer, who will communicate this to the complainant. If satisfied, the complainant signs to acknowledge that the issue has been resolved satisfactorily. If the complainant is not satisfied however, the complainant notes the outstanding issues, which may be re-lodged with the Grievance Committee or the complainant may proceed with judicial proceedings. The effectiveness of the GRM will be evaluated during the periodical performance reporting and as part of the Environmental Audits.

The GRM should be assessed on the following parameters: -

a. Number of complaints:
b. Grievance issues by type and how they were resolved:
c. Total received, total justified,
d. Total resolved at various levels including the type of agreement reached,
e. Total referred to legal system/courts of law, including clarification on who initiated (local leaders, PAP or MWE) the referral and subject matter.

VII. Proposed Terms of Reference for the Grievance Management Coordinator/Officer

In line with MWE's resettlement policy framework, projects need to adopt appropriate measures that minimize the risks relating to constructing the water supply and sanitation project. Based on consultations with stakeholders in both districts, effective management of grievances strongly enhances the performance of projects through elimination of construction delays, proper expectation management and increasing community support for the project the current situation

suggests that community members incur high transaction costs to ensure that their grievances are handled.

Therefore, MWE will seek the services of a grievance management coordinator to support the existing framework in documenting, analysing and engaging stakeholders on how to manage project related grievances as a way of minimizing to delays in works related to unresolved grievances. The roles and responsibilities of the grievance management coordinator will include: -

a. to coordinate the work of the Grievance Committee, including calling and chairing scheduled meetings;
b. help train Community and Local Government staff engaged in grievance management for land and crops;
c. provide advice and assistance to such persons;
d. monitor progress of grievances;
e. inform Members of outcome of vote on whether or not to proceed to grievance;
f. act as primary Association contact with lawyers and liaise with legal counsel regarding on going grievance issues;
g. And report on informal disputes and grievances to MWE Project Implementation Unit on a regular basis.

Training and Qualifications: Minimum of a relevant university degree with 5 years' experience in grievance handling in rural communities with solid working knowledge of environment, resettlement and compensation issues in Uganda.

Annex IX: RAP Executive Summary

E1. Introduction

The Integrated Water Management and Development Project (IWMDP (IWMDP-P163782)) is a Seven (7) year Government of Uganda (GoU) Project estimated to cost US$313 million.

The IWMDP will support the Government of Uganda through the Ministry of Water and Environment (MWE) and the National Water and Sewerage Corporation (NWSC) in achieving the United Nation's Sustainable Development Goals (SDGs), including SDG #6, 'Ensure availability and sustainable management of water and sanitation for all.' It is aligned to Vision 2040, which aims at transforming Uganda into a modern and prosperous country. In addition, it will support the fulfilment of the Third National Development Plan (NDP III) goals and priority actions.

The IWMDP will be implemented by the MWE and NWSC – with the oversight of the Water and Environment Sector Working Group and relevant governing bodies (e.g. NWSC Board of Directors) and supported by existing decentralized regional structures and entities (including Local Governments, Water Management Zones, Umbrella Operators, NWSC town offices, etc.) and their partners to deliver desired results.

The IWMDP under the MWE has been under implementation since December 2019, as a successor to the Water Management and Development Project (WMDP-P123204) of 2012-2018 which is consistent with the World Bank Group (WBG) Country Partnership Framework (CPF) FY16-17.

The IWMDP builds and scales up the achievements of the WMDP, paying special attention to the vulnerable Northern and Mid- Western regions, refugee hosting communities, and areas with low Water Supply and Sanitation (WSS) coverage by creating an enabling analytical, infrastructural and institutional platform to improve water resource management, productivity and service delivery and to reduce vulnerability to water shocks. The IWMDP will consolidate the progress made in implementation of Integrated Water Resources Management (IWRM) over the years by MWE.

The design of the IWMDP was informed by lessons learned from the implementation of World Bank Funded Lake Victoria Environmental Management Project II (LVEMP II) and the Water Management and Development Project (WMDP). These projects financed major water-related investments in priority urban areas and various measures to improve IWRM planning and development. The World Bank has also supported rural sector through the Uganda Water Small Towns and Rural Growth Areas Project, which provided technical assistance (TA) and capacity building for the development of the water sector.

The IWMDP Development Objective is to improve access to water supply and sanitation services, strengthen capacity for integrated water resources management and enhance the operational performance of selected service providers. The IWMDP will also contribute to the achievement of National Development Plan III objectives, Vision 2040 and Sustainable Development Goals.

The IWMDP will achieve this PDO through focusing on three strategic areas: (i) strengthening WSS infrastructure and catchment management measures in targeted areas; (ii) supporting water-related institutions (NWSC, MWE, local government, and service providers) in their efforts to establish and improve operational efficiency and service quality in small towns and rural areas; and (iii) strengthening national and regional capacity to improve IWRM.

The IWMDP is comprised of four (4) components, namely: (1) WSS in Small Towns and RGCs and Support to Districts Hosting Refugees; (2) WSS in Large Towns and Support to a District Hosting Refugees; (3) Water Resources Management and; (4) Project Implementation and Sector Support.

The International Development Association (IDA) will provide Project financing in an amount equivalent to US$280 million, of which US$81.9 million will be used to finance the refugee and host community subcomponent. The US$81.9 million will be financed by the IDA 18 sub-window for refugee and host communities (US$25 million credit and US$25 million grant) and by national IDA (US$31.9 million). The GoU will be responsible for counterpart financing of US$8 million to cover a portion of investment and

operating costs, the acquisition of land, and any compensation due to people affected by the Project. The KfW Development Bank will finance US$25 million of the new water supply scheme in Gulu under Component 2.

The Kasese RGC Water Supply and Sanitation Project falls under Subcomponent 1.1: Support to Small Towns and Rural Growth Centres. Subcomponent 1.1 includes carrying out of activities to improve WSS in selected Small Towns (STs) and Rural Growth Centres (RGCs) in the Recipient's territory, consisting of: (i) constructing and rehabilitating WSS facilities, as well as providing associated services, including engineering, environmental and social studies and supervision of construction activities; (ii) preparing and implementing sanitation plans in selected Small Towns; (iii) strengthening the capacity of the Umbrella Water Authorities in the areas of operational and financial management, including the establishment of a remote monitoring system for rural water systems; and (iv) carrying out of environmental and social management activities to protect water sources and sensitize communities.

