Republic of Uganda

Ministry of Water and Environment

INTEGRATED WATER MANAGEMENT AND DEVELOPMENT PROJECT

ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE SOLAR POWERED PIPED WATER SUPPLY SYSTEM AND SANITATION FACILITY IN KIDERA RURAL GROWTH CENTRE BUYENDE DISTRICT - EASTERN UGANDA

ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT

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AES	Audio Encounter Surveys
CAO	Chief Administrative Officer
CBO	Community-Based Organization
CFRs	Central Forest Reserves
CHS	Community Health and Safety
CIA	Cumulative Impact Assessment
DCDO	District Community Development Officer
DDP	District Development Plan
DEA	Directorate of Environmental Affairs
DED	Detailed Engineering Design
DEO	District Environment Officer
DHO	District Health Officer
DHO	District Health Officer
DLG	District Local Government
DWD	Directorate of Water Development
DWO	District Water Officer
DWRM	Directorate of Water Resources Management
EHS	Environmental Health and Safety
EHSGs	Environment Health and Safety Guidelines
EIA/ESIA	Environmental Impact Assessment/Environmental and Social Impact Assessment
EOC	Equal Opportunities Commission
ESIS	Environment and Social Impact Statement
ESMMP	Environmental and Social Management and Monitoring Plan
ESMP	Environmental and Social Management Plan
EUWS	Eastern Umbrella of Water and Sanitation
FGDs	Focus Group Discussions
GBV	Gender-Based Violence
GPS	Geographical Positioning System
GRM	Grievance Redress Mechanism
H/C/HC	Health Centre

HHs	Households
HMIS	Health Management Information System
IFC	International Finance Corporation
IPC	Infection Prevention and Control
IUCN	International Union for Conservation of Nature
IWMDP	Integrated Water Management and Development Project
IWRM	Integrated Water Resources Management
KIIs	Key Informant Interviews
LC	Local Council
LCV	Chairperson Local Council V
LULC	Land use and land cover
MGLSD	Ministry of Gender, Labour and Social Development
MHU	Makerere University Herbarium
MOES	Ministry of Education and Sports
MoH	Ministry of Health
MoLHUD	Ministry of Lands, Housing and Urban Development
MWE	Ministry of Water and Environment
NDP	National Development Plan
NEMA	National Environment Management Authority
NFA	National Forestry Authority
NGOs	Non-Governmental Organizations
O&M	Operation and Maintenance
OHS	Occupational Health Safety
OP	Operational Policy
OPD	Outpatient Department
PAD	Project Appraisal Document
PCRs	Physical Cultural Resources
PDO	Project Development Objective
PLA	Participatory Learning and Action
PWDs	Persons with Disabilities
QC	Quality Control

RAP	Resettlement Action Plan
RDC	Residence District Commissioner
RGC	Rural Growth Center
RWHT	Rainwater Harvesting Tanks
SAS	Senior Assistant Secretary
SDGs	Sustainable Development Goals
SEA/H	Sexual Abuse and Exploitation or Harassment
SH/SEA	Sexual Harassment/Sexual Expolitation and Abuse
SHS	Second Hand Smoke
SMC	Safe Male Circumcision
SPP	Source Protection Plans
STI/Ds	Sexually Transmitted Infections/Diseases
TC	Trading Centre
TSCs	Timed Species Counts
UBOS	Uganda Bureau of Statistics
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations International Children's Emergency Fund
UNRA	Uganda National Roads Authority
VAC	Violence Against Children
VECs	Valued Environmental Components
VES	Visual Encounter Surveys
VHT	Village Health Teams
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organization
WMD	Wetlands Management Department

EXECUTIVE SUMMARY

BACKGROUND

The Government of Uganda received credit from the World Bank towards implementation of the Integrated Water Management and Development Project (IWMDP). The Project Development Objective of IWMDP is to improve access to water supply and sanitation services, build capacity for integrated water resources management and support the operational performance of service providers in the water sector. IWMDP comprises the four components, namely:

- Component 1–WSS in Small Town & Rural Growth Centres which will cover Support to Small Town & Rural Growth Centres and Support to Refugee & Host Communities;
- Component 2–WSS in Urban Large Towns;
- Component 3–Water Resource Management; and
- Component 4–Project Implementation & Sector Support.

Sub-components 1.1 is designed to support Small Towns and Rural Growth Centres and will be implemented by MWE team at central level through the Department of Urban Water Supply and Sanitation Department (UWSSD) and Rural Water Supply Sanitation Department (RWSSD), with close collaboration with staff in Water and Sanitation Development Facilities (WSDFs) as well as district local governments.

Under this sub component, twenty five (25) solar powered piped water supply systems and associated public sanitation facilities will be developed in 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.

Specific for Buyende District, MWE intends to develop a solar power piped water supply system and an improved sanitation facility in Kidera RGC located in Kidera Town Council.

This is in response to the low safe water coverage (38.9%) and missing gaps in latrine coverage (83%) in for Kidera Town Council as indicated in the Buyende District Development Plan (2020/21-2025/26). As a result of the limitations in access to drinking water in the TC, women and children still have to bear the burden of fetching water, from long distances (1.8 to 2.5 Km) and for a long-hours (between 1-2 hours) per day. Additionally, latrine coverage severely dropped especially in growing urban agglomerations such as; hamlets, trading centres, town boards and town councils near Lake Kyoga after flooding of the lake in 2020, of which Kidera TC is among. The communities have adopted sharing of available pit latrines and open defecation among other adopted practices.

PROJECT COVERAGE AND LOCATION

The proposed Kidera RGC Water Supply System and Sanitation Facility Project will be located in Kidera Town Council, Buyende District – Busoga sub region in Eastern Uganda.

The RGC is approximately 23 Km from Buyende town, and 114 km from Jinja, the main regional town of Busoga sub region.

Kidera RGC WSSS project will cover 4 villages, namely; Kitete B, Nakibengo A, Nakibengo B and Kiwambya in Kidera Town Council.

PROJECT DESCRIPTION

The water supply system will comprise of two production boreholes (DWD 60870 and DWD 61681) with solar powered submersible pump at GPS coordinates 503363.74E, 147311.55N and 503314.60E, 147243.53N, respectively in Nakibingo Village, Kidera Parish pumping 325.26 m^3 of water over a 17-hour pumping regime on daily basis through 5.748 Km transmission main to a pressed steel storage tanks in at GPS coordinates 499051.64E, 147386.56N in Kiwambya Village, Kidera Parish. From the reservoir, water will be distributed by gravity using a 2 Km distribution line to four (4) villages, namely Kitete B, Nakibengo A, Nakibengo B and Kiwambya, that form part of the core Kidera Centre. A total of 65No. household connections and 4No. public stand posts are planned. A field water office will be constructed at Kidera Town Council offices (Coordinates 498871.46E, 147551.51N) to support the operation and maintenance of the water supply system.

Under sanitation, the project will construct a 6-stance waterborne public sanitation facility within the RGC. The sanitation facilities will be gender disaggregated and will comprise of 4No. Single Stances, 1No. Urinal, 2No. people with disability equipped stances, shower facility and complete hand washing facilities.

RATIONALE FOR THE ESIA STUDY

The proposed project was assessed against the World Bank Safeguards Operational Policies and found to triggers OP/BP/GP 4.01: Environmental Assessment, OP/BP 4.04: Natural Habitats, OP 4.11: Physical Cultural Resources, and OP/BP 4.12: Involuntary Resettlement. Furthermore, the Environmental and Social Management Framework developed for the project, classified it under Category B, for projects with moderate environmental and social risks and impacts that can be mitigated and/or managed through an Environmental and Social Impact Assessment (ESIA). At national level, the proposed water supply system and sanitation facilities project falls under Schedule 5 Section 4 (a) “Surface water abstraction for urban use of more than 1000 M^3/day”, and Schedule 4 section 9 (d) “Construction of public sanitary facilities” of the National Environment Act, 2019; as those for which an ESIA Study is mandatory before project activities implemented. This report therefore, presents the outcomes of an ESIA study conducted for the Kidera RGC WSS and improved sanitation facilities project.

ESIA OBJECTIVES

The purpose of this ESIA Study, therefore was to ensure that the proposed project activities comply with the existing environmental protection laws, regulations and standards in Uganda, as well as with the World Bank’s Operation Policies and Practices; and will not have a lasting adverse impact on the country’s population and their livelihood, the natural environment or assets of particular cultural heritage value. The specific objectives of the ESIA were to: (i) provide a description of the environmental and social baseline settings of the project areas; (ii) investigate the likely impacts of the proposed project on the biophysical and social- economic environment and propose appropriate mitigation measures to avert or reduce such impacts; (iii)promote environmental sustainability through identifying and implementing appropriate mitigation measures in the proposed project; (iv) involve and engage stakeholders including communities in the project area in the decision- making process and make them part of the project; and (v) facilitate informed decision making by the Ministry of Water and Environment (Project Proponent), National Environment Management Authority and other Lead agencies and to set terms and conditions for sustainable implementation of the projectThe study was preceded by internalization of the Terms of Reference and formulation of appropriate data collection tools. It

assessed the project environmental and social related project alternatives in relation to the project design and feasibility assessments. It further analysed each of the activities of the project covering physical, biological, socio- economic (including occupation health and safety); and socio-cultural environment as detailed herein. It determined and listed potential direct and indirect environmental impacts for each of the planned activities; evaluated and recommended mitigation measures for adverse negative/adverse effects. Key aspects involved in the study focused on literature review, field baseline environmental and socio-economic studies which included noise and vibration measurements, air quality, in situ and ex-situ water quality measurements, biological surveys covering flora and faunal investigations. Other activities involved environmental and social screening of the project, impact evaluation and preparation of environmental and social management plan (ESMP) alongside the environmental monitoring plan.

STAKEHOLDER ENGAGEMENT

Effective and meaningful stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. Consultations were organised at target sites, villages, and parish, Sub County, and district levels and at relevant ministries, departments, and authorities of government. The meetings engaged farmers, fishermen, women, men, youth, lake/wetland user groups, transporters local leaders and administration, technical officers. Over 204 stakeholders were engaged, 122 of whom were males, and 82 females.

Some of key issues raised from stakeholder engagements are summarised as follows;

- Employment opportunity priority be given to the local Communities in the project area;
- There should adequate compensation for all the land for the project in the RGC and;

ASSESSMENT OF PROJECT ALTERNATIVES

The comparison of project 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. Assessment of project alternatives/options was guided by the 2011 EIA Guidelines for Water Resources related projects as follows: The process took into consideration environmental, social, technological, engineering and economic aspects of the project which would effectively and efficiently deliver the development objective of the Project. The best alternative was the underground water source as opposed to surface water source. This was because of the high cost of investment as well as the operational cost for surface water.

POLICY, LEGAL AND REGULATORY FRAMEWORK

The proposed project was assessed taking into consideration policy, legal and related statutory requirements with which its activities amongst other has to comply with alongside World Bank Operational Polices. A summary of these instruments is presented as follows:

Policy Framework and Plans

Vision Uganda 2040

The Third National Development Plan III 2020/2022-2024/25

The National Environment Management Policy 1994,

The National Policy on Conservation and Management of Wetland resources 1995,

The National Water Policy 1999,

The Uganda National Land Policy 2013,

National Health Policy 2010,

The National Environment Health Policy 2010,

National Policy on Elimination of Gender Based violence 2016,

The National Equal Opportunities Policy 2006,

The National Policy on HIV/AIDS and the world of work 2007,

The Uganda Gender Policy 2007,

National Policy on Disability 2006,

National Climate Change Policy 2012.

Legal Framework

The Constitution of the Republic of Uganda 1995,

The National Environment Act 2019,

Water Act Cap 152,

Local Governments Act Cap 243,

The Employment Act 2006,

The Occupational Safety and Health Act 2006,

The Climate Change Act 2020

The Land Acquisition Act 1965,

The Public Health Act Cap 281,

The Roads Act, 2019,

The Workers' Compensation Act Cap. 225,

Children Act Cap 59,

Domestic Violence Act 2010,

Regulations, Standards and Guidelines

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

Water Resources Regulations 1998;

Water Supply Regulations 1999;

The National Environment (Wetlands, Riverbanks and Lakeshores Management) Regulations 2020;

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

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

The National Environment (Noise Standards and Control) Regulations 2003;

National Environment (Audit) Regulations, 2020, Uganda National Roads Authority (General) Regulations 2017;

Water Source Protection Guidelines 2007; and

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

World Bank safeguards operational policies (OP) and Bank procedures (BP), namely; OP 4.01 Environmental Assessment, OP 4.04 Natural Habitats, OP 4.09 Pest Management, OP 4.10 Indigenous Peoples, OP 4.11 Physical Cultural Resources, OP 4.12 Involuntary Resettlement, OP 4.36 Forests, and OP 4.37 Safety of Dams.

During IWMDP Project Preparation, an ESMF and RPF were prepared that are guiding the preparation of this ESIA. Much as the World Bank in 2017 published its new Environmental and Social Framework which sets out standards designed to support sustainability in projects, IWMDP project was prepared and approved under the World Bank Safeguards Operational Policies (OP) hence, its implementation is guided by the Operational Policies and the following 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.

DESCRIPTION OF THE PROJECT AREA

This is summarized under the themes as follows:

Physical Environment Baseline

Topography: The lowest and highest points in the project area are 1020 to about 1114 m ASL with a mean elevation of 1067 m ASL. The entire slope of the project area drains towards the L. Kyoga being the largest water body.

Hydrogeology: The project drilled two Boreholes (DWD60870 and DWD 61681) with consistent yield of 13.14 m3/hr and 12.0 m3/hr and the abstracted yield of 10.5 m^3/hr and 9.6 m3/hr, respctively. The drilled borehole will serve 4 villages at a 325.26m3 of water on a daily basis.

Hydrology: The Kidera RGC boreholes are located in Nakibengo Village, within (DWD60870) and outside (DWD 61681) the 200 m protection zone allocated to the Lakeshores as prescribed by the National Environment (Wetlands, Riverbanks and Lake Shores Management) Regulations, No. 3/2000, outside the highest L. Kyoga flooding mark.

Geology and soils: Kidera project sites are mainly comprised of gneisses and sediments rock types and undifferentiated gneiss. Only on the lakesides of Lake Kyoga one finds quaternary sedimentary rocks. In and around the project area, the dominant soil type is “Grey-brown and brown sandy loams over laterite”.

Air quality, noise, and Vibration: Measurements were taken from Nakibengo TC for peri-urban and Kidera Health Centre IV for institutional/hospital settings, for sensitive receptors in the project area. All average values of gases (Nitrogen dioxide, Carbon monoxide, Sulphur Dioxide and Volatile Organic Compounds) and particulate matter (PM2.5 & PM10) were in conformity with World Health Organisation Air Quality Standards. However, baseline noise levels recorded at the two sites slightly exceeded the maximum permissible noise limits as prescribed in the First Schedule of National Noise Standards and Control Regulations, 2003. Vibration results averaged between 0.824mm/s in Nakibengo Trading Centre

and 0.665 mm/s at Kidera Health Centre IV, both below the adopted standards (12.5 mm/s) for vibrations associated with construction activities.

Water Quality: Results of a water quality assessment from a sample collected from borehole in Nakibengo village, near the site proposed for the project borehole indicate that all physical chemical water parameters were within national baseline values for lake water quality monitoring except for Nitrites. Ground water pumped from the Kidera borehole will require additional and continuous monitoring to ensure suitability of the water for domestic use. Measured against acceptable limits for drinking water.

Biological Environment Baseline

The project area is not rich in terms of plant biodiversity with only 75 individual species recorded on all survey sites. Only **TWO** species namely Milicia excelsa (Mvule) and Tamarindus indica (Fabaceae) of the total species recorded are listed under IUCN Red List of Uganda as of 2018.

For fauna; Only three species of butterflies, nine species of amphibians, two lizards, one crocodile, one snake and two specieis of mammals were recorded during the survey

Socio-economic Baseline

The project will serve five (4) villages, namely; Kitete B, Nakibengo A, Nakibengo B and Kiwambya in Kidera Town Councilwith a population of 2,999 people and 577 households and a settlement pattern characterized by congested dwellings and linear settlements. The major economic activities include farming, trading and fishing.

There are 83 functional water sources in the project area majority of which are deep boreholes. On the sanitation part, approximately 98.8 percent of all households have their own sanitation facilities.

Common water related illness: The major water related illnesses in Kidera TC included include Cough or Cold, Malaria, Diarrhea, Intestinal worms, Gastrointestinal Disorders, Pneumonia, STIs, GBV related injuries, Typhoid, Stomach Aches, HIV/AIDs (HMIS2, 2021). The people in Kidera indicated that malaria (61.2%) and Respiratory Tract Infection 17.4 % are the most common diseases afflicting the households in the project area. Other diseases that affecting households are ulcers, skin diseases and dysentery.

Gender Based Violence (GBV): The Uganda Police crime report indicates that there are 217 reported cases of sexual assault, 20 cases related to child abuse and 102 cases of common assault. In Kidera RGC, married women (39.2%). Girls (37.2%); 5.2% children are victims of GBV. Main (51.5%) perpetrators of GBV are male spouses, 25.7% female spouses and strangers. Most common abuse experienced in the community, 36.4% cited battering/beating, and 26.5% verbal insults and abuses.