Subcomponent 1.1 includes five subprojects benefitting 16 small towns which include but are not limited to Lwentulege and Kasese RGCs in Rakai District, Bugwara and Kabamba RGCs in Kagadi District, Kikoora and Mwitanzige RGCs in Kakumiro District. This subcomponent will also support gravity fed or solar pumped piped water supply systems comprising of water source (spring, surface or borehole), storage tank and pipe distribution network feeding multifamily taps and/or household connections. Two specific gravity flow schemes have been identified to support rural communities in the districts of Kasese (Nyamugasani) and Buhweju (Bitsya). On sanitation, the subcomponent will finance on-site sanitation facilities, such as pour-flush toilets with a range of superstructures and septic tanks, targeting public spaces, schools and institutions.

Subcomponent 1.1 is expected to be executed by the MWE, Directorate of Water Development (DWD), Rural with its regional offices in close coordination with key stakeholders (local authorities and community organizations). With regards to service provision, currently there are three proposed arrangements (i) NWSC, (ii) Umbrella Organizations (UOs) and (iii) private operators contracted out through local governments. Based on existing sectoral trends, it is likely that for the most part, O&M of the systems will be transferred to NWSC; however, two or three small towns might be managed by UOs or private operators.

The MWE commissioned Bright Technical Services (BTS) to carry out the RAP to facilitate the acquisition of land for installation of permanent civil and electromechanical structures for the Kasese RGC water supply and sanitation project.

This document presents the Resettlement Action Plan (RAP) for the Kasese RGC Water Supply Supply and Sanitation Project. According to best practice, a project that will require land acquisition must prepare a RAP to guide these activities. This RAP shall be a living document throughout its implementation.

The Kasese RGC Water Supply and Sanitation Project is expected to cover Kasese RGC and all centres within 5 km of Kasese RGC. The centres and the points of interest for the Kasese RGC Water Supply and Sanitation Project implementation are: Kalwanyi, Kasese, Mweruka, Kijwara, Magabirano A and Magibirano B in Mweruka Parish; Ndaga A and Katunga in Ndagga Parish; as well as Kijonjo and Kyema in Rwesinga Parish among others shown in Table below. The location map is shown in **Error! Reference source not found.** below.

Table 1: List of Villages affected by the Kasese RGC Water Supply System and Sanitation Project

Subcounty	Parish	Village
Kibaale Town Council	Kigumba Ward	Kyakasesese B Cell
Kibanda	Magabi	Kiyonza
Kiziba	Mweruka	Kalwaayi
		Kasese

Subcounty	Parish	Village
		Kayolo
		Kijwaala
		Kiziba
		Kobukulula
		Kyajjumba
		Magabirano A
		Magabirano B
		Mweruka
		Nyanja
	Ndagga	Katunga
		Kyamigongo
		Ndaga A
	Rwakakara	Kiyonza
		Kyemwa

E2. Institutional, Legal, and Policy Framework

The Kasese RGC Water Supply and Sanitation Project is guided by both the applicable Ugandan laws and regulations related to land acquisition and involuntary resettlement as well as the applicable international standards.
Key Ugandan legislation and policies that will govern the Project include:

- The Constitution of the Republic of Uganda
- Water Act Cap, 152
- Land Acquisition Act (1965)
- The Land Act, Cap 227
- The Land Regulations, 2004
- The Roads Act, 2019
- The Access Roads Act, CAP 350
- Local Government Act (1997)

The key International RAP Implementation Standards and Guidelines (Applicable Standards) that guide this RAP and its implementation are:

- The World Bank's safeguard policy on involuntary resettlement, OP 4.12
- United Nations (UN) Basic Principles and Guidelines on Development-based Evictions and Displacement
- Voluntary Guidelines on Responsible Governance of Tenure of Land, Forests, and Fisheries (VGGT)

Where national legislation falls short of meeting the conditions prescribed by the Applicable Standards the latter will apply. The gap-filling measures proposed by the Kasese RGC Water Supply and Sanitation Project are also detailed.

E3. Stakeholder Engagement

The overall goal of stakeholder engagement is to establish an ongoing, accessible, and constructive dialogue with PAPs and other interested individuals and organisations, so that – in accordance with International Best Practice – their views and concerns can be considered in project decisions.

Stakeholder engagement is an inclusive process that should be conducted throughout the project life cycle, where properly planned and guided information is relayed to specific stakeholders to help in smooth implementation of a given project. This helps to communicate the purpose and objective of a given project. If executed well, it helps to support the development of strong, constructive and responsive relationships that are important for successful management of a project's environmental and social risks. Stakeholder engagement is most effective when initiated at an early stage of the project development process, and is an integral part of early project decisions and the assessment, management and monitoring of the project's environmental and social risks and impacts.

The Kasese RGC Water Supply and Sanitation Project has conducted a series of community sensitisation meetings, Focus Group discussions (FGs) Key Informant Interviews (KIIs) with PAPs to ensure strong participation and a comprehensive understanding of the entitlement framework. Comprehensive participation of displaced PAPs will be achieved using a variety of methods including smaller meetings to enhance participation levels.

Consultations were carried out with PAPs in the project affected areas of the Kasese RGC Water Supply System during preparation of this RAP between 2 July and 9 July 2022.

Identified Stakeholders

Primary stakeholders for consultation and disclosure are directly affected stakeholders with the most to lose or gain from the Project. Secondary stakeholders are government agencies at the National, district, Subcounty/Town Council and local level. Tertiary stakeholders include non-government organisations.

Information Disclosure

Disclosure entails making information accessible to interested and affected parties. Communicating information in an understandable manner to the relevant and interested stakeholders is an important factor in the stakeholder engagement process. Specific measures will be undertaken to ensure that Project commitments -- and specifically, the compensation entitlement framework and grievance mechanism information -- is accessible to all relevant parties, including those with disabilities preventing them from reading the documentation. The steps taken to ensure accessibility include:

- Development of a non-technical summary RAP version in both English and relevant local languages such as Luganda, Runyankore, and Kinyarwanda.
- Oral communication in relevant local languages such as Luganda, Runyankore, and Kinyarwanda via community meetings and household-level meetings.
- Supporting vulnerable or illiterate PAPs that require additional assistance to ensure comprehension of agreements and the sign-off process.

Information that has been or will be disclosed to stakeholders includes the following:

- The affected assets and interest in the affected assets were disclosed and signed off by PAPs during the cadastral and asset surveys
- Entitlement Cut-off Dates were disclosed to PAPs during one-on-one discussions as well as at community meetings
- The Entitlement Matrix will be disclosed through community meetings
- Expected Project impacts -- including loss of livelihood, economic displacement, migrant worker (construction worker) influx during the construction phase -- will be disclosed to stakeholders through community meetings as well as through district and Subcounty workshops targeting technical officials and elected leaders
- The RAP will be disclosed on MWE's website and will be disclosed to stakeholders through district and Subcounty workshops and village-level community meetings
- The compensation and resettlement packages -- including cash compensation, and resettlement assistance -- will be disclosed to individual PAPs and their spouses where relevant and their consent will be indicated via consent form sign-off
- Project strip maps will be disclosed to individual PAPs through community meetings
- The Livelihood Restoration Plan, including summarised matrices, will be disclosed to PAPs and local government administrative units through district and Subcounty community meetings and workshops
- Vacate dates will be disclosed to individual PAPs at the household level through the issuance of notices to vacate the permanently acquired land after compensation payment

Key stakeholder concerns were: whether structures be compensated for in case the pipe is affecting them; the payments for service lines connection and options for household connections; hiring local labour during project construction phase; continuing use of land; fear of not receiving any compensation and; delayed and unfair compensation.

Consultation and Disclosure Phases

Stakeholder engagement is an ongoing process. It involves two major phases:

1) **Phase I** covered the RAP preparation. It focused on the following:

   - Creating Project and RAP process awareness
   - Stakeholder mobilization to participate in RAP activities including cadastral survey, asset survey, socio-economic surveys, and vulnerability assessments
   - Management of grievances and concerns

   Phase I included three major stages:

   Stage 1: Engagement with district and Subcounty leaders during reconnaissance surveys and awareness creation

   Stage 2: Meetings with affected communities and PAPs for cadastral survey, asset survey, and socio-economic surveys

   Stage 3: Focus Group (FG) discussions and Key Informant Interviews (KII) for livelihood surveys and vulnerability assessments

   Management of grievances and concerns was an integral part of all stages.

   A consultative approach was used in the stakeholder engagement process. Consultation was a two-way process involving information sharing between the RAP Team and stakeholders. The local leaders -- especially the LC1s -- helped mobilise PAHs. Consultations commenced at 10 AM or 2 PM Ugandan Time to enable participation of all interested groups including women and children.

2) **Phase II** shall cover the RAP implementation. It will focus on land and property compensation packages, grievance management, livelihood restoration program implementation, and clearing the acquired infrastructure sites after the expiry of the 6 months' notice to vacate period.

   In order to mitigate gender-based violence, specific, deliberate approaches have been embedded in the Disclosure to PAPs and Compensation Agreement Sign-offs (Section **Error! Reference source not found.**) specifically requiring spousal consents and joint sign-offs and a grievance mechanism thoroughly addressing gender-related grievances (Section **Error! Reference source not found.**).

   Engagements in Phase II will be a continuation of the engagements conducted in Phase I. The activities will be tailored to specific stakeholders including PAPs, and local leaders

Planned Stakeholder Engagements During RAP Implementation

Stakeholder engagements will be continuous throughout RAP implementation phase. More than one topic, described in, Table 59 are to be addressed within the planned engagements.

The RAP Implementation Consultant will be responsible for the overall execution of stakeholder engagement activities, and MWE is responsible for ensuring these engagements are carried out.

The teams shall work with local government Technical Officials and elected leaders to ensure seamless implementation of planned stakeholder engagement activities.

Table 59: Schedule of Planned Stakeholder Engagements

#	Topic	Stakeholder Group	Format	Lead	Date/ Frequency	Project Stage
1	Project Coordination Meetings	MWE, WB	Project Meetings	MWE	Bi Monthly	RAP Preparation and Implementation
2	RAP Disclosure	District Local	Debrief	RAP	Monthly and	RAP

#	Topic	Stakeholder Group	Format	Lead	Date/ Frequency	Project Stage
		Governments, Affected Communities	Workshop, Community Meetings	Implementation Consultant & MWE	Quarterly	Implementation
3	Follow-up Surveys	Affected Communities	Field Surveys	RAP Implementation Consultant & MWE	Monthly and Quarterly, or as needed	RAP Implementation
4	Household Sign-off/ Valuation Disclosure	PAPs	Group Disclosures at Community Meetings Individual Disclosures	RAP Implementation Consultant & MWE	Regularly, after CGV approves Valuation Report	RAP Implementation
5	Compensation Payment	District Local Governments, PAPs	Small Group PAP Consultations	RAP Implementation Consultant & MWE	Regularly, after CGV approves Valuation Report	RAP Implementation
6	Livelihood and Vulnerables' Programs	PAPs	Community Meetings	RAP Implementation Consultant & MWE	Regularly, after completion of compensation payment	RAP Implementation

E4. Baseline Data Collection and Analysis

Socioeconomic surveys were conducted to define impacts and to provide a monitoring baseline following an initial desktop data review. Effective resettlement planning entails conducting a displaced persons census and an inventory of affected land and assets at the household, enterprise, and community levels.

The data was collected via a mixed-method approach incorporating both quantitative and qualitative assessments, as well as an assessment of available secondary resources. Quantitative surveys were conducted for all PAHs.

A total of 308 households were surveyed. The vast majority 87.84% of the survey respondents were the head of their household. Perspectives of both genders were captured and represented, with 76% male and 24% female respondents in addition to gender-specific Focus Groups (FGs) and Key Informant Interviews (KIIs).

Qualitative data was gathered to provide supporting details for the quantitative data collection surveys. Qualitative data collection was based on KIIs, FGs, and participatory methodologies including village transect walks.

Household socio-economic surveys was undertaken alongside the cadastral and asset surveys. The land and asset component measured and described fixed assets for each household including land holdings, land type, buildings, crops, and trees. This information was collected to inform compensation agreements and to assist in resettlement impact assessments.

A summary of the surveys completed is provided in the table below.