HIV/AIDS: HIV/AIDS prevalence in Buyende stands at 4.7%. Major factors attributed to the spread of HIV/AIDS, included lack of information 20.9%, poverty 17.5%, peer pressure 16.8% and alcohol/drug abuse 10.5%. Numerous factors likely to contribute to the spread of HIV/AIDS. And the various ways in which HIV/AIDS can be controlled such as sensitization activities, Bylaws against prostitution, promotion of ABC and Bylaws against drug/alcohol abuse among others.

PROJECT IMPACTS

Positive impacts of the project shall include:

- Creation of emplyoemnt opportunities for the local communities.
- Creation of market for construction materials thus increasing household incomes

- Skills development amongst the local community
- Increased access to clean and safe water supply
- Improved hygiene, sanitation and public health conditions.

Negative impacts of the project shall include:

- Loss of vegetation and habitat for fauna
- Soil erosion and sedmenetation of wetlands/rivers/lake
- Loss of land
- Risk of increase in HIV/AIDs in the project area
- SH/SEA and GBV risks due to labour influx
- Risks of OHS during project execution
- Environmental Pullution amongst others.

Generally, the purpose of this project is to increase sustainable access to safe water and basic sanitation in Kidera RGC along the distribution route. From the assessment, the positive impacts outweigh the negative impacts. Further, the negative impacts of the project are identifiable and mitigatable. The report presents specific mitigation measures for each impact identified. The mitigation measures are aimed at either eliminating the impact or reducing its magnitude and or severity or both. Therefore, the ESIA study recommends that the project should proceed but with the following recommendations;

a. During implementation, the Developer should engage with key stakeholders such as UNRA, LGs and the communities in laying of the water transmission and distribution lines so as to take care of any planned road upgrades, other developments and stakeholder support in the project area.

b. Ensure adequate and qualified staffing for Environmental and social safeguards management at MWE, Supervising Engineer, and Contractor during implementation to enhance oversight and compliance roles with environmental and social safeguards requirements.

c. Construct the proposed water project along the road reserves of the existing public roads as proposed by the Developer to avoid delays, impacts and negotiations associated with land acquisitions with private landlords.

d. The project design should incorporate aspects and techniques that protect the borehole structures from risk of flooding at borehole DWD 60870 and contamination from pit latrines at borehole DWD 61681 as included in the project ESMP.

e. Conduct and implement pre and post construction phase mitigation measures by coordinating with local authorities and involving the district and sub-county officials.

f. Implement the project Resettlement Action Plan recommendations in relation to land acquisition, easement and protection of physical cultural resources,

g. Implement actions proposed in the project water source protection plan for sustainability of the project water resources in the Kidera RGC

The following general mitigation measures shall be undertaken and will include but not limited to the following:

a. Ensure employment opportunities for the local people.
b. Ensure health and safety for both workers and the public.
c. Institute a programme where all communities affected by the water and sanitation project have access to adequate and clean water.
d. Control negative impact on biodiversity and wetlands.
e. Ensure all livelihoods lost are restored through a transparent and adequate compensation procedure and livelihood restoration plan.
f. Mainstream HIV/AIDS prevention in contractors SEAP.
g. The Contractor should develop a Construction specific ESMP after developing the final designs. This should constitute the monitoring checklist to be used by the Supervising Consult and MoWE.

The environmental management and monitoring plan shall be attached as a condition for the project construction contract so as to make the contractor aware of his environmental obligation before securing the contract and enhance the implementation of the ESMP.

The developer will also ensure that several licenses, permits and approvals are obtained from the relevant bodies before commencement of construction activities and also prior to to particular activities during project implementation. These permits, licenses and approvals include Water Abstraction permits, Waste Disposal Permit, Waste transportation license, ESIA approvals for campsites and hoarding areas, approval of campsites and hoarding plans, permit to carry out regulated activity in a wetland, Riverbank, lakeshore; License to emit noise in excess of permissible noise levels, Mining permit, extraction of minerals opening up of quarries and sand pits; Permit for storage of petroleum products and dispensing license, Work place registration permit, Work permits, Statutory Certification of equipment, Road Permits (in case of road crossings), traffic diversion consent; and RAP approval conditions.

Overall; this will enhance environmental standards in the whole project. In case of any archaeological finds during excavation, these shall be reported and handed over to the Department of Museums and Monuments in the Ministry of Tourism, Wildlife and Antiquities for further follow up in accordance with the Chance Find procedure developed for this project.

CONCLUSIONS

In this study, the need for the project was examined, its compatibility with the surroundings and economic benefits evaluated and environmental impacts assessed and analyzed.

Adverse impacts were identified, mitigation measures to avoid, reduce and minimize these impacts have been suggested, either as part of the design, or as measures to be implemented. Good practice measures were also identified in order to minimize the impact of the proposed development further. The proponent has agreed to these mitigation measures and they are, therefore, expressed as commitments.

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

Based on the above, it is recommended that NEMA approves this project because its planned activities do not pose a threat to environment and natural resources if the mitigation measures and monitoring plan are implemented effectively.

1. INTRODUCTION

1.1 BACKGROUND

The Government of Uganda through the Ministry of Water and Environment (MWE) received credit from the World Bank towards implementation of the Integrated Water Management and Development Project (IWMDP). IWMDP is aimed at (i) improving access to water supply and sanitation services, (ii) capacity for integrated water resources management, and (iii) enhancing the operational performance of service providers in project areas (World Bank, 2018). Component 1.1 of IWMDP is aimed at supporting small towns and Rural Growth Centres (RGCs) to improve the sustainable provision of water supply and sanitation services. The subcomponent is aimed at increasing the availability of safe drinking water, reduce the distance people must travel to access safe WSS systems, secure water sources to ensure sustainable supply, and improve sanitary conditions at the household and community levels.

In Eastern Uganda, the support will target the districts of Buyende, Kaliro, Namayingo, Mayuge, Jinja, Namutumba and Kamuli. Specific for Buyende District, the project will develop a solar powered piped water supply system and sanitation facility in Kidera RGC, Kidera Town Council as part of the strategy to improve access to clean water, improved sanitation, and hygiene in the mushrooming small towns in the RGC.

1.2 PROJECT JUSTIFICATION

Despite considerable progress in the WSS sector, Uganda still faces challenges of improved WSS delivery in semi-urban areas, commonly known as small towns and RGCs. The National water supply coverage levels (77 percent in urban areas and 67 percent in rural areas) mask disparities in service quality between urban and small towns/rural areas (MWE, 2020). In urban areas, 48 percent of households use piped water, but that number falls to 33 percent in small towns and to 9 percent in rural areas (UNICEF/WHO, 2019)[1]. Most of the country relies on community point sources. Despite an acceptable level of functionality of water systems (80 percent in rural and small towns), many people still travel long distances to fetch water. Populations with insufficient potable water oftentimes use unsafe water sources, triggering cholera, typhoid fever, and diarrhea outbreaks as well as adverse social consequences, such as sexual and domestic violence. As with safe water coverage, sanitation coverage poses another significant challenge. The United Nations Joint Monitoring Program reports that only 29 percent of the urban and 17 percent of the rural populations have access to individual improved sanitation facilities (UNICEF/WHO, 2021). Sewerage coverage is less than 7 percent in large towns and negligible in small towns. The low sanitation coverage indicates poor on-site sanitation conditions from unlined public and household toilets and inadequate wastewater treatment and fecal sludge management. These deficiencies have caused severe water pollution and related environmental and public health issues.

[1] WHO/UNICEF Joint Monitoring Programme. *Progress on Household Drinking Water, Sanitation and Hygiene 2000–2017.* (United Nations Children's Fund and World Health Organization, New York, 2019).

1.2.1 SAFE WATER AND SANITATION SITUATION IN BUYENDE DISTRICT

The national safe water coverage for Buyende District stands at 37% (*Uganda Water Supply Atlas*, 2022), in comparison to the district statistics of 47% in the same period (Buyende DLG, 2021). In Kidera Town Council (TC), 30% of the total population (26,442) is reported to have access to safe water, most of which is sourced from boreholes (80) rain water harvesting tanks (7), taps (4) and valley tanks (1) (*Uganda Water Supply Atlas*, 2022). Correspondingly, the Buyende District Development Plan (2020/21-2025/26) indicates that 38.9% safe water coverage for Kidera TC, accessed from 94 boreholes and 4 taps (Buyende DLG, 2021). Given the limitations in access to drinking water in the district and target TC, women and children still have to bear the burden of fetching water, from long distances (1.8 to 2.5 Km) and for a long-hours (between 1-2 hours) per day. This puts them at greater risk of sexual violence when collecting water, and also causes school absenteeism.

Latrine coverage in Buyende District has been improving between 83% in Kidera TC to 96% in Nkondo Sub County by 2018/19. This has however severely dropped especially in growing urban agglomerations such as; hamlets, trading centres, town boards and town councils near Lake Kyoga after flooding of the lake in 2020. The communities have adopted sharing of available pit latrines and open defecation among others. Additionally, latrines tend to fill with water due to high ground water table in the district during the rainy seasons (Buyende DLG, 2021).

In order to address the water supply and sanitation gaps in Kidera TC, Buyende District, a large solar powered piped water supply systems and sanitation interventions is planned. This water supply and sanitation facility project will be implemented as part of the strategy to improve access to clean water, improved sanitation and hygiene in Kidera RGC.

1.3 RATIONALE OF ESIA

The National Environment Act 2019, Section 113 (1) requires a developer who proposes to undertake a project that falls in its Schedule 5 of to conduct an Environmental and Social Impact Assessment (ESIA) as prescribed by, and outlined in section 3(a)(ii) of the National Environment (Environmental Impact Assessment) Regulations 2020.

The proposed water supply system and sanitation facility falls under Schedule 5 Section 4 (a) "Surface water abstraction for urban use of more than 1000 M^3/day", and Schedule 4 section 9 (d) "Construction of public sanitary facilities" of the NEA, respectively. Schedule 4 and 5 of the NEA requires mandatory ESIA to be undertaken before project implementation.

Furthermore, the project ESIA will be carried out pursuant to the World-Bank Safeguards Operational policies {Environmental Assessment (OP/BP/GP 4.01), Natural Habitats (OP/BP 4.04), Physical Cultural Resources (OP 4.11) and Involuntary Resettlement (OP/BP 4.12) which are triggered by the project activities. The ESMF of this project developed by MWE and approved by the World Bank classified it as Category B. This is in consideration of the nature of impacts of associated with the project.

Therefore, this ESIA was conducted and will be submitted to the National Environment Management Authority (NEMA) for their review and approval before commencement of project implementation.

1.4 OBJECTIVES

The overall purpose of the assignment was to identify, assess and evaluate the environmental and social impacts of the proposed water and sanitation project and propose mitigation measures to be put in place to ensure sustainability of the development.

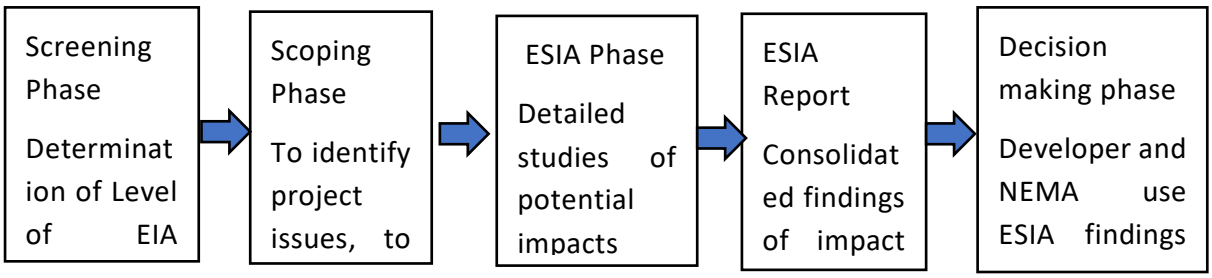
1.4.1 SPECIFIC OBJECTIVES

Primarily, the ESIA objectives included:

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

1.5 THE ESIA PROCESS

This ESIA was carried out in line with requirements of the legal, policy and regulatory framework of Uganda as well as the World Bank. Schematically, the ESIA study process is summarized in **Figure** 1-1.



(Source: Environmental Impact Assessment Guidelines, 1997)

Figure 1-1: ESIA Process

(a) Screening*:* The proposed Kidera RGC Solar Powered WSSS project was screened to preliminarily establish its key potential environmental and social impacts and the level of environmental and social assessments that would be required. The project falls under Schedule 5 of the National Environmental Act 2019 which require mandatory assessments to be conducted before implementation.

(b) Scoping: This was the first step in the ESIA, and it was determining the scope/extent of work to be undertaken in assessing the likely environmental and social impacts of the proposed project. This process entailed literature review, site reconnaissance visits which was conducted in the project area from (14th- 22nd February 2022), consultative meetings

with relevant agencies and stakeholders including project affected persons (PAPs) and with the local leaders to obtain their views and comments on the project and the ESIA studies. This culminated in the preparation of an E&S Scoping Report and Terms of reference, which was submitted to NEMA in keeping with EIA practice and procedures on 7th June 2022 and approved. The NEMA conditions of approval of the terms of reference for this ESIA are presented in ***Table*** 1-1 below and included in ***Annex A*** of this report.

Table 1-1: NEMA approval conditions for the Terms of Reference

No.	Condition	Incorporation in the report
(i)	Provide a comprehensive description of the project components and activities covering the construction and operational phases, associated infrastructure, details of the design and capacity of water supply systems, the methods and chemicals to be used for water treatment, and size of the workforce; and the implications of these on the environment.	Included in Chapter 2 (Project Description) of this report
(ii)	Undertake geotechnical investigations of the proposed project sites to inform the design and construction of the Water Supply Systems and Sanitation Facilities.	Reviewed and required information included in the geology section (Section 6.1.4)
(iii)	Include in the ESIA reports hydrological investigative reports in regards to the potential impacts of the project on underground water resources within the proposed project areas, and mitigation actions to address such impacts.	Included in Section 6.1.2 – Water Resources and Hydrology
(iv)	Provide a detailed description of the waste streams that will be generated from the activities of the piped water supply systems and sanitation facilities, and the measures and equipment that will be put in place to handle such waste.	
(v)	Include in the ESIA reports other relevant baseline information that is project site specific, on the soils, water, air quality and noise levels; as well as, clear colored photographs depicting the current status of the project areas and the neighbouring environs.	Included as Chapter 5 (Baseline Conditions)
(vi)	Provide clear colored and well-labelled location maps/images (preferably each covering A-3 size papery and accurate sets of GPS coordinates clearly indicating the site boundaries and locations of the various project components. Ensure that all GPS coordinates are provided in UTM format.	Included in several sections of the report

No.	Condition	Incorporation in the report
(vii)	Append to the ESIA report well-labelled copies of the proposed site layout plan (preferably covering A3 or larger paper size) that shows the layout and placement of the different project components.	Included as Annex B of this report
(viii)	Carry out comprehensive consultations with all the relevant key stakeholders of Buyende District Local Government Authorities, Department of Occupational Safety and Health (Ministry of Gender, Labour and Social Development), local communities in the neighborhood and the Directorate of Water Resources Management (DWRM) particularly in regards to 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 reports.	Detailed Stakeholder engagement with all the proposed stakeholders engaged has been included in Chapter 7
(ix)	Include in the ESIA report, comprehensive analysis of analysis of alternatives/ options to the selected project location, design and technology among other aspects.	Detailed Alternative analysis has been included as Chapter 3 (Impact Analysis) of this report
(x)	Carry out a comprehensive evaluation of the negative environmental impacts associated with the proposed project activities and the relevant mitigation measures to minimize the identified environmental impacts of the proposed project.	Detailed Impact Analysis, including analysis of the project negative impacts with relevant mitigation measures is included as Chapter 8.
(xi)	Refer to all the relevant provisions of the applicable policies, laws, regulations, guidelines and standards the National Environment Act, No. 5 of 2019.	Detailed analysis of the applicable policies, laws, regulations, guidelines and standards is included as Chapter 4.
(xii)	Append to the ESIA reports, authentic copies of land ownership and acquisition documents.	A resettlement Action Plan for the project has been undertaken. Recommendations of which will guide land acquisition on the project.
(xiii)	Consider any other critical environmental aspects/concerns which, may have not been initially foreseen during preparation of the scoping report and TOR, and include an evaluation of such environmental and social concerns in the ESIA reports.	All the environmental aspects relevant to this ESIA have been included in Chapter 6 (Baseline conditions) and further

No.	Condition	Incorporation in the report
		assessed in Chapter 8 (Impact Analysis)
(xiv)	Indicate the estimated cost of the project evidenced by a certificate of valuation of the capital investment of the project, issued by a qualified and registered valuer in accordance with Regulation 18(1) of The National Environment (Environmental and Social Assessment) Regulations, S.I No. 143/2020.	The project cost is included in Section 2.1 as adopted from the project feasibility and design report.
(xv)	Provide evidence of payment of a non-refundable administration fee of 30% (thirty percent) of the total fees on submission of the Environmental and Social Impact Statements, in accordance with Regulation 49(2) of The National Environment (Environmental and Social Assessment) Regulations, S.I No.143/2020.	To be appended at submission of the report to NEMA

(c) Detailed ESIA study and information collection: Upon completion of the Scoping study and approval (Annex A), detailed field investigations and consultations were undertaken then leading to the preparation of this Environmental Social Impact Assessment Report for stakeholder review and consideration by NEMA as part of its approval process.