Table 60: Completed Baseline Surveys

Survey	Number of Surveys Completed	Timing
Cadastral Survey	782[5]	3 July – 9 July 2022
Assets Survey	782	3 July – 9 July 2022
Socio-Economic Household Survey	308	6 July – 16 July 2022
Focus Group (FG) Discussions: held with women (housewives), male elders	2	1 July – 16 July 2022
Key Informant Interviews (KIIs)	1	1 July – 16 July 2022

Survey & Household Demographics

A total of 308 households were surveyed. The vast majority 87.84% of the survey respondents were the head of their household. Perspectives of both genders were captured and represented, with 76% male and 24% female respondents in addition to gender-specific Focus Groups (FGs) and Key Informant Interviews (KIIs).

In Uganda, even though there are more female than male in terms of population, most of the land and property assets are owned by male. This could explain why there are more male respondents than female respondents. Whereas the male own land, women will mostly farm on the land. Women who owned land in the project area either had purchased it with their own money or were widows. According to the 2015-2020 District Development Plan, in Rakai District, many landless potential farmers especially women cannot easily access land because of costs, cultural norms and threats.

Water Sources

According to the 2015-2020 Rakai District Development Plan, the safe water coverage is 45%, latrine coverage is 76% and good latrine coverage is 64%. Additionally, the greatest distance is approximately 16km from the water source.

According to the RAP household surveys, ponds /dams and constitute 98.4% of the main water source for the surveyed population, community boreholes and rainwater constitute 0.6% and the protected springs only 1%.

Cooking Fuel

95.1% Households in the project area use firewood as a source of energy for cooking. This is supplemented with charcoal at 4.9%. The use of firewood is mainly due to its cost effectiveness and availability.

Forms of Sanitation

[5] Number of PAPs/Transactions as per the Cadastral and Asset Survey contained in the Valuation Report. PAPs include affected households or institutions that might be having multiple entries in the valuation report because of holding multiple properties/parcels

The overwhelming majority of survey participants (99%) have access to a pit latrine only, 1% has a flushing toilet.

The percentage of survey respondents with access to a flush toilet is aligned with the national rural averages according to the 2016 UDHS. Only 19% of Ugandan households use improved sanitation. Urban households are more likely than rural households to use improved sanitation (27% versus 16%). Eight in ten households use unimproved sanitation: 20% use a shared facility, 55% use an unimproved facility, and 7% have no facility.

The households without any form of sanitation and use neighbors or communal pit latrines is mainly due to the expenses and difficulty involved in the construction of sanitation facilities. Some of the soils in the project area are loose and often collapse making the difficult and more expensive.

Therefore, the Kasese RGC Water Supply and Sanitation Project will supplement sanitation efforts by constructing 03 public toilet facilities.

Project Perceptions

The majority of households surveyed are very supportive of the Kasese RGC Water Supply and Sanitation Project at 98.7% and 1.3% of the households are somewhat in support of the project.

The very high support of the project implies that water is very much needed in the project and surrounding areas and that there will be minimal disturbances during the construction phase of the water pipelines. However, more sensitization is needed to bring the 1.3% to support the project so that there is full support for the project.

E5. Project Impacts Identification

Project Impact Minimisation Efforts

This RAP has been prepared based on the MWE approved Feasibility and Preliminary Design Reports of December 2021. During the RAP surveys, efforts have made to avoid physical displacements as much as possible by avoiding impacting public and institutional infrastructure structures as much as possible.

In addition, the Project water pipes (transmission and distribution pipes) are routed along the existing community access roads. The easement corridors for pipes have been proposed at 3 meters wide (1.5 meter on either side of the centerline). Furthermore, the sites for permanent land acquisition – borehole sites, access roads, and sanitation facility sites -- are of minimal land take or located on land parcels with minimal impacts on economic and livelihood activities of affected persons. For example, the borehole, reservoir, and sanitation facilities whose sites measure approximately 0.2224, 0.1112 and 0.0247 acres respectively.

Identifying Project Impacts

For the purposes of defining impacts, a distinction is drawn between households that are both physically and economically displaced and those that are only economically displaced, as follows:

- **Physical Displacement:** Loss of shelter and assets resulting from land acquisition associated with a project that requires PAP to relocate.
- **Economic Displacement:** Loss of income streams or livelihood means resulting from land acquisition or obstructed access to resources (land, water, or forest) resulting from the construction or operation of a project or its associated facilities. For example, economic displacement can result from loss of access to farmland and can occur without physical displacement occurring.

Another important distinction in defining impacts is between permanent land acquisition and permanent land restrictions, which are defined as follows:

- **Permanent land acquisition** involves the project acquiring all land including land registration and title processing. This is the case for land required for the Water Source Sites, Reservoir Sites, Access Roads and Sanitation Facility Sites.
- **Permanent land restriction** involves limitations imposed on the land under easement corridors for water pipes which prohibits building any structures or cultivating perennial crops and trees within the corridor. However, any existing PAH retains land use/ownership rights and cultivation of seasonal crops within the easement corridor, or any other land uses. Land use restrictions decrease land use potential which decreases the land value. It is this diminution (reduction in value) that is compensated.

Lastly, impacts have been disaggregated by land tenure status in accordance with Article 237 of the Constitution of the Republic of Uganda (1995) and land tenure systems found in the Project Area including:

- **Customary:** Applicable to a specific area of land and characterized by local customary regulation which applies local customary regulation and management to individual and household ownership, use and occupation of, and transactions in, land. Providing for communal ownership and use of land in which land parcels may be recognized as subdivisions belonging to a person, a family, or a traditional institution. Land is considered as owned in perpetuity.

The PAHs by land tenure type is presented in the table below.

Table 61: PAH by Land Tenure Type

Land Tenure	No. of PAPs	Percentage
Customary	782	100.00%

Table 62: Project Impacts Based on Socio-economic and Asset Surveys

Impacts	Total
Total Land Affected (Permanent Acquisition & Restriction)	22.9232Acres
Permanent Land Affected (Borehole Sites, Reservoir Sites, Access Roads, and Sanitation Facility Sites)	1.0839Acres
Permanent Land Restriction (Easement for Transmission and Distribution Pipes)	21.8393Acres
Total Number of Customary Landowners Affected	782
Permanent Land Affected (Borehole Sites, Reservoir Sites, Access Roads, and Sanitation Facility Sites) of Customary Landowners affected	1.0839Acres
Permanent Land Restriction (Easement for Transmission and Distribution Pipes) of Customary Landowners affected	21.8393Acres
Physically Displaced Households (PAHs)	0
Physically Displaced Persons (PAPs)	0
Number of Affected Residential House Structures	0
Number of other Affected Fixtures (i.e. Fences)	34

Impacts	Total
Number of Affected Graves	0
Economically Displaced Households (PAHs)	3
Economically Displaced Persons (PAPs)	3
Number of Affected Crops and Trees	3,945
Number of Affected Commercial Structures	3
Number of Affected Public Institutional Properties	23

E6. Compensation Framework

Under the applicable standards, the Project Proponent MWE is required to compensate and/or assist physically or economically displaced PAPs.