(d) The study was preceded by internalization of the Terms of Reference and formulation of appropriate data collection tools. It assessed each of the activities of the project covering physical, biological, socio- economic (including occupation health and safety); and socio-cultural environment as detailed herein. It determined and listed potential direct and indirect environmental impacts for each of the planned activities; evaluated and recommended mitigation measures for adverse negative/adverse effects. Key aspects involved in the ESIA study focused on literature review, field baseline environmental and socio-economic studies which included noise and vibration measurements, air quality, *in situ* and *ex-situ* water quality measurements, biological surveys covering flora and faunal investigations. Other activities involved impact evaluation and preparation of environmental and social management plan (ESMP) alongside the environmental monitoring plan. Details of these process are presented under chapter 5 of this ESIA herein. In addition, this ESIA report was prepared with in consultation of the manual for EIA Guidelines for Water Resources Related Projects in Uganda (MWE, 2011); Environmental and Social Management Framework for the IWMDP; and the World Bank´s general Environment Health and Safety Guidelines (EHSGs), with specific reference to the EHSGs for Water and Sanitation Projects. The World Bank policy requirements, in instances that they were more comprehensive, were addressed over and above the requirements of the regulatory framework of Uganda.

(e) Decision-making: Submission of the ESIA report to NEMA for due approval in accordance with the provisions of the National Environment Act 2019 and EIA Regulations 2020. On the other hand, the Bank will review the ESIA report and upon clearance through its procedures, it will be disclosed in its external website.

1.6 ESIA REPORT STRUCTURE

The ESIA report is structured as summarized herein with section-based explanatory highlights.

Chapter	Highlight on section content
Executive Summary	Executive Summary of the project and its activities, ESIA study methods, key findings and impacts as well as proposed mitigation measures.
Chapter 1	Introduction with details of project background, objective, justification, categorization of the Project and ESIA process.
Chapter 2	ESIA Methodology
Chapter 3	Project description detailing its location, project parameters and the proposed project activities at different phases.
Chapter 4	Analysis of project alternatives, a comparison of the options and their significance
Chapter 5	Outline of different laws, policies, regulations, institutions and international guidelines and conventions relating to implementation activities of the proposed project as well as ESIA study.
Chapter 6	Description of Biophysical and Socioeconomic baseline information of the project area
Chapter 7	Public consultation and stakeholder engagement processes and Grievance Management.
Chapter 8	Impact Identification and Description of the project anticipated environmental and social impacts and their mitigation measures
Chapter 9	The Environmental and Social Management Plan (ESMP) as well as the Environmental and Social Monitoring Plan Chance finds Procedures
Chapter 10	Recommendations and Conclusion
Chapter 11	
	References
	Annexes

2. ESIA METHODOLOGY

2.1 GENERAL

The ESIA methodology presented is in line with the Environmental Impact Assessment Regulations, 2020, the National Environment Act 2019 as well as thematic tasks included in the project's Terms of Reference (ToRs).

2.2 SCOPING

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

2.3 REVIEW OF RELEVANT LITERATURE

The ESIA study was partly undertaken by intensive literature review, using documents provided by the Client and those from other sources such as:

a. National Development Plan III 2020/2021-2024/2025;
b. Ministry of Water and Environment Annual Sector Review Report 2021;
c. UBOS Statistical Abstract 2021
d. Project documents which included:
   - ❖ Uganda – IWMDP Project Appraisal Document-PAD No. P163782;
   - ❖ Uganda - IWMDP Project Implementation Manual, 2018;
   - ❖ Uganda - IWMDP Environmental and Social Framework 2018;
   - ❖ Uganda - IWMDP Resettlement Policy Framework 2018;
   - ❖ Detailed Design Kidera Rural Growth Centre Water Supply System and Sanitation Report, 2021;
   - ❖ Feasibility Study Report for the Kidera Rural Growth Centre Water Supply System and Sanitation Report, (2019); Environmental and Social Management Framework (ESMF) for the Integrated Water Management and Development Project N^{o}: P163782;

   a. World Bank Operational Policies (OPs);
   b. Uganda Poverty Assessment Report (2014)
   c. IFC Environmental Health and Safety Standards for Water and Sanitation 2007;
   d. Buyende District Development Plan 2015/14 –2019/20)
   e. The Water Act, and accompanying regulations [Water Resources Regulations (1998), Waste Discharge Regulations (1998), the Water Supply Regulations (1999), Sewerage Regulations (1999); and
   f. The National Environment Management Policy (1994); The National Environment Act 2019; the National Environment (Environmental and Social Assessment) Regulations 2020; and the National Environment (Standards for Discharge of Effluent into Water

or on Land) Regulations (1999), National Environment (Waste Management) Regulations (1999) as well as EIA Guidelines 1997.

g. The National Red List for Uganda 2016, published by Wildlife Conservation Society
h. The International Union for Conservation of Nature (IUCN) Red List of threatened species 2019.

2.4 BASELINE ENVIRONMENTAL & SOCIO-ECONOMIC CONDITIONS

2.4.1 PHYSICAL ENVIRONMENT

The following parameters under physical environmental baseline conditions were studied:

NOISE, AIR QUALITY AND VIBRATION ASSESSMENT

Baseline measurement of noise, air quality (*Error! Reference source not found.*) and vibration will be undertaken at set out locations in and around the project sites during the ESIA study. The baseline measurements sites were selected considering the presence of potential receptor(s) and its sensitivity to noise, air pollution and vibration impact.

Figure 2-1Baseline air quality, noise, and vibration measurements in Kidera Health Centre IV

CRITERIA FOR SELECTION OF SAMPLED SITES

The selection of sampling points in the ESIA study was guided by the provisions of the Uganda's Draft Regulatory Air Quality Standards and National Environment (Noise standard and Control) Regulations, 2003 which defines air quality, noise limits for various land uses zones i.e., commercial (urban centres, health units), mixed land use (residential areas, farmlands, schools and administrative units) and industrial zones, therefore, the sampling points were selected to represent the above land uses in the project area. Noise levels from heavy construction equipment ranges from 80 to 120 dB(A) and power tools commonly used in construction produce noise levels up to 114 dB(A).

During the ESIA studies, the selected receptors for noise, air quality and vibration assessment were purposively sampled based on proposed project works likely to generate noise, air pollution and vibration above the permissible limits and location of major sensitive receptors in respect to project component sites (Error! Reference source not found.**)**. As part of the ESIA studies, the consultant undertook site-survey/transect walks or drive through to ascertain the number, distribution and potential of the sensitive receptors and their distance from the proposed facility. The selection of location and number of points was guided by the project areas topography, which was mainly characterized by the terrain. Additionally, the land use and land cover (LULC) i.e., existence of tall structures and vegetation would constrain air mixing and cause variation in baseline air quality. Therefore, the baseline focused on selected sensitive receptors based on their location from the proposed project sites. Considering the above, the selected potential receptors for noise, air quality and vibration assessment will be clustered and then randomly sampled.

The sampled sensitive receptors were:

a) representative of the different land uses and activities in and around the project sites;
b) potential candidates for noise and air pollution mitigation through site hoarding; and
c) Sections within the project sites/areas.

Table 2-1Criteria for selection of potential air quality, noise, and vibration sampling points

Project component	Type of activity	Range of noise, air pollution and vibration	Anticipated duration of activity	Level of nuisance	Key land use/ receptor	Current condition	Sensitivity	Selected for measurements
Intake and Pump house	Excavation, Levelling, Installation of equipment, Metal and carpentry work Haulage of material to the site (2 trucks)	Noise: 80 to 120 dB(A), Vibration: 12.5 mm/s Air pollution: NO2, CO2, PM (2.5 and 10), VOCs	8-hour work day; Phased in 3 months	High	Farming, Fishing, Low/no population in proximity, Aquatic environment (amphibians, reptiles, and fish)	No major sources of noise, air pollution or vibration	Negligible	Not selected

Project component	Type of activity	Range of noise, air pollution and vibration	Anticipated duration of activity	Level of nuisance	Key land use/ receptor	Current condition	Sensitivity	Selected for measurements
Raw water transmission and partly distribution, sanitation facility	Trenching, Movement of trucks (about 2), Excavation by causal workers, Use of mobile compactors	Noise: 80dB(A), Vibration: <12.5 mm/s Air pollution: NO2, CO2, PM ($_{2.5}$&$_{10}$), VOCs	Project duration Intermittent (as and when vehicle passes and/or trenching by workforce)	Moderate	Relatively dense settlements, (Nakibengo, Kitaidhumba, Kabugudho, Kitete and Kidera Trading Centres), Kidera primary school, Kabugudho Primary School and Kidera Health Centre IV	Saloon, vehicles, Conversations, Motorcycle (1 per 5minutes)	High	Selected: Major sensitive receptors along the stretch (Kidera Health Centre IV)
Reservoir tank, water office	Excavation, Levelling, Installation of equipment, Metal and carpentry work Haulage of material to the site (1 truck)	Noise: 80dB(A), Vibration: <12.5 mm/s Air pollution: NO2, CO2, PM ($_{2.5}$&$_{10}$), VOCs	8-hour work day; (Maximum 1 month)	Moderate	Dense settlement (Kiwambya Trading Centre), Kidera Town Council and weekly market on Saturday	Conversations, Motorcycle (1 per 5 minutes), Sugar cane trucks and transport vehicles (3 per hour)	High	Selected; Representative for dense settlement and commercial area

Project component	Type of activity	Range of noise, air pollution and vibration	Anticipated duration of activity	Level of nuisance	Key land use/ receptor	Current condition	Sensitivity	Selected for measurements
Transmission	Trenching, Transportation of workers	Noise: <80dB(A) Vibration: <12.5 mm/s Air pollution: None	Intermittent (as and when trenching is required in location)	Negligible	Settlements (mix of dense, scattered and none)	Conversations, Motorcycle (5 per hour), Sugar cane trucks and transport vehicles (3 per hour)	Low	No selected

Selected sampling points: Nakibengo village Trading Centre and Kidera Health Centre IV were selected for the assessment of noise levels, air quality and vibration due to the proximity of the receptors to project works likely to generate moderate nuisance compared to prevailing conditions.

AIR QUALITY MEASUREMENTS

Ambient air quality monitoring on seleted parameters was undertaken at two selected locations with potentially sensitive receptors where pollution impacts including dust nuisance are likely be a concern. Air quality measurements were undertaken using the Aeroqual S500 Monitor to establish the baseline values for $PM_{2.5}$, PM10, NO_2, SO_2, VOCs and CO. The Aeroqual monitor was placed on a tripod stand 1.2m above the ground, switched on, allowed 3 minutes of zeroing and 7 minutes of stabilizing readings. The monitor was then be set to start data logging at a frequency of five (5) minutes for 7-12 hours per site. The data was then be downloaded using Aeroqual S500 V6.5 Software and analyzed.

Aeroqual S500 Monitor placed on a tripod stand 1.2m above the ground in Nakibengo TC

Display of results by Aeroqual S500 Monitor during measurement of ambient air quality

Figure 2-2: Field air quality measurement

NOISE MEASUREMENTS

Ambient noise measurements were undertaken at two selected receptors in and around the project sites (trading centres). A duly calibrated Casella CEL-633B Environmental & Occupational Noise Meter was used for the assessment. The Casella CEL-633B device provides Sound Pressure Level (SPL) readings, Integrating and Octave band noise measurements compliant with the following international standards:

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

The instrument has A, C and Z filter weightings satisfying IEC 61672-1: 2002 Class 1 and time weightings of Fast (F), Slow (S) and Impulse (I) according to IEC 61672-1: 2002.

The instrument can measure the Equivalent continuous sound pressure levels (Leq) as follows: LAeq, LCeq, LZeq, LAIeq, LC –LA and LAeqT80. It can also measure the Peak sound pressure level i.e., LApk, LCpk and LZpk. In addition to all the broadband results listed above, the instrument can also produce the following results for each of the octave or 1/3-octave bands: LZeq, LZFmax, LZSMax, LZF10, LZF50, LZF90, LZF95, LZF variable LCeq, LCFmax, LCSMax, LCF10, LCF50, LCF90, LCF95, LCF variable LAeq, LAFmax, LASMax, LAF10, LAF50, LAF90, LAF95, LAF variable.

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

SET-UP AND MEASUREMENT

The Casella CEL-633B Environmental & Occupational Noise Meter was first calibrated using Acoustic sound level calibrator type CEL-251 for sound level meter at 114.0 dB (A) for every point measured. The device was placed on a tripod stand (1.2m high) from the ground, switched on and the run mode set up. The instrument has an initialization screen that displays for approximately 10 seconds and then the measurement screen is displayed and ready for use. The equipment was left to log noise readings at an interval of 30 minutes and the results will later be downloaded to a computer for analysis using the Casella Insight software.

Casella CEL-633B noise meter on a tripod stand (1.2m high) from the ground

Display of results by Casella CEL-633B during measurement of ambient noise levels

Figure 2-3: Noise measurement at Nakibengo TC

VIBRATIONS

Vibration measurements were undertaken at two selected locations within the project sites using Extech SDL800: Vibration Meter/Datalogger. The SDL800 measures and logs vibration data using a remote vibration sensor with magnetic adapter on 47.2"(1.2m) cable. It offers a wide frequency range of 10Hz to 1kHz with basic accuracy of ± (5% + 2 digits). The machine continuously logs vibrations data using a SD memory card, which allows user to easily transfer collected data to a PC for further analysis. The distance from the point of measuring and the vibration source was measured and recorded. The machine was connected to a 6-inch nail using the magnetic adapter and the nail mounted into the ground near the facilities where vibrations will be measured from. The machine was switched on and allowed 1 minute to settle, it was then be set to start logging data at a frequency of 5 minutes. The peak particle velocity (PPV) will be measured in mm/s.

2.4.2 BIODIVERSITY ASSESSMENT

The proposed Kidera RGC piped water supply system project will be in Eastern Uganda and the project site is in highly modified environments by human activities (through cultivation, grazing and seasonal fires amongst others). The following biodiversity groups were studied:

VEGETATION STUDY

To study the vegetation structure and composition in the planned project sites was done through a combination of methods such as; field observations, and plots were used. A Global Positioning System (GPS Garmin 62CSx) unit was used to locate plots along the proposed transmission, Distribution, intake and WTP site, and Reservoir site. A diameter tape was used to record tree diameters at 1.3 m or breast height, a pair of tape measures and stick poles were used to demarcate the plots along and within sites. Measuring tree heights was made possible by using yardstick and estimates. Regional flora keys were used in the field for better species identification. Cover classes this method uses six separate cover classes.

Table 2-2: Vegetation cover classes

Cover Class	Range of Coverage
1	0-5%
2	5- 25%
3	25 - 50%
4	50 - 75%
5	75 - 95%
6	95 - 100%

The systematic sampling technique was operationally more convenient for this work, as it ensures that each unit has equal probability of inclusion in the sample. In this method of sampling, the first unit was selected with the help of random numbers and the remaining units are selected automatically according to a predetermined pattern. Plots were laid within the limits of 30m alternating along the proposed Transmission and Distribution routes bearing in mind the road effect but within the limits of thirty meters (30m) from the road centre (**Error! Reference source not found.**).

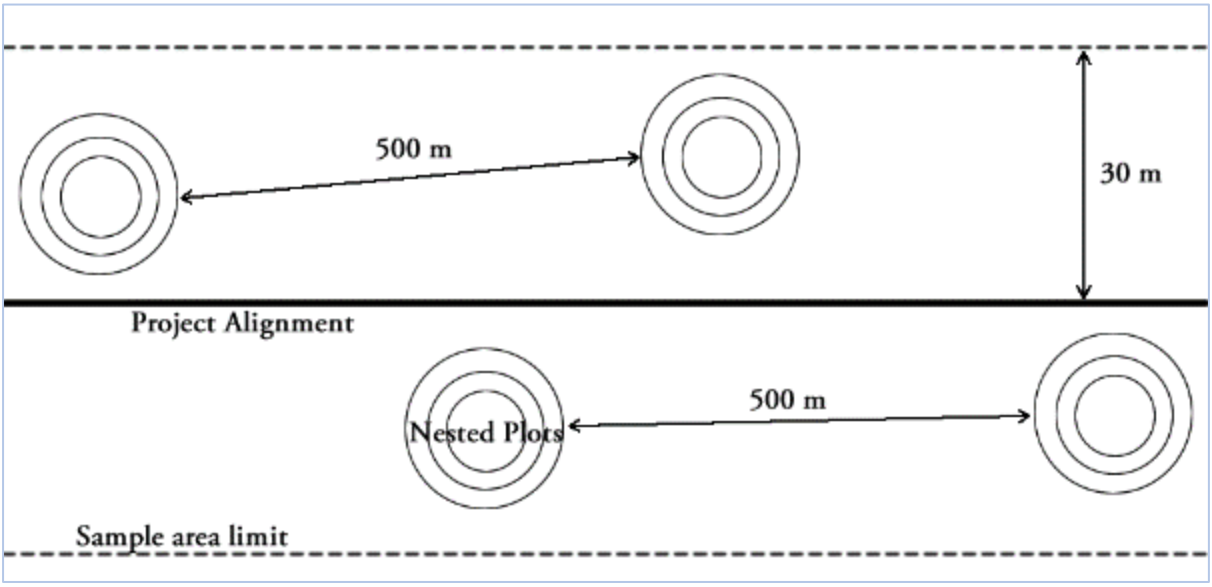


Figure 2-4: Illustration of the flora sampling technique

SAMPLING

Standard nested circular plots were located across the study areas, 0.5km intervals were used along Water transmission and distribution lines from the intake/WTP to the reservoir sites and along the distribution lines. Random sampling technique was applied to sample vegetation at the proposed water intake and reservoir sites. Circular plots consist of a 10m radius plot (where trees ≥10 cm of Diameter at breast height (DBH) are identified and counted), 5m radius plot (where lianas, shrubs, and trees ≤ 10cm DBH but greater than or equal 2.5 cm DBH were identified and counted) and a 2 m radius plot (where all grasses and herbs were identified).