Affected persons includes:

1) Those who have formal legal land or asset rights.
2) Those who do not have formal legal land or asset rights, but have a claim to land or assets that is recognized or recognizable under national law.
3) Those who have no recognizable legal right or claim to the land or assets they occupy or use.

Compensation for assets should be at full replacement value which includes:

- **Agricultural Land:** The market value of land of equal productive use or potential -- which must be located in the vicinity of the affected land -- plus the cost of preparation to levels similar to or better than those of the affected land plus the cost of any registration and transfer taxes
- **Residential and Urban Land:** The market value of land of equal size and use, with similar or improved public infrastructure facilities and services -- preferably located in the vicinity of the affected land -- plus the cost of any registration and transfer taxes
- **Perennial Crops and Trees:** Equivalent to current market prices given the type, age, and productive value of the plants and/or trees, including lost future productivity
- **Household and Public Structures:** The cost of building a new structure with an area and quality similar to or better than those of the affected structure, or the cost of repairing a partially affected structure, including labour and contractor fees and any registration and transfer taxes
- In determining replacement costs, neither asset depreciation nor the value of salvage materials are taken into account.

Compensation Eligibility

PAHs are eligible for compensation and other assistance if they have a "legitimate interest" in Project Area "immoveable assets" that are in place (i.e. established, in the case of crops; or constructed, in the case of buildings and other structures) at the time of the Entitlement Cut-off Date.

"Legitimate interest" in household-level immoveable assets is usually held by a single member: the HoH. Through traditional and family practice, the HoH is typically the most senior male household member. In some instances, the legitimate interest may be held jointly, i.e. by the household head and his/her spouse, or with other extended family members. In accordance with the applicable standards, the compensation framework includes gender-specific components to ensure that documentation of ownership or occupancy and compensation payments will be issued in the names of both spouses and single heads of households as relevant.

Note that "legitimate interest" is not synonymous with ownership. Even those Project-affected persons/households/communities with no recognizable legal right or claim to assets they are occupying should be considered eligible for resettlement assistance, in accordance with the applicable.

Immoveable assets comprise:

- Land
- Perennial crops and trees fully or partly established at the Entitlement Cut-off Date
- Buildings and Other Structures including residential houses, stores, kitchen blocks, latrines, wells, commercial structures and other structures such as animal pens and graves. These must have been fully or partly constructed.

Immoveable Assets that are planted (in the case of crops and trees) or constructed (in the case of buildings) after the Entitlement Cut-off Date are not included in compensation calculations.

Therefore, eligibility derives from association with the land, based on the results of the asset and socio-economic surveys. Categories of eligible persons will include --but not limited to -- the following:

- Households whose fixtures (fences) are affected by the Project Permanent Land Restrictions (Easement for Transmission and Distribution Pipes)
- Households that will be economically displaced, as they have assets or crops/trees to be affected by the Project, so will lose access to their means of production (including rights to unrestricted use of agricultural land or other natural resources);
- Public institutions such as educational institutions, religious institutions and administrative centres affected by the Project Permanent Land acquisition (especially sanitation facility sites) and Permanent Land Restrictions (Easement for Transmission and Distribution Pipes) that will lose fences and crops and;
- Households experiencing loss of, or restrictions of access to some or all of their common resources (for example fuel wood).

Entitlement Cut-off Date

The date of cadastral and asset surveys is the entitlement cut-off date. PAPs were informed of entitlement cut-off dates during the stakeholder consultations as well as during the PAH surveys. Each PAH was provided with a copy of the Asset Survey Form that was dated and signed off by the Valuer, PAP, and the Local Council Chairperson. Cadastral and asset surveys were carried out from 3 July – 16 July 2022.

Entitlement Matrix and Payment Options

All entitlements associated with the defined eligibility are presented in the Entitlement Matrix below.

Table 63: Detailed Entitlement Matrix

Affected Asset or Right	**Eligibility Considerations**	**Entitlements**		
		Compensation	**Allowances**	**Livelihood Restoration + Vulnerable Assistance**
Loss of Fruit Trees and Perennial Crops	Crops in place at Entitlement Cut-off Date and identified during asset surveys.	Cash compensation at district rates based on size (height and maturity)	15% disturbance allowance based on cash compensation value.	Access to financial management training

Affected Asset or Right	Eligibility Considerations	Entitlements		
		Compensation	**Allowances**	**Livelihood Restoration + Vulnerable Assistance**
			Salvaging permitted	
Loss of Non-economic Trees and Bushes	Non-economic trees and bushes in place at Entitlement Cut-off Date declaration.	Cash compensation at district rates based on size (height and maturity). .	15% disturbance allowance based on cash compensation value. Salvaging permitted	Access to financial management training
Loss of Seasonal or Annual Crops	Crops in place at Entitlement Cut-off Date declaration	Not eligible for cash compensation.	Harvesting permitted	Timing of Project aligned with harvesting seasons to ensure no loss of annual crops. However, if Project schedule impinges on PAPs ability to harvest, cash compensation at district rates based on size (height and maturity) + 15% disturbance allowance based on cash compensation value. The seasonal assets will be assessed and a valuation report prepared and approved accordingly
Permanent Loss of Land (Water	Customary Landowners (whose land is not encumbered with	Non-vulnerable households: Cash compensation at 100% of full	15% disturbance allowance based on cash	Agricultural starter kit Access to financial

Affected Asset or Right	Eligibility Considerations	Entitlements		
		Compensation	**Allowances**	**Livelihood Restoration + Vulnerable Assistance**
Source Sites, Reservoir Sites, Access Roads, and Sanitation Facility Sites)	Kibanja interests) at Entitlement Cut-off Date	replacement value. Vulnerable households: In kind compensation with a standard plot size. Land Title Certificate or Certificate of Customary Ownership to HoH and spouse(s)	compensation value.	management training
Permanent Land Use Restrictions (Easement)	Customary Landowners (whose land is not encumbered with Kibanja interests) at Entitlement Cut-off Date	Non-vulnerable households: Cash compensation at 100% land interest and 80 - 100% diminution of full replacement value Vulnerable households: In kind compensation with a standard plot size. Land Title Certificate or Certificate of Customary Ownership to HoH and spouse(s)	15% disturbance allowance based on cash compensation value.	Access to a number of capacity-building programs. Access to financial management training
Loss of Other	Other structures (fences etc.) at	Cash compensation at	15% disturbance	Access to financial management

Affected Asset or Right	Eligibility Considerations	Entitlements		
		Compensation	**Allowances**	**Livelihood Restoration + Vulnerable Assistance**
Structures	Entitlement Cut-off Date declaration.	full replacement cost (based on size, level of completeness, construction materials, and finishes with no depreciation considered).	allowance on cash compensation. Salvaging permitted	training
Other Allowances	All affected households and entities		Harvesting permitted Salvaging permitted Support opening bank accounts	Access to financial management training
Vulnerable Persons	Identified Existing & Potentially Vulnerable Households	Eligible for in kind compensation for loss of land or dwellings.	Prioritisation for compensation and moving assistance.	Support: All vulnerables will be eligible for vulnerable support program (legal, psychological, educational, health support)

E7. Livelihood Restoration Plan

The Kasese RGC Water Supply and Sanitation Project will act to restore the livelihoods and living standards of all displaced persons to levels equivalent to or better than those maintained at the time of physical or economic displacement.

Therefore, this Project LRP aims to restore and improve PAPs affected livelihoods. This RAP also takes a Sustainable Livelihoods approach, which presents a holistic method to livelihood restoration, bridging the relationship between capital assets (human, natural, financial, physical, and social) and the latest empirical evidence-based economic and international development research to achieve livelihood outcomes (well-being, income, food security, vulnerability/risk management, and sustainable use of natural resources).

Livelihood restoration encapsulates specific measures necessary to mitigate any harmful or negative Project impacts on PAPs economic assets or activities.

The LRP objectives are to:

- Support affected people, households, and communities in overcoming the disruption generated by displacement and promote the establishment of inclusive and sustainable community livelihood systems.
- Improve the quality of life of affected families by building their capacity in managing, cash compensation.
- Meet the compensation commitments – and support the effective management of compensation commitments – as negotiated with affected households, such that they receive compensation and other assistance in a manner enabling them to create new income sources.
- Ensure that displaced households can equally access and benefit from other community, district, and regional development programs and initiatives such as government programs and community development activities.

The LRP programs include:

- Financial Management Support Program (FMSP)
- Agricultural Starter Kits

E8. Vulnerable Persons

Vulnerables refers to those who may be more likely to be adversely affected by the Kasese RGC Water Supply and Sanitation Project impacts and/or more limited than others in their ability to take advantage of a project's benefits.

In preparing this RAP, vulnerable PAPs have been identified and consulted. Assistance measures have been developed to prevent disproportionate impacts among such groups.

The completed socio-economic survey and vulnerability assessments indicate that the categories of Project-affected vulnerable persons include:

- **Elderly headed households with limited support.** A household headed by an elderly person could have difficulty producing enough crops to feed the family. Elderly people may not necessarily be vulnerable, particularly if they live in extended family groups, but the Project will need to ensure their needs are appropriately met during physical relocation and re-establishment of houses and crops.
- **Widows.** In Uganda, widows remain the most vulnerable members of society as they are often threatened by in-laws and without proper ownership documentation of the assets of their late husbands. The Project shall provide sufficient legal support to households headed by windows to ensure they are not disfranchised of their property and asset ownership rights.
- **Physically disabled households.** These households may be impoverished due to the cost of providing support to the affected household members and potentially lower household productive capacity.
- **Mentally disabled households.** These households may be impoverished due to the cost of providing support to the affected household members and potentially lower household productive capacity. The study identified 03

<u>Vulnerability Support Programs</u>

Identified vulnerable households and individuals will be monitored and provided with the following assistance:

- Assistance with understanding of agreements and signing and additional time and independent support to ensure their agreement is properly informed.

- Assistance with collection of compensation and priority access to mitigation and development.
- Legal assistance (if required) for establishing powers of attorney).
- Transport assistance to designated Project meeting venues.
- Increased number of monitoring visits.

E9. Cultural Heritage Protection

The Asset survey indicates that the Kasese RGC Water Supply and Sanitation Project **will not impact any graves**, however, the activities of the Kasese RGC Water Supply and Sanitation Project have the potential to trigger OP 4.11 Physical Cultural Resources. During excavation works for Project infrastructure, there might be chance finds.

Any chance finds will be treated in line with the requirements of OP 4.11. The objective of OP 4.11 is to avoid, or mitigate, adverse impacts on cultural resources from World Bank Funded Development Projects

Chance Finds

The Project has developed a Chance Finds Procedure for when previously unknown cultural heritage is encountered during Project activities. This procedure will be included in all construction-related contracts for this Project.

All MWE and contractor personnel involved in Project construction shall be responsible for following the Chance Finds Procedure.

E10. Household Sign-offs and Moves

Where resettlement is confirmed and unavoidable, projects need to develop strategies for household sign-off and moves.

There are two key household sign-off phases:

1) Phase 1: Household Verification – This process involves households verifying that assets have been properly surveyed and the records fully reflect their interest in the asset.
2) Phase 2: Sign-off – Where households confirm the compensation as applied to their household are acceptable and they agree to allow the Project to proceed and take over ownership of the land for Project components that require permanent land acquisition.

Group Disclosure

Together with the RAP Implementation Consultant, MWE is responsible for overall RAP implementation. Once the RAP and the Valuation Report are approved, MWE shall undertake group disclosures with affected Project Area communities and their leaders. These shall take place in Rakai District at the Sub-counties and Town Council and all PAPs shall be invited to attend. Information on key RAP findings and impact mitigation measures for minimizing displacement will be shared at the meetings. Importantly, the group disclosure meetings will be held at a time that takes into consideration local context, ensuring that women and youth are able to attend.

PAPs will be informed of compensation procedures, modes of compensation, eligibility criteria, livelihood programs, vulnerable support programs, and the process for signing compensation agreements.