OPPORTUNISTIC RECORDS

Although quadrants can register reasonable data on the distribution, diversity, and abundance of the various plant stratum according to the land use types of the area, a cumulative list was compiled from both the quadrants and opportunistic encounter that were recorded as they were encountered in the case study areas.

VOUCHER SPECIMENS

Plant species that could not be instantly identified were collected and photographed for further confirmation at Makerere University Herbarium where identification and archiving were done.

ANALYSIS

A plant species lists (species richness) was compiled from the plot data and additional opportunistic observations and presented in tables and graphs.

FAUNA STUDY METHODS

Fauna assessment were undertaken within the proposed project area especially along the proposed water distribution/transmission lines as well as proposed site for establishment of different project facilities, namely; at the boreholes, at the reservioir site, the project water offices and proposed sites for the sanitary facilities.

Three main approaches were employed in conducting the baseline survey. The approaches include: 1) Literature review, 2) Informal community consultations, and 3) Use of field scientific sampling methods

LITERATURE REVIEW

Different literature was reviewed to establish known habitat types, fauna species diversity and ecological communities in the project area, the following publications were reviewed.

- Biodiversity Inventory Reports for Central Forest Reserves by Forest Department 1996
- The National Red List for Uganda 2016, published by Wildlife Conservation Society
- The International Union for Conservation of Nature (IUCN) Red List of threatened species 2019.
- Previous fauna studies conducted in the Study Area and region by universities, research centres, Government Departments, NGOs and international organisations. Field guides for the different fauna groups were also consulted
- Search was also conducted for distribution ranges for the different fauna groups

The literature review informed all aspects of this terrestrial biodiversity and habitats baseline study.

FIELD SURVEYS AND LOCAL CONSULTATIONS)

.During the field visit (14th-18th February 2022), the fauna specialist consulted the community members. The purpose was to document information on fauna which the specialist may not be able to get during field sampling. Discussions with the community members revolved around faunal groups / species that occur in and along the project alignment.

USE OF SCIENTIFICALLY TESTED AND APPROVED METHODS

Several methods are available for studying fauna and they vary from animal to animal as well as the type of habitat. The following methods were used to study the different fauna species in and around the proposed project area.

BUTTERFLIES

Butterflies were surveyed using Pallard's sweep net method (Gall, 1985; New, 1991; Warren, 1992; De Vries 1997) along established transects within a radius of 500m of sampling point. The method was used to document the butterfly species richness, as well as estimate their relative abundance. The method was chosen because it is time-efficient and also chosen for the reason that the negative effects associated with handling of individuals are avoided (Nowicki, P *et al.,* 2008). At each of the sampling point, transects of 10m wide and 100m long were established. The fauna ecologists moved through the transect along a fixed line with 5m stretch on either side of the data collectors left and right hand. The observer moved at a slow and uniform / even pace of approximately 1km/h (Pellet 2007) through the transect, recording individuals sighted within the 10m width. Sampling was conducted when weather warmed up or in sunny weather (13-17°C) and between 9am-5pm.

Collected data was analyzed by (1) Estimating species richness based on recorded species presence or absence at the different sites that were sampled. (2) Estimating species relative abundance by counting and recording the number of individuals of the different butterfly species that were encountered while sampling. (3) by ascertaining species conservation status from the 2019 published IUCN red data list and the National red list of Uganda's threatened species (Wildlife Conservation Society 2016). Standard guide by Larsen (1991) was used to identify specimens to species level, and also by matching with Makerere University Museum collections. The species were arranged into families *Hesperiidae, Lycaenidae, Nymphalidae, Paeridae* and *Papilionidae* and genera.

DRAGONFLIES

Pallard's sweep net method (Gall, 1985; New, 1991; Warren, 1992; De Vries 1997) was used to survey dragonflies at the different project sites. Same design and analysis as for butterflies was adopted (see above). Dragonflies need sunny warm weather to fly; the temperature below 25˚C slowed the activity whereas an optimal temperature above 30 °C increased activity. If it is too cold or wet, they usually hide in vegetation. Sampling was therefore conducted when weather warmed up. Each sampling event was conducted between 09:00h to 17:00h time and lasted about 1hour at each sampling point. All dragonflies that were flying or be perched within 5m of transect routes were recorded. All flying species were easily detected within the project area and an aerial net was swept through the vegetation to elicit a flight response from less conspicuous, resting individuals. Same amount of sampling effort (time given to searches) was applied at each site.

HERPETOFAUNA (AMPHIBIANS AND REPTILES)

The methods employed to study herperto fauna included:

a. ***Visual Encounter Surveys (VES):*** The method involves moving through a habitat watching out for, and recording surface-active herpetofauna species. VES was complimented by visual searches, by examining under logs, leaf litter, in vegetation, and crevices. Species encountered were recorded and where possible photographed.

b. ***Audio Encounter Surveys (AES):*** This method uses the species-specific calls / vocalizations / sounds / advertising calls made by breeding males. The identity of the amphibian species heard calling and their numbers were counted and recorded.
c. ***Dip netting:*** Using a dip net, ponds, pools, and streams and other water collection points were dip netted. Adult amphibians and tadpoles encountered were also recorded.
d. ***Opportunistic Encounters:*** Herpeto-fauna species encountered opportunistically while moving in the project area were also recorded.

Reptiles were identified using (Schiøtz, 1975, 1999; Stewart, 1967) while amphibians were identified using Channing and Howell (2006) and information was collected on relative species abundance, distribution and richness. Data analysis was done by 1) compiling Species checklist, 2) determining the species conservation status using IUCN 2019 published Red List of threatened species as well as use of the 2016 National Red List for Uganda published by Wildlife Conservation Society.

AVI-FAUNA (BIRDS)

A combination of Timed Species Counts (TSCs), transect walks, and opportunistic observations were used to survey bird fauna diversity within the road alignments (Bibby et al., 2000 and Voříšek et al., 2008) as well as in and around the different interchanges and U-turns. The survey targeted the different habitats (forests, woodlots, wetlands, streams, Lake Shores and peri-urban areas) identified during the scoping.

Prior to the commencement of field sampling, transects and sampling points were established in and around the different habitat types. The fauna ecologist walked along each transect searching for the presence of birds. Each TSC lasted one hour, during which time all bird species seen or heard were listed in order of detection. The bird surveys were also supplemented with opportunistic observations by recording species found present along the road alignment outside the time of the count. Species were identified through visual observations and the identification of bird vocalizations. The observer's eyes were aided by a 10 x 40 binocular. Efforts were made to sample the different habitats represented along the road alignment. All identifications were made to species level. Birds that were recorded during the survey were categorized as shown in *Error! Reference source not found.* below.

Table 2-3: Categorisation of Avifauna by habitat

Main Category	Sub-Category with Codes		Descriptions
Forest Birds	FF	Forest specialists	Forest interior birds
	F	Forest generalists	Normally breed in the forest or fragments but may occur outside the forest
	f	Forest visitors	Non-forest birds

Aerial	AA	Aerial feeders	Species feeding on the wing
Water Birds	W	Water specialist	Restricted to wetlands or open water
	w	Water generalist	Often found near water
Grassland	G	Grassland specialist	Characteristic of open grasslands
	g	Grassland generalist	May be found in grassland habitats but also able to utilize woodland and forested habitats.
Migrants	A	Afrotropical	Species migrating within Africa
	P	Palaearctic	Species breeding in Europe or Asia
	Ap	Afro-Palaearctic	Species with both Palaearctic and Afrotropical populations

Data analysis was done by 1) compiling Species checklist, 2) determining the species conservation status using IUCN 2019 published Red List of threatened species as well as use of the 2016 National Red List for Uganda published by Wildlife Conservation Society.

MAMMALS

The mammals were surveyed using three main methods:

a. ***Direct observation/opportunistic encounters:*** This entailed the collection of direct evidence of fauna activity (e.g. sightings, vocalizations). All mammals seen or opportunistically sighted or heard vocalizing while moving in and around the project area were identified, counted and recorded;
b. ***Use of Signs e.g. footprints and/or dung or calls:*** This entailed the collection of indirect evidence (e.g. faeces or dung, footprints). Mammal species whose signs / indirect evidence were recognized were recorded for their presence;
c. **Local consultations:** The fauna specialists held discussions with local residents in and around sampling points about the availability of mammal species in the area.

Mammal identifications were based on Kingdon (1974), Delany (1975) and Kingdon *et al.* (2013). The conservation status of the encountered mammal species was ascertained using the 2019 version of the IUCN Red List of Threatened Species.

CONSERVATION STATUS OF THE BIODIVERSITY IN THE PROJECT AREAS

The conservation status of each flora and fauna species encountered were ascertained using the 2019 versions of the published IUCN red data list and the National red list of Uganda's threatened species (Wildlife Conservation Society – WCS, 2016). This helped to identify species that are nationally threatened in case they exist based on the IUCN red list status.

Through examining published distribution records and literature, assessment of distribution range limits of the different species, new records, lack of records of expected species, and determining how typical/representative/distinctive the species/communities in the area were conducted. Therefore, historically existing biodiversity such as indigenous, vulnerable, or endangered species were identified and recommended for preservation or propose other mitigation and enhancement measure for nature.

2.4.3 OCCUPATIONAL HEALTH AND SAFETY ASSESSMENT

To prevent the negative effect of the project on the health and safety of the workers and community members, the identification and assessment of hazards inherent in the project during construction and operation phases will be conducted. This will be through;

a. Assessing the capability of the district to handle fire outbreaks;
b. Assessing whether there are enough health facilities to handle emergencies that may arise during construction and operation of the project;
c. Assessing the common mode of traffic within the project area;
d. Assessing if the police have enough resource to provide security to the project's facilities
e. Identifying health and safety hazards construction and maintenance workers will be directly exposed to;
f. Assessing how the project will influence adherence to COVID-19 SOPs; and
g. Assessing how the project will impact on the health, safety, and security of the communities where it is being implemented.

The above assessments will be conducted through; field visits, observation, interviewing the respective stakeholders

- Reviewing primary and secondary literature
- Direct measurement of noise, air quality and vibrations

To ensure that the negative health and safety impacts of the proposed project, reference shall be made to the Environmental, Occupational Health and Safety (OHS), Community Health and Safety (CHS), in line with WBG EHS Guidelines, Occupational Health and Safety Act of 2006, MGLSD Social, Safety and Health Safeguards Implementation Guidelines, etc.

2.4.4 SOCIO-ECONOMIC SURVEYS

Mixed Methods approach in collecting and analysing data and information were used. Survey questionnaire as a quantitative method was applied during May 2022. In terms of qualitative methods, the ESIA applied Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), in addition to integration of Participatory Learning and Action (PLA) methods.

SAMPLING PROCEDURES

Study Area & Population: The study covered 4 core villages; namely; Kitete B, Nakibengo A, Nakibengo B and Kiwambya that make up Kidera RGC with a study population of 2,999

aggregated in 577 households (UBOS, 2021). **Sample Size**: A sample size of 164 respondent households was covered representing 70% of determined sample using Morgan and Krejcie (1970) Sample Size Determination Table as shown in Appendix C.

Sampling Methods: The ESIA applied 1) Probability (random) sampling methods that included a) Stratified random (divided households into strata based on location, beneficiary area; b) Simple random and 2) Non-probability (non-random) sampling methods - a) Purposive sampling using pre-determined characteristics such as proximity to proposed water facility (production well, reservoir, pipes), water source, trading centre, etc; b) Cluster sampling by identifying a manageable number of respondent households within a zone or micro catchment; d) Convenience sampling by picking respondents that are easily accessible.

Sampling Plan: A representative study sample using a two (2) stage stratified sampling method was used. In the first stage, it involved identifying and sub dividing beneficiary villages and non-beneficiary areas, and the second stage it involved identifying respondent household members, Key Informants and groups.

Table 2-4 Sampling plans

Sampling Methods	Adult Female	Adult Male	Total	REMARKS
Probability (random) sampling methods				
a) Stratified random	83	81	164	This sampling methods overlaps in all the others.
b) Simple random	85	79	164	
Non-probability (non-random) sampling methods				
c) Purposive sampling				Applied after stratified sampling
Widow / Windower	21	12	33	
d) Cluster sampling	48	20	68	Applied after stratified sampling

DATA COLLECTION INSTRUMENTS

1) Survey Questionnaire: The consultant applied Survey Questionnaire to collect baseline data on socio-economic characteristics that include water, sanitation & hygiene, among others. Analysed data had corresponding GPS Coordinates which were stored in GIS Database for detailed GIS mapping and analysis.

2) Using Digital Tools (KOBO COLLECT): The structured questionnaire was converted, validated, loaded and aggregated them into a digital form called KOBO COLLECT FORM. The form was loaded and uploaded on mobile devices (smart phones or tablets), used to collect the data. This process increases efficiency, minimize errors and ensures timely collection and analysis of data.
3) Qualitative tools - Consultative meetings discussion guides; Focus Group Discussion (FGD) guide; Key Informant Interview (KII) guide; Direct Observation checklist; Photography guide; Document Review Checklist.
4) Participatory Learning & Action (PLA) tools - Transect walks / drives; Timeline & Trend Analysis; Seasonal calendar; Pairwise Ranking.

Figure 2-5: Training in sampling and data collection

DATA ANALYSIS METHODS

Data was analysed using a) Thematic Analysis for qualitative findings obtained from FGDs, KIIs, etc; b) Statistical Analysis using Ms Excel for quantitative findings obtained using KoboCollect. All Likert Type Data was analyzed by determining the frequency and percentage of Likert Type Items for selected variables. The Likert Items included (but not limited) Highly Agree, Agree, Disagree, among others.

DATA QUALITY MANAGEMENT

The consultant ensured proper quality management of all data processes, protocols and methods I.e., design and pretest of tools, collection, handling, processing, analysis, interpretation and reporting consistently followed appropriate data life-cycle requirements. The consultant ensured that all data collected is sufficient, accurate, reliable, valid and acceptable to serve the purposes for which it is gathered. All the 6 stages of data management cycle was properly managed and controlled namely data sources, data collection, data collation, data analysis, data reporting and data usage.

QUALITY CONTROL & ASSURANCE

Quality Control (QC) and Quality Assurance (QA) was done to ensure defect detection and prevention respectively. This was through pre-testing survey tools; training research team; debriefing of research assistants; applying mixed methods in same study areas; timely

deployment of research assistants. Research ethics and principles were adhered to such as creating rapport and obtaining informed consent from respondents through use of introductory letters; ensuring cultural sensitivities such as language, dress code and conduct. At the same time, the CSA team adhered to the JBN Code of Professional Conduct.

2.5 IMPACT IDENTIFICATION AND ANALYSIS

IMPACT SENSITIVITY

Sensitivity is generally site specific and criteria the was developed from baseline information gathered. The sensitivity of a receptor was determined based on review of the population (including proximity, numbers, vulnerability, among others) and presence of features (sensitive ecosystems), such as rare and endangered species, unusual and vulnerable environments, architecture, social or cultural setting, major potential for stakeholder conflicts on the site or the surrounding area. Generic criteria for determining sensitivity of receptors are outlined in **Error! Reference source not found.**.

Table 2-1: Criteria for rating impact sensitivity

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

INTENSITY OF IMPACT

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

- Type of impact (i.e., direct, indirect, induced);

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

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

Table 2-0-2 Criteria for rating impact intensity

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

Criteria	Intensity Description (considering duration of the impact, spatial extent, reversibility, ability of comply with legislation, etc)	Rating scales
	Medium - where the affected environment is altered but natural, and/or cultural and social functions and processes continue albeit in a modified way, and valued, important, sensitive or vulnerable systems or communities are moderately affected.	***3***
	High - where natural and/or cultural or social functions and processes are altered to the extent that they will temporarily or permanently cease, and valued, important, sensitive or vulnerable systems or communities are substantially affected. The changes to the natural and/or cultural / social- economic processes and functions are drastic and commonly irreversible.	***4***

2.6 IMPACT EVALUATION AND DETERMINATION OF SIGNIFICANCE

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

Impacts will be identified and significance will be attributed considering the interaction between magnitude criteria and sensitivity criteria as in the significance matrix (Error! Reference source not found.). The impact severity is then calculated as the product of the two numerical descriptors;

Impact Significance = Impact Intensity (I) x Impact Sensitivity (S)

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

Table 0-3: Determination of impact severity

		Sensitivity			
		1 **Very low**	**2** **Low**	**3** **Medium**	**4** **High**
Intensity	**1** **Very low**	1 Negligible	2 Minor	3 Minor	4 Minor
	2 **Low**	2 Minor	4 Minor	6 Moderate	8 Moderate

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

- ***Major***: These denote that the impact is unacceptable and further mitigation measures must be implemented to reduce the significance. More details are provided in Error! Reference source not found..
- ***Moderate***: Impacts in this region are considered tolerable but efforts must be made to reduce the impact to levels that are as low as reasonably practical. Shaded orange in the impact significance matrix.
- ***Minor***: Impacts in this region are considered acceptable. Shaded blue.
- ***Negligible***: Impacts in this region are almost not felt. Shaded green.

Table 0-4: Impact Severity

Impact Rating	Impact Description	Rating scales
Major	• Highly noticeable, irreparable effect upon the environment • Significant, widespread and permanent loss of resource • Major contribution to a known global environmental problem with demonstrable effects • Causing mortality to individuals of a species classified as globally or regionally endangered • Major expedience of water/air quality and noise guidelines representing threat to human health in long and short term • Causing widespread nuisance both on and off site	> or = 12

Moderate	• Noticeable effects on the environment, reversible over the long-term Localised degradation of resources restricting potential for further usage • Sub-lethal effects upon a globally or regionally endangered species with no effect on reproductive fitness and/or resulting in disruption/disturbance to normal behaviour returning to normal in the medium term • Elevated contribution to global air pollution problem partly due to preventable releases • Frequent breaches of water/air quality and noise guidelines • Causing localised nuisance both on and off site	> or = 6 but < or = 9
Minor	• Noticeable effects on the environment, but returning naturally to original state in the medium term • Slight local degradation of resources but not jeopardising further usage • Disruption/disturbance to normal behaviour of a globally or regionally endangered species returning to normal in the short term • Small contribution to global air problem through unavoidable releases • Elevation in ambient water/air pollutant levels greater than 50% of guidelines • Infrequent localised nuisance	> or = 2 but < or = 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	= 1

	• No reported nuisance effects	

2.7 CUMMULATIVE IMPACT ASSESSMENT

The combined, incremental effects of human activity, referred to as cumulative impacts, pose a serious threat to the environment. While they may be insignificant by themselves, cumulative impacts accumulate over time, from one or more sources, and can result in the degradation of important resources.

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

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

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

This involved identification of other past, existing, or planned activities within the analytical boundaries. Assessment of their potential presence of natural and social external influences and stressors (e.g., wildfires, droughts, floods, predator interactions, human migration, and new settlements). This guided on knowing if there are any other existing or planned activities affecting the same VEC and if there are any natural forces and/or phenomena affecting the same VEC

Step 3: Establish Information on Baseline Status of VECs

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

Step 4: Assess Cumulative Impacts on VECs

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

Step 5: Assess Significance of Predicted Cumulative Impacts

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

Step 6: Management of Cumulative Impacts – Design and Implementation

Depending on the context in which the development impacts occur (i.e., the impacts from other projects and natural drivers that affect the VECs) and the characteristics of the development's impacts, mitigation measures were proposed as a result of views and actions of multiple stakeholders. This involved utilisation of the mitigation hierarchy to design management strategies to address significant cumulative impacts on selected VECs; engage other parties needed for effective collaboration or coordination; propose mitigation and monitoring programs on how to manage uncertainties with informed adaptive management. This included aspect of how cumulative impacts can be avoided, minimized, and/or mitigated; how can the effectiveness of proposed management measures be assessed and what are the triggers for specific adaptive management decisions, among others.

2.8 STAKEHOLDER AND PUBLIC CONSULTATIONS

The consultant conducted stakeholder consultative meetings with both state and non-state actors. Meetings were held with the staff of the District on 03/02/2022, Subcounty on 15/02/2022 and Town Council 23/02/2022 including the CAO, DWO, DEO, DIS, DCDO, ADHO, Town Clerk, SAS among others while other stakeholders consulted included members of the community on 7/05/2022. Effective and meaningful stakeholder engagement can improve

the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. 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 consultations organised at target sites, villages, parish, sub county, and district levels. The key aspects consulted on are stated in consultative meeting guide attached. The meetings engaged farmers, fishermen, women, men, youth, local leaders and administration, lake/wetland user groups, transporters etc. In this ESIA studies, the process of stakeholder engagement involved:

- Stakeholder identification and analysis;
- Planning the stakeholder engagement method and process;
- Disclosure of information;
- Consultation with stakeholders;
- Addressing and responding to concerns and issues; and
- Reporting to stakeholders (second round of disclosure).

STAKEHOLDER IDENTIFICATION

In this context, stakeholders are individuals and organizations potentially affected by the project (directly or indirectly), or who have an interest in or influence on the project and its impacts, either positive or negative. Therefore, to ensure a successful project, the project team identified and engaged all stakeholders, determine their requirements and expectation, and manage their influence in relation to their requirements. Several stakeholders, important to this project were identified and analysed in respect to location, interest, mandate, influence, and vulnerability; and including level of literacy and potential mode of engagement. This criterion is explained below.

a. The location criterion was used in respect to proximity to the proposed project sites. Village/ community members close to the project sites will be considered as primary stakeholders using this criterion;
b. Interest criteria was used in the study to refer to the level of concern and significance to the project site and the proposed project;
c. Mandate refers to consideration for the level of directive reasonability the stakeholder has in respect to the project or the affected project sites. This is usually considered together with influence which implies the ability or powers to influence encourage or discourage project activities; and
d. Vulnerability refers to levels of susceptibility that compromise or makes a stakeholder unable to meaningfully participate in planned stakeholder engagements or equitably benefit from other project activities or outcomes such as inability to attend meetings, interpret messages, among others. This can be a function of literacy, age, gender, physical barriers, relation to land tenure, income, and livelihood activities.

To adequately appreciate the views and concerns of stakeholders about the proposed project, key stakeholders such as local community members and leaders, government institutions, and other interested parties were identified and consulted.

STAKEHOLDERS ENGAGEMENT

1) **Focus Group Discussions (FGDs):** Focus Group Discussions (FDG) is useful for revealing through interaction the beliefs, attitudes, experiences, and feelings of participants, in ways that would not be feasible using other methods, such as individual interviews, observation or questionnaires (Gibbs 1997). Focus group discussions were chosen in order to; provide detailed information; on the many qualitative, non-measurable issues (for example, gender roles in the community, youth and women access to social services, nature of economic activities, cultural perceptions about water supply and sanitation, social issues such as child abuse, violence against children, gender based violence, sexual harassment, access to natural resources or the structure of social institutions); and to ensure a more inclusive, participatory approach. Having carried a reconnaissance to the field and established the location and the concentration of different groups such as neighbouring communities and businesses, schools among others, the ESIA study selected members of these groups (women, men, vulnerable, elders, and Youth), as they are likely to be affected by the project especially during its implementation.

Key Informant Interviews (KIIS): The KII were used to collect information from relevant respondents closely related to the proposed project. Several KIIs were done with different key personnel at different levels to understand their perceptions, concerns, fears, and expectations regarding the proposed water and sanitation project including related issues like environment conservation, gender-based violence, sexual exploitation and abuse/ sexual harassment. The key informants included the District Water Officer, District Natural Resources Officer, Disrict Environment Officer, Parish Chiefs, District Health Inspector, District Community Development Officer, and Town Clerk. The details of the stakeholders consulted are listed in Error! Reference source not found.**,** and photographically catalogued below:

Meeting with Buyende District Officials on 4th February 2022

Meeting in CAO's office – Buyende District

Meeting with Kidera Town Council officials on 15th February 2022 in relation to Kidera RGC

Meeting with Kidera TC officials on 23rd February 2022 in relation to Kidera RGC

Community engagement at Nakibengo Trading Centre on 7th May 2022

Community engagement at Nakibengo Trading Centre on 7th May 2022

Enumertors engaging Community members in Kidera Trading centre on 7th May 2022	Community engagement Kabugudho P/S on 23rd February 2022
 Community engagement Kabugudho T/C on 23rd February 2022	 Community engagement Kabugudho village on 7th May 2022
 Community members at Nakibengo village 23rd February 2022	 Enumertors engaging Community members in Kidera Trading centre on 7th May 2022
 Meeting UNRA HOD at UNRA on 25th March 2022	 Meeting MGLSD on 17th May 2022

Meeting with DWRM and DWM at MWE Head Offices on 8th June 2022

Table 0-5: Stakeholders engaged

Date	Stakeholder	Designations	Venue	Gender		Total
				M	F	
3rd February 2022	Buyende District Technical and Political Teams	Chief Administrative Officer, Deputy Chief Administrative Officer, District Water Officer, Asst. District Health Officer, District Health Inspector, District Natural Resources Officer,	Buyende District Board room	6	5	11

Date	Stakeholder	Designations	Venue	Gender		Total
				M	F	
		District Community Development Officer, PAS, Resident District Commissioner,				
14th February 2022,	Kidera TC Technical and Political Teams	Town Clerk Mayor Kidera Councillor (03) C/P LCII-Kitaidhumba Community Development Officer C/P LCI-Kyauka D/mayor, In-charge Kidera HCIV, Chair persons LCI Butemera, C/P LCI – Kitete,, C/P LCI – Nakibengo, OC Kidera TC, Senior Assistant Secretary, Secretary Finance, Secretary for Production, Secretary for Health & Education, Parish chief (04),	Kidera Town Council Headquarters	21	5	26

Date	Stakeholder	Designations	Venue	Gender		Total
				M	F	
		DWO				
23th Feb 2022	Nakibengo village	Community members around water abstraction point	Nakibengo village	9	2	11
7th May 2022	Kidera Trading Centre	Community members	Kidera Trading Centre	29	12	41
7th May 2022	Community members at Nakibengo Village	Community members	Nakibengo Village	20	8	28
23rd Feb 2022	Kabugudho primary school	Teachers	Kabugudho primary school	5	1	6
23rd Feb 2022	Kabugudho T/C	Community members	Kabugudho T/C	10	4	14
7th May 2022	Kabugudho village	Community members	Kabugudho T/C	18	0	18
25th March 2022	Uganda National Roads Authority -	Head of Design – Roads and Bridges	UNRA Head Quarters	2	0	2
17th May 2022	Ministry of Gender Labour and Social Development	Directors: Occupational Safety and Health	MGLSD Head quarters	2	0	2
8th June 2022	DWRM and DWM	Water officers, Water quality Wetlands Department	MWE headquarters	8	5	23
Total				130	87	217

GBV AND VAC RISK ASSESSMENT

To ensure that the GBV risk on the project is mitigated, an assessment was carried out to establish the prevalence rates of GBV and the causal effects in the community. As such corrective and mitigation measures were crafted to minimize or/alleviate risk impact during

implementation. Notably, the following activities were carried out to inform the risk assessment. Relatedly, Violence Against Children (VAC) using qualitative methods using existing data and interviews from community development offices and community leaders. As such, the consultant:

- Consulted the Kidera police post on gender and child related cases;
- Review of Ministry of Gender Labour and Social documents
- Uganda Police Crime Report 2019

During the study, consultative approaches including group discussions with women, business people and roadside vendors, traders, and interviews with key informants such as Government officers to capture their views and concerns about the implementation of the proposed project were used. Issues raised include concerns and appreciation for the proposed project will be presented in the ESIAs.

3. PROJECT DESCRIPTION

MoWE intends to develop of a water supply system and sanitation facilities Kidera RGC, Buyende District.

3.1 THE LOCATION AND AREA OF INFLUENCE

LOCATION

The proposed Kidera RGC Water Supply System and Sanitation Facilities will be located in Kidera Town Council, Buyende District – Busoga sub region in Eastern Uganda. The project main components will be located at GPS coordinates and villages indicated in Error! Reference source not found. and as shown in **Error! Reference source not found.** below.

Table 3-1: Location of Main Project Components

No.	Component	Coordinate	Village	Parish
1	Borehole (DWD 60870)	503363.74 E, 147311.55 N	Nakibengo	Kidera
	Borehole (DWD 61681)	503314.60E, 147243.53N	Nakibengo	Kidera
3	Reservoir Tank	499051.64 E, 147386.56N	Kiwambya	Kidera
4	Sanitation facility	Kidera TC Market near the proposed park	Kyauka	Kidera
5	Water field office	498871.46E, 147551.51N	Kiwambya	Kidera

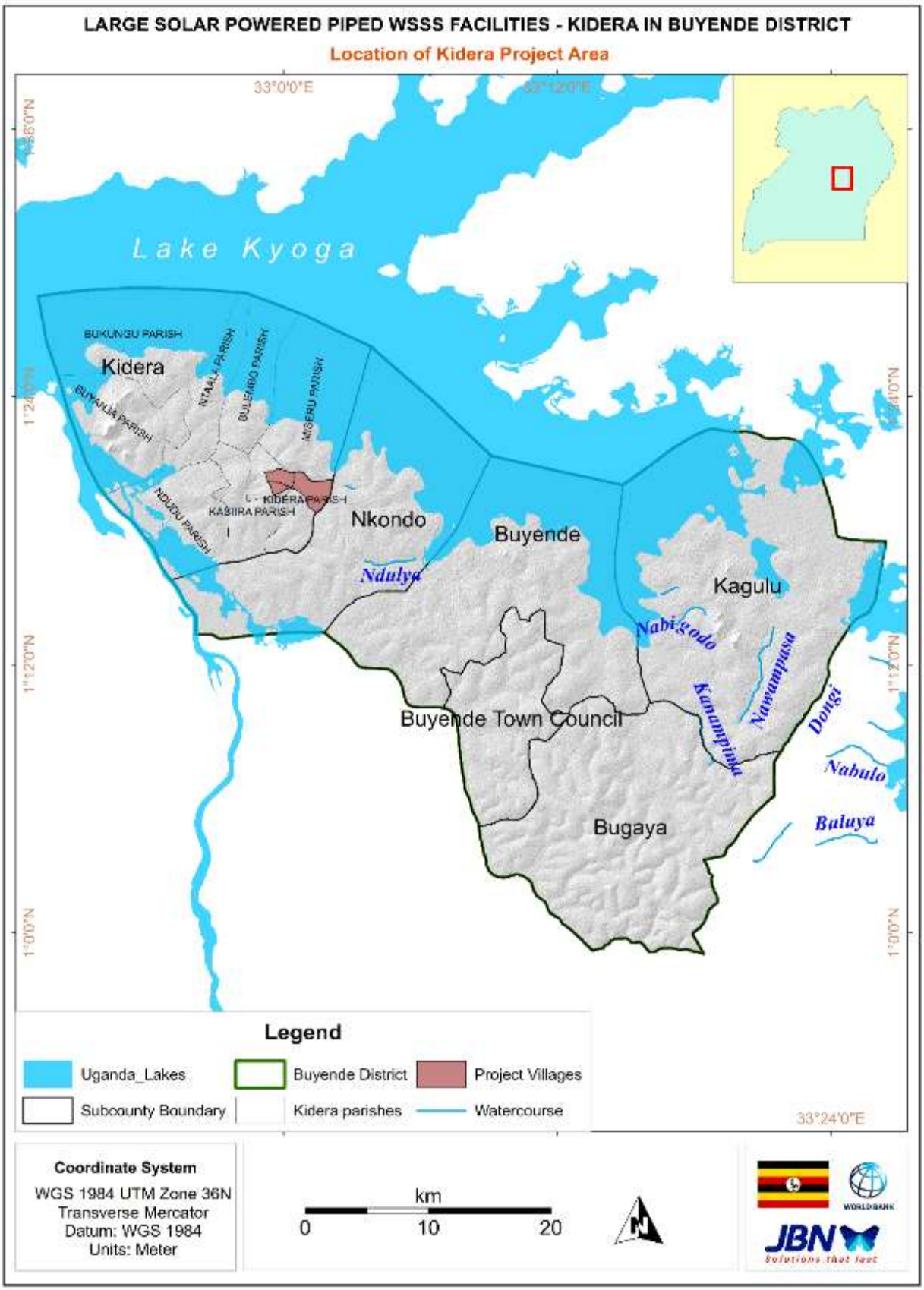


Figure 3-3-1: Location of the proposed Kidera RGC Water Supply Systems and Sanitation Facility Project

The RGC is approximately 23 Km from Buyende town, and 114 km from Jinja, the main regional town of Busoga sub region.

Buyende District is bordered by the districts of Kamuli to the South, Luuka to the Southeast, Kaliro to the East, Pallisa to the Northeast, Serere to the North, Kaberamaido and Amolatar to the Northwest and Kayunga to the West.

3.2 AREA OF INFLUENCE

Kidera RG CWSSS project will cover four villages; namely; Kitete B, Nakibengo A, Nakibengo B and Kiwambya in Kidera Parish, Kidera Town Council.

WATER DEMAND

Kidera RGC WSS was designed based on a 20-year design period, starting with the initial year 2021 up to the ultimate year 2041. The projected population to be served by the water supply system by ultimate year is 6,961 people. The Maximum Day Demand (MDD) over a 17-hour pumping regime, which depict the daily water consumption by domestic and nondomestic consumers are 325.26 m3/day. *Error! Reference source not found.* summarises the water demand in Kidera RGC.

Table 3-2: Maximum Day Demand for Kidera RGC

VILLAGE	MAXIMUM DAY DEMAND (M^3/DAY)					
	2019	2021	2026	2031	2036	2041
Kitete LCI B	37.81	48.14	51.95	64.88	81.03	101.21
Nakibengo LCI B	21.07	29.61	28.68	35.65	44.33	55.12
Nakibengo LCI A	36.52	46.72	50.16	62.62	78.20	97.66
Kiwambya	26.93	36.10	36.84	45.88	57.18	71.27
Kidera Phase I Total	**122.34**	**160.58**	**167.62**	**209.03**	**260.74**	**325.26**
Source: Project estimates.						