PAH Verification

Each household asset survey included sign off by the relevant LC1, BTS, and the Project affected head of household. A copy of the captured assets was handed to head of household to support a smooth verification process. This provided the PAH an opportunity to verify that all their assets have been recorded properly and that they agree to use the recorded assets as the basis for their RAP entitlements. As part of the verification process, PAHs will be presented with:

- Demographic information including name, ID number, recorded affected assets, contact information and photos.
- Table for each main asset type (land, crops, structures) outlining survey date, survey code, and asset interest.
- Record of grievances lodged by the PAH to help the Project assess any outstanding issues.
- Photos of assets taken during the surveys.
- Agreement with relevant signatures (LC1 chairperson, Area Land Committee Chairperson, MWE Officer, and the RAP Implementation Consultant, PAPs) that the household accepts the information on the form. The statement should include agreement to abide by any relevant land use restrictions (e.g. plant height restrictions above the easement).

Household verification will be undertaken by the head of household and spouse(s) to ensure they both agree to the survey findings and to protect the interests of the spouse(s). MWE (together with the RAP Implementation Consultant) to obtain PAP bank details or support PAHs in setting up accounts. A spousal consent and joint account shall be required where applicable.

Sign-off Process

Upon completion of the verification exercise, the RAP Implementation Consultant and MWE, shall disclose the individual compensation packages in one-on-one meeting with PAHs timed to not impact livelihoods as well as cultural or religious functions or duties. For the sign off process, the same information listed in Section 8.4 will be presented in the form of a household dossier.

PAPs who agree with the entitlements shall sign off on the compensation agreements. For couples, a spousal consent and joint account shall be required. The agreements shall be witnessed by an LC1 chairperson, Area Land Committee Chairperson, MWE Project Officer, and the RAP Implementation Consultant.

PAHs who disagree with the compensation package shall notify the RAP Implementation Disclosing Officer and register their concerns in the area designated for grievances on the disclosure document. PAHs are also free to provide additional information and register their grievance in accordance with the RAP's grievance mechanism.

E11. Grievance Mechanism

The Kasese RGC Water Supply and Sanitation Project is required to propose and implement a grievance mechanism to receive concerns and grievances and facilitate their resolution.

The grievance mechanism's goal is to deploy a reliable and effective method for project stakeholders to voice and address land acquisition and resettlement-related concerns.

Grievance Management Committees (GMCs)

Prior to RAP implementation, GMCs shall be established and trained by the RAP Implementation Consultant in grievance handling with clear responsibilities including the following:

- Facilitating access to information and attending to complaints that may be resolved by providing information
- Providing a free and accessible method to PAPs to report their grievances and complaints as the established GMCs. In addition, any aggrieved stakeholder will be free to submit their grievance through their LC1 chairpersons.
- Maintaining records of all grievances brought before the committee by PAPs
- Establish a forum and a structure to report grievances with dignity
- Providing a forum for resolving grievances and disputes at the lowest level
- Providing access to a fair hearing and remedy

- Verifying facts presented at grievance hearings using their community knowledge and experience and providing MWE with meeting minutes from each hearing
- Providing access to negotiate and influence project decisions that may adversely affect them
- Resolving disputes quickly before they escalate to unmanageable levels
- Referring any unresolved grievances to higher levels for action and further follow up
- Liaising with local leaders to ensure health, safety and security of the communities, workers and construction materials during the project implementation

The GMCs shall be established at four different levels as below:

- Village GMC
- Subcounty/Town Council GMC
- District GMC
- Ministry GMC

Grievance Mechanism Publicizing

The grievance mechanism shall be widely publicised within the Project Area through sensitization and community meetings.

The grievance mechanism shall be publicised as part of consultation and disclosure activities. It will be communicated verbally at community and public meetings and will also be included in all communication materials such as Sub county noticeboards. Specific reference to the grievance mechanism shall be included in all compensation and sign-off agreements.

The grievance-handling steps are outlined below. Once received, all grievances will be responded to within a maximum of 30 days.

Table 64: Grievance-handling Steps

#	Step	Responsibility
1	Receive Grievances and Provide PAPS with a Grievance Acknowledgement Form	MWE, RAP Implementation Consultant, and GMCs
2	Grievance Registration and Acknowledgement	MWE, RAP Implementation Consultant, and GMCs
3	Grievance Sorting and Logging in database and tracking system	MWE, and RAP Implementation Consultant
4	Grievance Assignment	MWE
5	Grievance Processing and Feedback (30 days)	MWE, RAP Implementation Consultant, and GMCs
6	Corrective Actions, Grievance Follow Up and Closure	MWE

A grievance shall be submitted either verbally or in writing at the complaints and grievance desk which will be the secretariat for grievances management. The desk shall be at the Subcounty, town council, and Ministry. This desk will be assigned with the responsibility of receiving, registering, and screening, assessing and following up complaints and grievances to their conclusion. The desk will be hosted by the following officers who shall serve as Grievance Officer (GO) at different levels.

Table 65: Grievance Officers at Different Levels

No.	Grievance Committee Level	Responsibility/ Host office

No.	Grievance Committee Level	Responsibility/ Host office
1	Sub County/ Town Council	CDO Subcounty or Town Council
2	District	CDO District level
3	MWE	Principal Sociologist

Grievances may, in addition, be submitted through any of the following channels:

	Letter to: The Permanent Secretary Ministry of Water and Environment Plot 3-7 Kabalega Crescent P.O. Box 20026, Kampala
	Email: mwe@mwe.go.ug
	Telephone: + 256 800 200 977
	Walk in to: MWE Offices GMC Offices at Subcounty HQs or District HQs
	Social Media: @min_waterUg
	Through stakeholder consultation and engagement meetings

Complainants identified as recognised vulnerable persons, per the Vulnerables Program, will be provided with adapted grievance procedures to ensure their interests are protected. These grievances will be handled with utmost importance and special considerations (document support and legal advice) will be upheld.

Grievance Database Management and Tracking

All received grievances shall be registered and logged into the grievance register for further management and tracking. An acknowledgement receipt shall be issued to the complainant. MWE shall keep written records of all complaints for effective grievance management.

All decisions reached at the different resolution levels shall be communicated to the complainant and other stakeholders by the Chairperson of the respective GMC. It will be the responsibility of the GO to deliver the communications. Evidence of communication of decisions to complainants shall be acknowledged by way of signing a dispatch form or acknowledgement of a file copy.