3.3 MAIN COMPONENTS

The main components of the proposed project will include a water supply system and a sanitation component. Under the water supply system, the following structures are proposed:

i. Motorized boreholes (DWD 60870 and DWD 61681)
ii. Solar Pumps and Solar Panels,
iii. A transmission main (Borehole to storage),
iv. Storage reservoir,
v. Distribution Network,
vi. Intensification Network, and
vii. Service Connections
viii. Water field offices.

The sanitation component will mainly consist of a waterborne public toilet.

WATER SUPPLY SYSTEM

Water will be abstracted from two boreholes (DWD 60870 and DWD 61681) in Nakibengo village in Kidera Parish, then pumped using solar to a reservoir tank in Kiwambya hill, Kidera Parish and distributed to four villages within Kidera TC. The size and capacity specifications of the water supply system components is presented in Table 3-3 below. The designs and technical drawings for the water supply system components are included in **Annex B**.

Table 3-3: General specifications of the main water supply system components

PARAMETER	DESCRIPTION	
Project Area	Kidera RGC	
Parish	Kidera	
Town Council	Kidera	
Water Source	**Borehole DWD 60870**	**Borehole** DWD 61681
Borehole Yield	13.1 m^3/hr	12.0 m^3/hr
Borehole Pump	Q = 10.5 m^3/hr, H = 195 m	Q = 9.6 m^3/hr, H = 180 m
Water Treatment	Post Chlorination (Dosatron D30)	
Power Source	Primary Power Source - Solar Power	Secondary Power Source - Hydroelectricity
Maximum Water Demand	325.26 m^3/day	
Reservoir tank	104 m^3 Tank on 10 m tower	
Transmission	5.748 Km	
Distribution System	9.5 km	
OD280 uPVC PN10	175 m	
OD225 uPVC PN10	525 m	
OD160 uPVC PN10	679 m	
OD110 uPVC PN10	1,007 m	
OD90 HDPE PN10	4,782 m	
OD50 HDPE PN10	2,313 m	
Intensification Network		
OD40 HDPE PN10	1,000 m	
OD32 HDPE PN10	1,000 m	

PARAMETER	DESCRIPTION
OD25 HDPE PN10	2,000 m
Service Connections	65
PSPs	4
Sanitation	Public Toilet, 6 stance waterborne toilet

WATER SOURCES

The project will utilise two borehole (DWD 60870 and DWD 61681) located in Nakibengo Village in Kidera Parish at coordinates 36N 05503375 0147312 and 503314.60E, 147243.53N, respectively, 4.8km from Kidera Centre. At the water sources, a submersible pump with capacity will be installed at the borehole, complete with control kit and dry run protection. A pump-house will be constructed and detailed including plastering and painting, fitted with steel panel doors, windows and ventilation units; including security lights. A Perimeter fence of will be constructed using chain link and barbed wire fastened to steel poles will be secured in a concrete foundation. Paspalum grass will be planted in the compound area. ***Table*** 3-4 and *Error! Reference source not found.* gives the water source specification and locations, respectively.

Table 3-4: Details of water sources

Parameter	DWD 60870	DWD 61681
Borehole Depth (m)	128.5	120
Pump installation Level (m)	57	53
Static Water Level (m)	2.95	8.5
Dynamic Water Level (m)	47.6	44.1
Draw Down (m)	46.58	35.62
Discharge Rate (m^3/hr)	13.14	12
Abstraction Yield (m^3/hr)	10.5	9.6
Casing Diameter (mm)	152 / 168	152 / 168
Perimeter fence	Fence	30m x 30m
	G.I poles	50mm x 50mm x 6mm
	G12 chain link, spacing	75 x 75 x 3mm, 2.5m c/c
Source: DED		

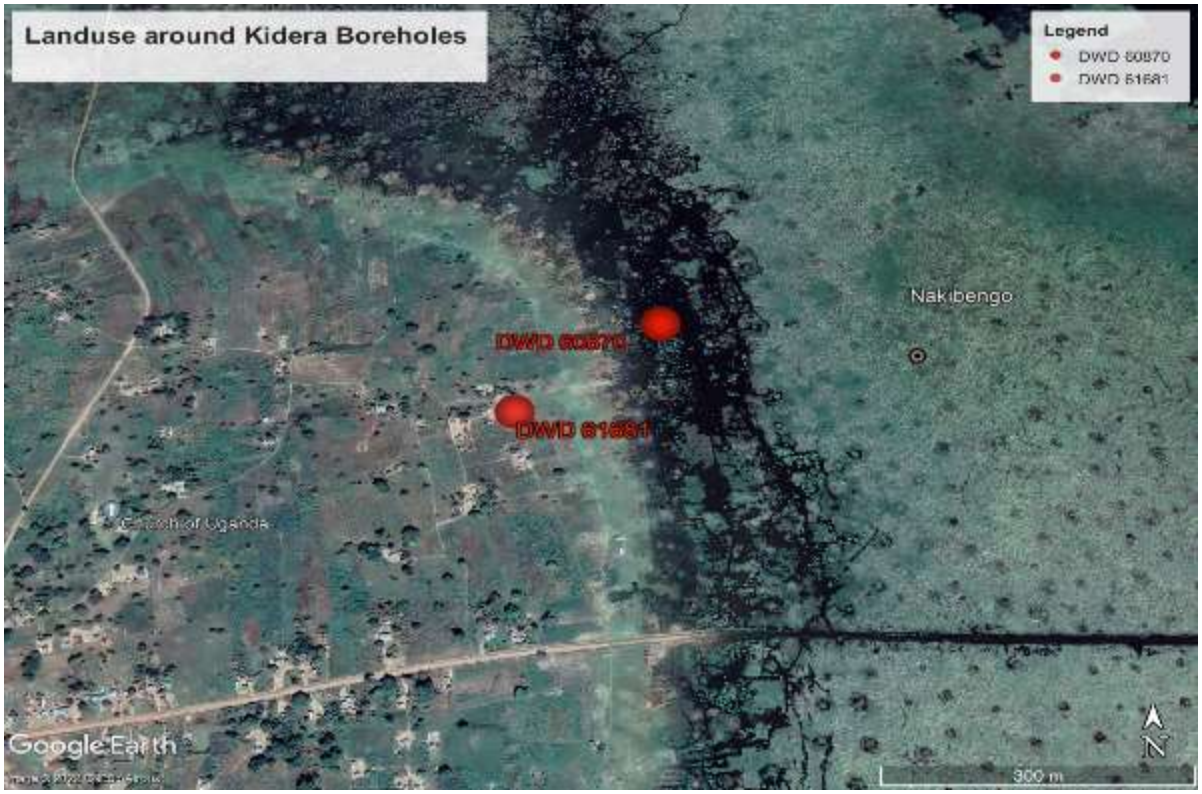


Figure 3-2: Google Image of the borehole location in Nakibengo village

WATER TREATMENT/DISINFECTION FACILITIES

Disinfection of the water from the Kidera RGCs production wells will be achieved by installation of a DOSATRON online proportional chemical dozer at the sump. However, a possibility of using local materials such as sodium chloride to generate chlorine gas will also be looked at. A sump will be constructed to receive the water from all the boreholes. The water will be disinfected at the sump after which it will be pumped to the reservoir tank. One of the sump pump house rooms will be used to house the doser.

WATER TRANSMISSION

Water will be pumped from the boreholes using 57 m long riser mains and independently transmitted for a distance of 5.748 Km along the existing Kidera-Nakibingo-Itamia and Buyende-Kidera public roads to the storage reservoir at Kiwambya hill, Kidera Parish. The nature of the environment traversed by the transmission pipe is not rich in terms of biodiversity. The design specifications for the transmission line are presented in Table 3-5 and transmission line shown in Figure 3-3 below.

Table 3-5: Transmission line Specifications

Component	Specifications	Dimensions
Riser mains	DN 65 Steel to PN10	57 m long
Pumping mains	Flow rate	13.14 m^3/hr (4 l/s)

	OD 90 HDPE to PN10	5,748 m long
	Pump head	199 m
	Borehole to road crossing	440 m
	Along Kidera-Nakibingo-Itamira	4,789 m
	Along Buyende-Kidera road	347 m
	Road to Reservoir	172 m

Figure 3-3: Google image of the transmission line

The pipeline will make one major road crossing between 503236.93E, 146906N and 503238.78E, 146891.64N in Nakibengo village along the Kidera-Nakibingo-Itamia road (***Figure*** 3-4 and ***Figure*** 3-5), from where it will then stretch for about 5.7 Km to Buyende-Kidera murram road.

Figure 3-4: Google image of Transmission pipeline road crossing in Nakibengo Village

Figure 3-5: Location of the road crossing transmission main at Nakibengo village, Kidera Parish

WATER RESERVOIR

Kidera RGC will have one reservoir tank located in Kiwambya Village, Kidera Parish, Kidera Town Council approximately 1km from Kidera trading centre and 162m off the Buyende –

Kidera murram road (***Figure*** 3-6). The chosen tank site will be located on a raised land on top of a hill at 1105 m.a.s.l. The site is characterized by rock boulders and currently harbours a ground-based telecommunication and broadcasting mast (***Figure*** 3-7).

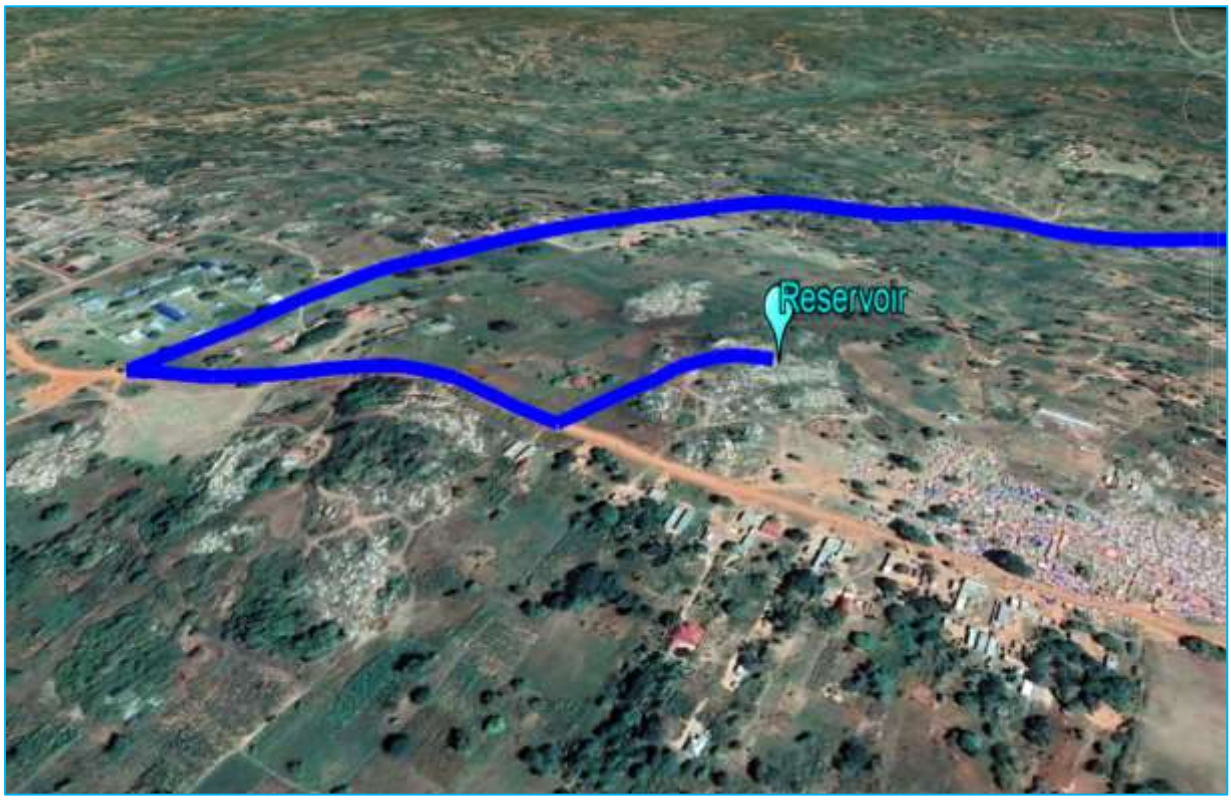


Figure 3-6: Google image for the location of the reservoir

Figure 3-7: Location of the reservoir at Kiwambya hill, Kidera Parish

A 104 m^3 capacity reservoir tank will comprise of a square cold pressed steel tank of 1.22 m panels measuring 7.32m long, 6.10 m wide, and 3.66 m high as detailed in ***Table*** 3-6. Due to the topography of the RGC and the pressures experienced in the distribution network around the tank and in the far reaches of the network, the reservoir tank will be erected on a 10m steel tower. The storage reservoir will provide for fluctuations in consumer demand during the day (e.g., the hourly peak flow), without having to design the pumping mains to match the peak flow. Furthermore, the storage will provide for a fairly constant residual pressure and flow to the consumers. 30% of the maximum day demand was adopted for storage as stipulated by the MWE Water Supply Design Manual (2013).

Table 3-6: Specifications of the reservoirs

Component	Specifications	Dimensions
Tanks	Cold pressed steel	1.22 m
	Dimensions	7.32 m long, 6.10 m wide, and 3.66 m high
	Capacity	104 m^3
Tower	Tower height	10 m
	Number of bars	6 bars

DISTRIBUTION

The distribution network will be fed by gravity from the storage reservoirs to cover initial year core villages of Kitete B, Nakibengo A, Nakibengo B and Kiwambya, that form part of the core Kidera Centre; however, the networks were designed for the year 2041 at a peak hour factor of 2.0 using EPANET 2.0 software. The distribution mains were designed with adequate capacity to meet the peak hour demands of the consumers being supplied. The transmission and distribution corridor will be and proposed access roads, as the pipes will be buried in the road reserves. The pipe details of various specifications as specified in the feasibility study report (SARI Consulting Ltd & SGAPI, 2021) will be used to distribute water in the project area covering a total of 9.481 km (***Table*** 3-7***)*** and shown in ***Figure*** 3-8 below.

Table 3-7: Proposed distribution Network for Kidera RGC

Pipe Details	Length (km)
OD 280 uPVC PN10	0.175
OD 225 uPVC PN10	0.525
OD 160 uPVC PN10	0.679
OD 110 uPVC PN10	1.007
OD 90 HDPE PN10	4.782

OD 50 HDPE PN10	2.313
Total	9.481

Source: SARI Consulting Ltd & SGAPI, 2021

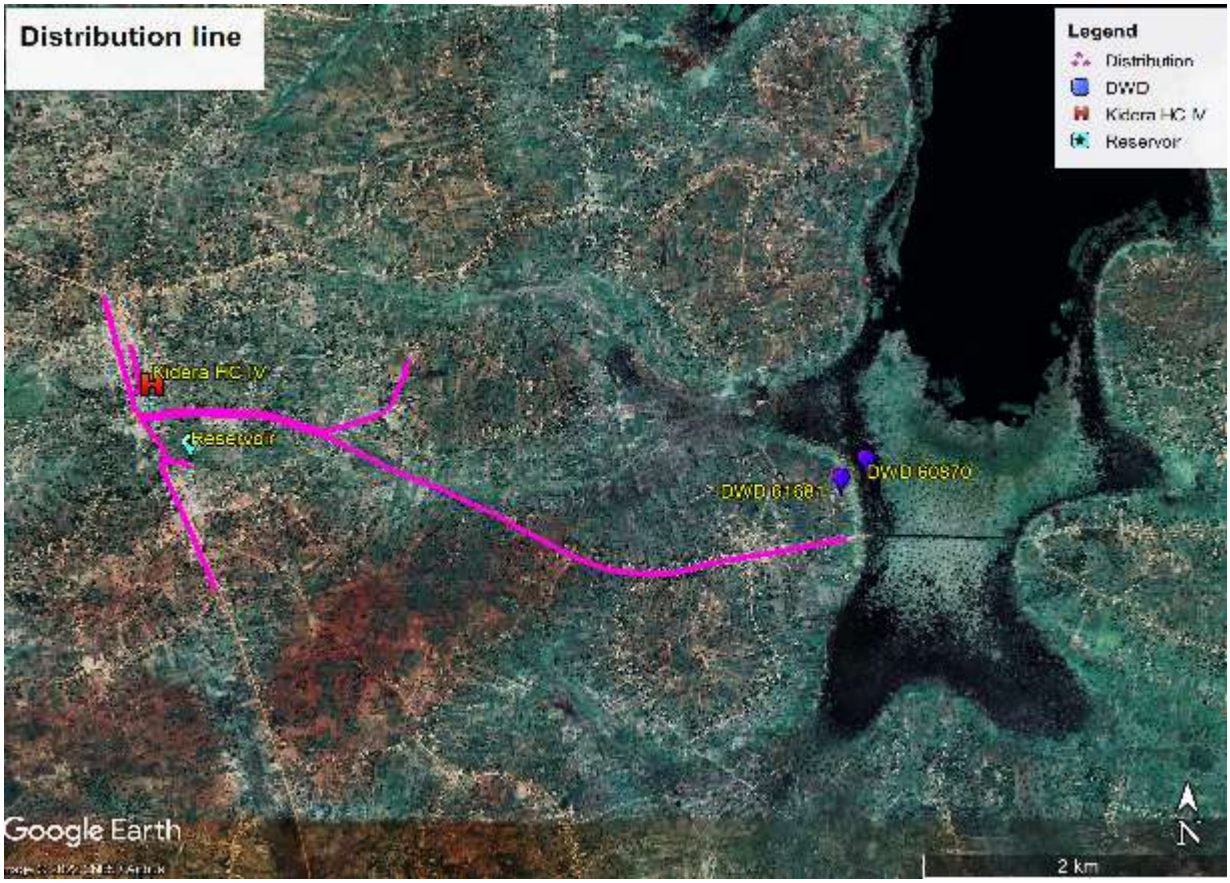


Figure 3-8: Google image of the distribution line

From the reservoir storage tank, the distribution mains will make three crossings along Buyende-Kidera road reserve at coordinates 498881E, 147428N crossing to Kabugudho trading centre (

Kabugudho Road crossing	Google image of the Kabugudho Road crossin
 Nakibengo-Itamia roadside to Nakibengo oad crossing	 Google image of the Kabugudho Road crossing
 Kidera trading centre road crossing	 Google image of Kidera trading cente road crossing

Figure 3-9), at coordinates 498727.52E, 147734.56N through Kidera-Nakibengo-Itamia roadside to Nakibengo and at 498669.49E, 147887.77N to Kidera trading cente

Kabugudho Road crossing

Google image of the Kabugudho Road crossin

Nakibengo-Itamia roadside to Nakibengo oad crossing

Google image of the Kabugudho Road crossing

Kidera trading centre road crossing

Google image of Kidera trading cente road crossing

Figure 3-9: Road crossings

NETWORK INTENSIFICATION

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. The planned estimated quantities for network intensification lines for Phase I are 2 Km of pipe work. The location of the service pipes will not be known until applications for connections are received.

DISINFECTION FACILITIES

Disinfection of the water from the wells will be effected by the installation of a DOSATRON online proportional chemical dozer at the reservoir. A pipe manifold will be constructed to receive the water from the borehole before disinfection is effected prior to entry into the tank. A chemical house will be constructed adjacent to the reservoir to house the doser and serve as a chemical storage, mixing and dosing place.

POWER SUPPLY

The water supply system will be powered by solar power. The power requirements at the pump station (DWD 60870) will be a hybrid of solar energy consisting of a system of multi crystalline PV solar panels rated at 280pW 24 Volts DC, 75No. cells, with a control unit, support structure, and electrical accessories and cabling.

ACCESS ROADS

Water transmission and distribution will be gained through existing public roads, given their convenient location in closed proximity to the existing road network. However, some components, not located in close proximity to the existing road network, have been identified to require access roads as detailed in **Table** 3-8. The access to the borehole and reservoir site is not clear and unpaved since the site is on a raised land, surrounded by boulders. Therefore, there is a need to open up an access road to the site during implementation. Part of the

Table 3-8: Access roads for project components

Project Component	**Land Requirements**	
	Length	Width
Borehole DWD 60870 Access Road	300m	4m
Kidera Reservoir Access Road	154m	4m

Figure 3-10: Access footpath to Borehole DWD 60870 off the Kidera-Nakibengo-Itamia murram road

Figure 3-11: Access footpath traversing homesteads near the project Borehole DWD 60870

Figure 3-12: Access Road to reservoir site in Kidera RGC

WATER FIELD OFFICE

The field water office will be located at Bukamba Sub County head office. The office (***Figure*** 3-13) will include a general office, manager's office, accounts office, sanitation facilities, postage and a store and will be refurbished with a power supply and internet connection (for the online billing and payment system) and IT equipment.

Figure 3-13: Design of the project water field office

SANITATION FACILITIES

The project will construct 1No. 6 stance waterborne public toilets, 1No. Stance of which will be to cater for both the disabled men and women to serve the residents in the busy town centre of Kidera in Kabugudho village. The sanitation facilities will be gender disaggregated and having a 1000litre water storage tank for the hand washing facility.

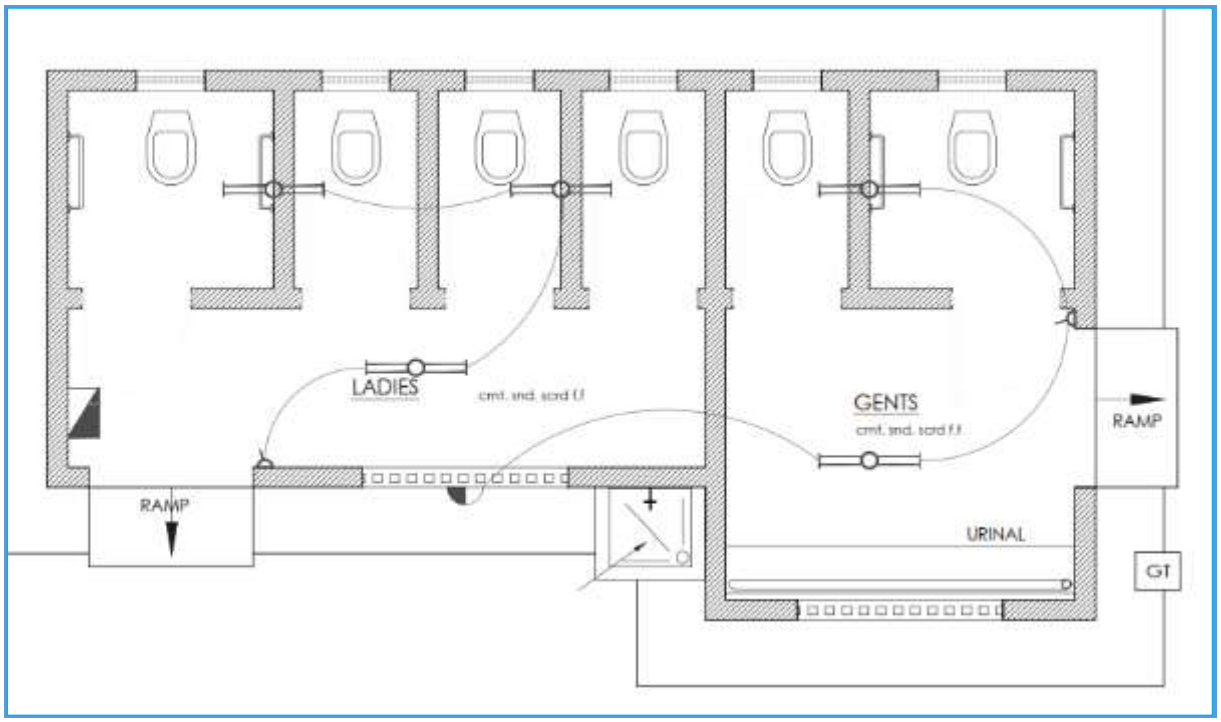


Figure 3-14: Proposed design of the sanitation facility

3.5 CONSTRUCTION PHASE

LABOUR FORCE

On average, an estimated 10-40 people are anticipated to constitute the workforce on the project. While in many cases the workers will arrive at the site on foot, some pool transport can be provided as necessary to bring workers to the project sites. The entire recruitment process for the workers will be managed by the contractors in accordance with Uganda labour laws, the World Bank safeguard policies and EHS requirements/guidelines.

CAMP SITES

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

MATERIALS SOURCES

Where there is need for local materials such as water, sand, aggregates and gravels, the contractor shall be required to get from legally existing and authorized sources. The supervising consultant shall undertake due diligence with further guidance from MWE and Local Governments to ensure that all material sources are acquired in compliance with the country E&S regulations. establishment of the sites.

The structural designs will make use of as much of the available local materials as possible provided they meet the project specifications for the anticipated design quality, strength, and life of the structures. As such, due consideration will be given to use of locally available materials such as timber, sand, aggregates and steel reinforcement and cement produced locally in the region and or country.

All component materials will be in conformance with the durability requirements of the project sites/localities. Material specifications shall meet the requirements of MoWT General Specifications Part 6 and the Special Specifications of the designs will be informed by international best practices. The overall objective in the selection of materials therefore will be to minimize maintenance requirements and facilitate simple and easy construction of structures.

EQUIPMENT

Equipment to be used during the implementation activities of the proposed solar-powered water supply and sanitation systems and support facilities under Kidera RGC is envisaged to include excavator(s), wheel loaders(s), dump trucks and tippers, concrete mixers, welding machines and water bowser(s). Energy requirements including diesel fuel for the construction equipment will be locally sourced and it is recommended that all servicing of the equipment and heavy machinery be undertaken by a licensed and qualified service provider. A parking area for heavy mobile machinery and vehicles should be especially designated to allow for safe turning, servicing, and security on site during construction and this should serve as muster stations and staging areas for vehicles and equipment in case of any emergency.

OTHER AUXILIARY FACILITIES

Secondary facilities associated with implementation activities of the proposed solar-powered water supply and sanitation systems and support facilities under Kidera RGC will include materials stockpile areas, workshops, equipment parking/storage yards, temporary site stores and sanitary facilities, site clinic etc. In addition, it will be necessary for the contractor with guidance from MWE to undertake assessments that include Technical, Environmental and social to establish suitability for the proposed sites. The contractor shall properly engage and document the land acquisition processes including agreements and consents. The supervising consultant shall undertake due diligence with further guidance from MWE and Local Governments to ensure E&S compliance in acquisition and establishment of the sites. Thus, all the facilities shall all be established by the contractor with approval of the supervising consultant and local leadership. On completion of the project implementation activities, all

support infrastructure shall be decommissioned, and all disturbed areas shall be restored to their original state through landscaping and re-vegetation.

WASTE HANDLING AND DISPOSAL

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

2.6 PROJECT MANAGEMENT

OPERATIONS AND MAINTENANCE

WATER SUPPLY SYSTEM

The proposed operation and management option is to handover the water supply system and public sanitation facilities to the Eastern Umbrella of Water and Sanitation (EUWS). Within the decentralization framework, the experience and capacity of Umbrella organization, applied directly to the management of the newly constructed facilities will increase the likelihood of sustainable commercial operations and management of the town systems in the next 5-10 years. It can use experience gained elsewhere in the past 5-years to extend services to rural & urban poor areas. The key roles and responsibilities of EUWS will be:

a. Operating the system in accordance with the set guidelines
b. Maintaining the system,
c. Developing the system,
d. Billing the consumers,
e. Collecting revenue,
f. Receiving applications for and making new connections,
g. Making extensions to the system or assets,
h. Attend to all customers,
i. Prepare draft business plans for the authority,
j. Prepare regular status reports for the operations of the system,
k. Maintain regular accounts for submission to the Ministry.
l. Operation of the Management Information System (MIS) as provided by the Ministry.
m. Keep records of the operation of the water supply system - both physical and technical,
n. Ensures that all accounts are audited, and
o. Set and publish Tariff & Charges.

SANITATION FACILITIES

The public toilets will be properly maintained by users paying a fee set by the local authorities. This will be in the form of;

- A monthly fee being charged to the residents within the locality of the public toilet who would wish to use it, while the non-residents paying and fee for every time, they use the toilet or,
- A standard user fee is charged for using the toilet at any one time.

When the sanitation facilities fill up, they will be emptied and faecal sludge disposed of at the waste stabilisation ponds in Iganga Town.

HUMAN RESOURCE

The EUWS will employ a system manager, an accountant, a receptionist, a plumber, and a systems overseer (Table 3-9). Two additional operators will be required to run the water treatment plant. The entire recruitment process for the workers will be managed by the EUWS in accordance with Uganda labour laws, the World Bank safeguard policies and EHS requirements/guidelines.

Table 3-9: Permanent roles during operation phase

Position	No. of Staff Required
Manager	1
Accounts Officer	1
Secretary	1
Plumbers / Technicians	3
Meter Readers	4
Intake Attendants / Guard	6
Total	16
Project estimates	

2.7 PROJECT PROPONENT AND COST ESTIMATES

PROJECT PROPONENT

The Permanaet Secretary,

Ministry of Water and Environment,

Directorate of Water Development,

Plot 3-7, Kabalega Crescent Road,

P.O. Box 20026, Kampala.

PROJECTED INVESTMENT COST

The project has a Capital Investment Cost Estimate of USh 2,197,526,779 (Two Billion One Hundred Ninety-Seven Million Five Hundred Twenty-Six Thousand Seven Hundred Seventy-Nine) see valuation certificate Annexed.

4. ANALYSIS OF ALTERNATIVES

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

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

a. Project or No Project Alternatives;
b. Water Source Alternatives;
c. Water availability;
d. Water Treatment Technology Selection Alternatives; and
e. Alternative technology for sanitation facilities.

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

4.1 THE PROJECT VS NO PROJECT OPTION

THE "NO PROJECT" ALTERNATIVE

Analysis of the "No project" option as an alternative, provides an environmental baseline against which impacts of the proposed action can be compared. Adopting this alternative means that the status quo remains and the proposed project is not developed.

i. The water resource potential of the proposed ground water sources would remain unchanged as water will not be extracted;
ii. Short-term impacts such as noise, dust generation, vibrations, etc., emanating from construction activities would be avoided;
iii. The loss of the relatively small amounts of privately-owned agricultural land to the construction of water source facilities and storage reservoirs would be avoided;
iv. Temporary disruption of property such as houses, roadside stalls, schools, crop gardens emanating from construction activities and temporary road closure for pipeline crossings within urban areas, would be avoided; and
v. The health risks associated with handling of harmful water treatment chemicals would be avoided.

KEY BENEFITS OF IMPROVED WATER SUPPLY IF PROJECT IS IMPLEMENTED

i. Easy access to potable water within homesteads at various levels – stand posts, yard taps and house connections;
ii. Reduction in incidences of diarrheal and other water borne diseases; this leads to reduction in mortality and morbidity, especially of children;
iii. Improvement in hygiene and sanitation from increased use of hand washing, personal hygiene and environmental sanitation;
iv. Reduction in hours spent searching for and fetching water from distant sources which would significantly increase the time allowed for other activities; this is expected to lead to better livelihood for women and the girl child, who are traditionally, responsible for fetching water;
v. Reduction in domestic violence and abuse of women as people in the homestead compete for the little potable water;
vi. Reduction incidences of promiscuity which are often carried out in the guise of fetching water, some involving children; this leads to incidences of child abuse, domestic violence and early pregnancies;
vii. Possibility of improving the quality of life of the poor neighbourhoods in the RGCs where the most vulnerable people live. The project will offer pro-poor preferential tariffs to these communities;
viii. Cleaner and more conducive environment for activities in the RGC such as sports, markets, public places, etc.;
ix. Employment opportunities at all stages of the project – from construction, operation and marketing of the services; this leads to increased skills transferred to the community;
x. Increased revenue to the local authority and the country in general through the collection of taxes.

KEY BENEFITS OF IMPROVED SANITATION FACILITIES IF PROJECT IS IMPLEMENTED

i. Reduced incidences of diarrheal and other water borne diseases; this leads directly to lower rates of mortality and morbidity, especially of children;
ii. Boost in the daily economic activities of the busy town centre characterised by restaurants, bars, saloons and a weekly market. This will supplement the 2-stance improved latrine with more comfortable, cleaner and safer toilets, thus improvements with community health and hygiene;
iii. Cleaner and more conducive environment for urban activities such as sports, markets, public places, etc.;
iv. Employment opportunities at all stages of the project – from construction, operation and marketing of the services; this leads to increased skills transfers to the community;
v. Increased revenue to the local authority and the country in general through the collection of taxes.

CONCLUSION ON THE "NO PROJECT" OPTION

Water access rates in Buyende District vary from 30% in Kidera Town Council to 53% in Buyende Town Council. Buyende District has 576 domestic water points which serve a total

of 163,068 people – 146,688 in rural areas. 44 water points have been non-functional for over 5 years and are considered abandoned (Water Atlas, 2022). The existing water supply system is operating below demand and communities still collect water from open surface water sources, implying continued trends of water-related diseases. The current sanitation systems are unreliable, sub-standard and dilapidated. If this is allowed to continue, not only will the residents be exposed to public health risks but development opportunities will continue to be stifled and curtailed. The direct or indirect employment opportunities associated with the project will also cease.

In conclusion, the benefits to be obtained on implementing the Kidera RGC Water Supply and Sanitation Project far outweigh the farfetched benefits of the No-Project option.

4.2 PIPED WATER SUPPLY SYSTEM

The project alternatives have been assessed based on:

a) Water source Alternative;
b) Water availability; and
c) Choice of technology of water treatment;

WATER SOURCE ALTERNATIVES

SURFACE WATER FROM LAKE KYOGA

Lake Kyoga which surrounds Kidera RGC is located about 6km from Kidera TC and was initially considered as a surface water Source for Kidera RGC water supply system. Iniatially, the project was designed to serve 43,324 people in four parishes as indicated in Table 4-1 below.