Agreed corrective action will be undertaken by the responsible agency/ part for example a Local government, MWE, contractor or authorized sub-contractors in close consultation with the complainant within the agreed timeframe and completed action recorded in the grievance database. To verify satisfaction, the Grievance Committee will upon receipt of a completion report from the GO verify that corrective actions have been implemented. A signature of the complainant will be obtained on the

consent form. If the complainant is not satisfied with the outcome of corrective action, additional steps may be undertaken to reach agreement or an appeal will be lodged by the complainant.

As part of the broader community engagement process, MWE shall also report back periodically to communities and other stakeholder groups as to how the company has been responding to the grievances it has received (i.e. time to respond, percentage of closed/resolved cases, number of complaints monthly).

E12. Monitoring, Evaluation, and Reporting Framework

Monitoring Framework

Monitoring is an internal management function that measures RAP implementation progress and performance including key procedure progress such as compensation and resettlement. Specific consideration will be given to:

- Monitoring the use of RAP inputs and outputs according to established cost and time schedules.
- Any emerging social or economic difficulties encountered by PAPs during the compensation process
- Compensation program compliance and completeness
- Monitoring community consultation and grievance participation

Performance Monitoring

Performance monitoring is also an internal management function allowing MWE and the RAP Implementation Consultant to measure the results of the delivered inputs.

RAP performance monitoring will be integrated into the overall project management to ensure RAP activities are synchronized with all project implementation activities. Performance Monitoring Reports shall be prepared every month throughout the RAP implementation schedule.

Internal Monitoring Process

The Internal Monitoring Process includes establishing M&E systems and databases, ongoing monitoring, monthly reporting, and vulnerability assessments. Internal evaluation shall be based on the following criteria:

- **Project Effectiveness:** Have the planned purpose, objectives, and results been achieved? Was the intervention logic correct? Were the resources applied appropriately in relation to the expected outcome? Were the means commensurate with the goal(s)?
- **Project Efficiency:** Were resources (human, financial, material, time) used satisfactorily to achieve outcomes? What could be done differently to maximize impacts within acceptable and sustainable resource structures?
- **Project Impacts:** To what extent has the program contributed toward its longer-term goals? Why or why not? What unanticipated positive and negative consequences did it have? To what extent has the Project achieved the central resettlement objective that affected communities and households have opportunities to improve their pre-Project livelihoods and living standard levels? Why or why not?
- **Results Sustainability:** Are positive impacts resulting from the program continuing? Will they continue once the program has been completed? Why or why not?

The monthly internal monitoring process will entail the following:

- To-date accomplishments.
- Objectives attained and not attained during specific periods.
- Problems and challenges encountered.
- Suggestions for corrective actions.

MWE has the overall responsibility for conducting regular internal project implementation monitoring with tasks including the following:

- Tracking RAP implementation progress.
- Indicator measurements at appropriate intervals.
- Implementation of a system to regularly respond to monitoring findings by adapting existing measures or modifying implementation processes.

This monitoring process will be used to analyse progress and change at regular intervals and shall be linked to the various RAP implementation activities.

Evaluation Framework

Evaluation considers resettlement program outcomes through an impact assessment of affected household income, living standards, and environmental issues. RAP implementation focus is on household baseline data compilation to enable comparison during evaluation missions.

Impact monitoring gauges RAP implementation and its effectiveness in meeting the affected population's needs. Impact monitoring for this project will be conducted by the MWE and RAP implementation consultant Team. It will provide MWE and the funders with an assessment of resettlement effects, verification of internal performance monitoring, and identification of any necessary RAP implementation adjustments. PAPs should be included in all impact monitoring phases.

Project-related land acquisition will be tracked against the population's pre-land acquisition baseline conditions. This baseline has already been established through cadastral surveys, assets surveys, land use assessments, and socio-economic surveys of the affected population and the Project-affected area.

This RAP has established objectively verifiable indicators for measuring resettlement impacts on the health and welfare of the affected population and the effectiveness of impact mitigation measures including livelihood restoration and community development initiatives.

Implementation

This RAP has established objective, verifiable indicators for measuring resettlement impacts on the health and welfare of the affected population and the effectiveness of impact mitigation measures including livelihood restoration and community development initiatives.

E13. Organisational Framework

MWE is responsible for RAP Implementation for the Kasese RGC Water Supply and Sanitation Project and is committed to allocate more staff that shall constitute a RAP Implementation Team.

The specific MWE roles and responsibilities during RAP Implementation phase include:

- Lead RAP Implementation agency
- Reviewing and approving the RAP and all other reports
- Overall planning, co-ordination, and management of RAP implementation activities
- Liaising and coordinating with all RAP participants and contributors
- RAP activity budgeting
- Compensation Payment, including resettlement assistance
- Internal monitoring and evaluation
- Stakeholder Engagement
- PAP Verification
- PAP disclosure and Compensation Agreement sign-offs
- Grievance Management including preparation of supplementary valuation reports
- Management of Livelihood Restoration Programs, Community Development Programs, and Vulnerability Assistance Programs including:
    - Implementation of Financial Management Support programs

    - Implementation of Construction Training
    - Implementation of LC1 Capacity-building Training
    - Provision of legal services to PAPs where necessary in the course of compensation payment
- Internal monitoring and evaluation
- Survey and Titling of acquired land for the water source and reservoir sites.

Other RAP Implementation Parties

Other government departments and agencies play different but complementary roles in land acquisition, compensation, resettlement, and livelihood restoration. Each government department and agency bear institutional responsibilities and mandates as indicated below:

- Valuation: Office of the Chief Government Valuer
- Compensation Payment: MWE
- Livelihood Restoration: MWE, District and Local Governments of Rakai
- Grievance Mechanism: LCs, Local Governments, and Courts of Law.
- Land Titling: Department of Surveys and Mapping, Department of Land Registration, and District Land Boards

E14. RAP Implementation Schedule, and Budget

MWE has committed that this RAP shall be implemented within a 12 months' period from October 2022 - September 2023. Project construction activities are expected to commence by the end of August 2023.

The overall RAP Budget is estimated at **UGX 1,006,266,545**

E15. Change Management

This RAP is a living document that will be periodically updated as the Project progresses. This RAP should be regarded as a key management tool and Project document to serve as the basis for any future sub project RAPs.

The construction contractor may require land for lay down areas, and camps. In addition, unintended damage to land, crops, and structures may occur. MWE shall ensure that this land and any impacted assets are compensated for in accordance with the provisions of this RAP.