Table 4-1: Summary of projected population to be served by the water and sanitation system

SUBCOUNTY	PARISH	SERVED POPULATION					
		2019	2021	2026	2031	2036	2041
Kidera	Kasiira	4,024	4,376	5,402	6,668	8,231	10,159
	Kidera	8,768	9,535	11,768	14,526	17,930	22,130
	Miseru	4,043	4,398	5,429	6,702	8,271	10,208
	Bulembo	328	357	440	543	670	827
Kidera RGC Total		**17,163**	**18,665**	**23,039**	**28,439**	**35,102**	**43,324**
Source: *DED*							

The maximum day demand for Kidera RGC (1,689.74 m^3/day) represents 0.001% of Lake Kyoga's total water storage)

Table 4-2).

Table 4-2: Projected maximum day demand for the water supply system

SUBCOUNTY	PARISH	MAXIMUM DAY DEMAND (M^3/DAY)					
		2019	2021	2026	2031	2036	2041
Kidera	Kasiira	110.64	129.54	153.42	192.51	241.61	303.22
	Kidera	405.40	536.75	554.87	691.73	862.46	1,075.44
	Miseru	104.46	115.60	145.18	182.38	229.07	287.77
	Bulembo	8.46	9.37	11.77	14.78	18.56	23.31
Kidera RGC Total		**628.96**	**791.26**	**865.24**	**1,081.40**	**1,351.69**	**1,689.74**
Source: DED							

However, considering the swamps and floating islands characterising the lake that can damage the intake structure and affect the water quality, the large variations in Lake level, presenting a challenge in designing an efficiently operating intake. The high capital investment costs that would be incurred to construct a strong intake, long transmission mains from the lake and a water treatment plant were also factors that considered. This water source option was therefore, not further assessed due to the challenges and prohibitive costs therein.

GROUND WATER SOURCE

The two borehole sources DWD 60870 and DWD 61681 were earmarked as water sources for the piped water supply system. The project area boundaries were reduced to the population that can be served by the boreholes. The villages that can be served in the Ultimate Year in Phase I are Kitete B, Nakibengo A, Nakibengo B and Kiwambya with a total population of 6,961 persons as summarised in **Table** 4-3 below. These villages form part of the core of Kidera center and include the location of the borehole (Nakibengo village).

Table 4-3: Summary population to be served by groundwater sources

VILLAGE	POPULATION SERVED					
	2019	2021	2026	2031	2036	2041
Kitete LCI B	969	1,054	1,301	1,606	1,982	2,446
Nakibengo LCI B	321	349	431	532	657	811
Nakibengo LCI A	919	1,000	1,234	1,523	1,880	2,320
Kiwambya	548	596	736	908	1,121	1,384
Kidera Phase I Total	**2,757**	**2,999**	**3,702**	**4,569**	**5,640**	**6,961**
Source: DED						

The proposed water sources are boreholes DWD 60870, with a safe yield of 10.5m^3/hr (80% of the test pumped yield of 13.1m^3/hr) and DWD 61681, with a safe yield of 9.6m^3/hr (80% of

the test pumped yield of 12.0m^3/hr). The borehole sources can meet the 2041 maximum day demand (reduced project area boundaries) over 17 hours pumping regime

Table 4-4: Maximum Day Demand for Phase I

VILLAGE	MAXIMUM DAY DEMAND (M^3/DAY)					
	2019	2021	2026	2031	2036	2041
Kitete LCI B	37.81	48.14	51.95	64.88	81.03	101.21
Nakibengo LCI B	21.07	29.61	28.68	35.65	44.33	55.12
Nakibengo LCI A	36.52	46.72	50.16	62.62	78.20	97.66
Kiwambya	26.93	36.10	36.84	45.88	57.18	71.27
Kidera Phase I Total	**122.34**	**160.58**	**167.62**	**209.03**	**260.74**	**325.26**
Source: DED						

The maximum day demand for Phase I is 325.26 m^3/day.

CONCLUSION ON WATER SOURCE ALTERNATIVE

The project therefore, considered ground water source option mainly due to the relatively low costs compared to the surface water option from Lake Kyoga as summarised in **Table** 4-5 below.

Table 4-5: Comparison of Capital Investment and Operating costs

NO.	DESCRIPTION	INVESTMENT COSTS	
		GROUND WATER SCENARIO (PHASE I)	SURFACE WATER SCENARIO
1.0	General works	511,625,000	-
1.0	Distribution Network and Intensification	431,887,358	1,723,102,595
2.0	Storage Reservoir	217,257,537	799,500,000
3.0	Water Office	121,148,113	125,000,000
4.0	Borehole Pump Houses / Intake	961691745	215,000,000
5.0	Water Treatment Plant	-	2,028,000,000
6.0	Transmission Mains	61,929,550	1,443,127,860
7.0	Mechanical and Electrical Items	771,873,664	1,120,750,000
8.0	Sanitation Facilities	56,057,705	95,000,000
	Sub Total 1	**3,290,939,705**	**7,549,480,456**

NO.	DESCRIPTION	INVESTMENT COSTS	
		GROUND WATER SCENARIO (PHASE I)	SURFACE WATER SCENARIO
	Add 10% for Contingecies	329,093,970	754,948,046
	Sub Total 3	**3,620,033,675**	**8,304,428,502**
	Add 18% VAT	651,606,062	1,494,797,130
	Grand Total	**4,271,639,737**	**9,799,225,632**
Source: *DED*			

WATER TREATMENT TECHNOLOGY SELECTION ALTERNATIVES

The type of treatment operation performed and the treatment chemicals used depend largely on the contaminants present in the source water (EPA, 2011). An analysis of water samples collected from existing boreholes in the project area indicated satisfactory water quality for drinking for both physiochemical and bacteriological quality. To ensure the adherence to Uganda Drinking Water Standards disinfection was integrated in the water supply system inform of a chlorine dosing unit at the reservoir. The following is the analysis of the key technologies that could be adopted in disinfection process.

DISINFECTION

Historically, chlorine was the disinfectant used, but more recently other chemicals such as chlorine dioxide, chloramines, and ozone have been used to purify water. Non-chemical methods of disinfection include heat and radiation (e.g. ultraviolet light (UV)). **Table** 4-6 below is an analysis of the key options that could be employed in the project. The application of UV disinfection for source water treatment is limited because turbidity and suspended solids that can render it ineffective (EPA, 1999). Thus, UV has not been analysed for the project.

As can be seen from **Table** 4-6, ozone, the most efficient disinfectant, is not a persistent disinfectant, thus unsafe water consumption can occur in case of recontamination along transmission/distribution lines and reservoirs. It is also difficult to fulfil the legal limit for the formation of bromate during the process of ozonation, thus most water treatment processes tend not to employ ozonation. Chlorine and chloramines are more effective in secondary disinfection in comparison to chlorine dioxide (Less persistent chemical). Thus, chlorine dioxide may not be suitable for the project given the extent of piping systems. Lastly, though the combined residual from chloramines lasts longer than chlorine residuals, chloramines are not as effective as other germicidal agents.

In general, chlorine is the key form of disinfectant employed in Uganda. This is similar to the US, a developed country, with up to 80% of water treatment plants employing free chlorine (EPA, 2011).

Table 4-6: Technology analysis of disinfection types

Criteria	Disinfectant			
	Chlorine	Chloramines	Chlorine dioxide	Ozone
Persistency	Persistent chemical (used locally and for transport across long distances to the final consumers).	Persistent chemical (used locally and for transport across long distances).	Less persistent chemical (used locally and for transport across long distances).	Non-persistent chemical (used locally at production plants).
Oxidant demand rate	Chloramine > Chlorine > Chlorine dioxide > Ozone			
Disinfection efficiency	Ozone > Chlorine dioxide> Chlorine > Chloramine NB: efficiency order can be changed by local conditions e.g. disinfectant consumption rate, biofilm protection, etc.			
Disinfection by-products	More than 500 by-products identified that are formed by reaction with organic matter; most products are halogenated (Cl, Br, I) organics; most relevant organic halogenated by-products are Trihalomethanes, Haloacetic acids, Haloacetonitriles, Haloketones, and	Nearly no halogenated organic by-products formed; negligible reaction with organic matter, except halogen transfer to nitrogen amines; some halogenated organic by-products formed with trace of chlorine or chlorine in excess; Ammonia is formed if used in excess, thus nitrite formed from bacterial oxidation of ammonia.	Nearly no halogenated organic by-products; significant reaction with organic matter leading to no halogen transfer; some halogenated organic by-products formed with excess of chlorine used or chlorine formed in-situ.	Nearly no halogenated organic by-products; significant reaction with organic matter leading to no halogen transfer; some halogenated by-products formed with excess of chlorine used or chlorine formed in-situ; main halogen by-product is

	Haloaldehydes; Trihalomethanes are regulated in Europe; Both Trihalomethanes and Haloacetic Acids are regulated in the US.			bromate; it's difficult to fulfil the legal limit for its formation, thus many WTPs have replaced the ozonation step.

4.3 SANITATION FACILITIES

ALTERNATIVE TYPES OF SANITATION FACILITIES

There are many types of sanitation systems used in the country, each with numerous variations. Selection of the variant to be used is dependent on income which determines water consumption patterns. High income residents in medium or high-income group housing may be served by off-site sanitation and septic tanks but the majority rely on onsite sanitation technologies. The following section discusses the onsite options for the project.

PIT LATRINE

A pit latrine is one of the most common and simple forms of excreta disposal. Pit latrines consist of a slab over a pit which may be from 2 m to 12 m in depth depending on soil suitability and owner preference. Slabs should be firmly supported on all sides and raised above the surrounding ground to prevent surface water ingress. If the sides of the pit are liable to collapse, they can be lined – particularly if it is proposed to empty them in the future. A squat hole in the slab or (less often) a seat is provided so that the excreta fall directly into the pit. These facilities are however deficient as they produce odour and attract flies and mosquitos. Additionally, there are chances of ground water contamination from pits which do not have a proper lining. Therefore, this option was dropped.

VENTILATED IMPROVED PIT LATRINE (VIP LATRINE)

Similar construction to the simple pit latrine but in order to reduce the fly and odour nuisance the pit is ventilated using a pipe extending from the pit to above the latrine roof with fly proof netting across the top. Furthermore, the inside of the superstructure should be kept dark although vents are provided to enable fresh air to flow into the latrine through the pit and out of the vent. These facilities too pose a great risk of contaminating ground water when not with porous lining.

ECOLOGICAL SANITATION (ECO-SAN) TOILET

Ecological Sanitation (or “Eco-San”) is the name given to a group of latrine types the common feature of which is that human excreta is treated as a resource. Human excreta are processed on site and then, if necessary, further processed off site until they are completely free of disease organisms. The nutrients contained in the excreta are then recycled by using them in agriculture.

There are three ways to recover the resources in urine - diversion, separation and combined processing.

- Diversion is when urine is diverted away from faeces - they are never mixed with each other and the faeces are dehydrated.
- Separation is when urine and faeces are initially mixed together then separated from each other for re-use.
- Combined Processing is when urine and faeces are mixed together, processed together and their resource value is captured together.

Based on experience in other parts of the country the most common form of Eco-San is the urine diversion type.

As Eco-Sans do not require a pit they can therefore be cheaper and more suitable than pit latrines in areas of the Town where pit excavation is difficult; e.g. areas with poor soils, high groundwater or rocky ground.

This opition was not preffered becasues of the hight cost compared to pit latrines, its operation and maintenance requires additives while its proper use requires behavioural change to maintain sanitation of excreta.

VAULTS AND CESSPITS

Watertight tanks called vaults are built under or close to latrines to store excreta until they are removed by hand or vacuum tanker. Similarly, household sewage may be stored in large tanks called cesspits, which are usually emptied by vacuum tankers.

Vaults or cesspits can be emptied when they are nearly full or on a regular basis. They can be cheaper than sewerage especially if waste water is disposed of separately. This form of on-site sanitation is not available in the Town.

Given the need for periodic emptying of the vaults and cesspits, this option was not chosen due to the high cost of maintenance and low potential for faecal sludge treatment in the project area as the nearest Faecal Sludge Treatment facility is located in Kamuli District.

WATER-FLUSHED TOILETS WITH SEPTIC TANKS

All of the latrine technologies described so far are dry systems. These are the most appropriate systems for places where there is limited water supply. If water is piped into the premises or is otherwise easily available, then a water-flushed system can be used. Water-flushed toilets, can be connected to a pit, septic tank or sewer.

A septic tank is an underground watertight settling chamber into which raw sewage is delivered through a pipe from plumbing fixtures inside a house or other building. The sewage is partially treated in the tank by separation of solids to form sludge and scum. Effluent from the tanks infiltrates into the ground through drains or a soak pit. The system works well provided:

- The soil is permeable and not liable to flooding or water-logging;
- The sludge is removed at appropriate intervals to ensure that it does not occupy too great a proportion of the tank capacity.

In Uganda, the predominant type is reported to be a two-chamber tank for water closet waste only (waste water goes to a separate pit) which is a reasonably efficient arrangement

The flush toilets are capable of cleaning the bowl surface with less than a gallon of water, which not only means you save a considerable amount of money on water bills, but also positively contribute towards conservation of available water source. Thus, this was the most preferred alternative for the project.

CONCLUSION ON TYPE OF SANIATION FACILITY SELECTED

There were two major alternatives namely dry (Pit latrine, VIP, Eco-san, & Vault and Cesspit) and water borne system (flush toilet). The best choice is one that promotes total sanitation and hygiene to the users and the neighbouring communities, that is able to utilize and promote the objective of water supply facilities provided under the project. The selected option of water borne facility will potentially become as a model for the public and households. The option poses minimal risks to ground water contamination.

The water-flushed toilet was therefore chosen in considering the low water maintenance costs, odour reduction and facility's features in the design including; gender separation with 3No. stances for women and 3No. stances for men, a shower, Urinal, 1No. stance for the disabled for both men and women, handwashing facility with a 1000 litre water storage tank.

5. POLICY LEGAL AND REGULATORY FRAMEWORK

This chapter presents an overview of the key policies, laws, and regulatory framework relevant to the planned project and it is summarized as follows:

NATIONAL LEGISLATIONS AND REGULATIONS

5.1 POLICY FRAMEWORK AND PLANS

VISION UGANDA, 2040

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

Relevance: Access to safe water and improved sanitation are priority interventions highlighted in the Vision 2040 as key drivers of socio-economic transformation. This project will increase access to safe water and improved sanitation in Kidera RGC and is in line with the aspirations of the Vision 2040.

THE THIRD NATIONAL DEVELOPMENT PLAN III, 2020/2022-2024/25

The plan provides guidance to the nation in delivering the aspirations articulated in Uganda Vision 2040 for the period 2020/21–2024/25. The Goal of NDP III is attaining Increased Household Incomes and Improved Quality of Life of Ugandans, under the theme: "Sustainable Industrialization for inclusive growth, employment and wealth creation". The NDP III Water, Sanitation and Hygiene objectives include, improved rural water coverage (85%), increased access to improved sanitation facilities (40) and improved adequacy to hygiene (handwashing) facility (50%) by 2025. The developemnet of Kidera rural growth water and santitation project is in line with NDPIII objectives.

Relevance: The proposed project will increase access to safe water and sanitation in Kidera RGC, Buyende district and contribute to the overall targets as set in the NDP III.

THE NATIONAL ENVIRONMENT MANAGEMENT POLICY, 1994

The overall policy goal of the Policy is sustainable development which maintains and promotes environmental quality and resource productivity for socio-economic transformation to promote sustainable economic and social development, mindful of the needs of future generations. The policy calls for integration of environmental concerns into development policies, plans and projects at national, district and local levels, using ESIA as one of the vital tools.

Relevance: The policy obliges development projects (such as the planned water supply and sanitation system for Kidera RGC) to conduct an ESIA to ensure that aspects for environmental and social sustainability are integrated in the project cycle.

THE NATIONAL POLICY ON CONSERVATION AND MANAGEMENT OF WETLAND RESOURCES 1995

The objectives of this policy include establishing the principles by which wetland resources can be optimally used now and in future; to end practices, which reduce wetland productivity; maintaining the biological diversity of natural or semi natural wetlands; maintaining wetlands functions and values; and integrating wetlands concerns into the planning and decision making of other sectors.

Relevance: Some of the proposed project activities will be or transvers some wetlands or flood plains e.g., water abstraction activities, transmission and distribution pipelines. Therefore project management must ensure that project activities are undertaken in a sustainable manner in keeping with wetlands policy requirements.

THE NATIONAL WATER POLICY, 1999

The objective of this policy is to provide guidance on development and management of the water resources in Uganda in an integrated and sustainable manner, to secure and provide water of adequate quantity and quality for all social and economic needs, with full participation of all stakeholders and mindful of the needs of future generations.

Relevance: The policy advocates for integrated and sustainable development, management and use of water resources with full participation of all the key stakeholders. Construction of the water supply system will require water, and therefore, the contractor shall secure the required water abstraction permit from the Directorate of Water Resources Management (DWRM).

THE UGANDA NATIONAL LAND POLICY, 2013

The vision of the policy is: “Sustainable and optimal use of land and land-based resources for transformation of Ugandan society and the economy” while the goal of the policy is: “to ensure efficient, equitable and sustainable utilization and management of Uganda’s land and land-based resources for poverty reduction, wealth creation and overall socio-economic development”.

Relevance: The Kidera RGC WSS project will require aquaizition of land. Therefore WSS will be implemented to ensure that all land use practices conform to land use plans and the principles of sound environmental management as highlighted in the policy, resettlement action plan to ensure compensation to land owners as well as acquisition of all the necessary approvals and permits will be sought

NATIONAL HEALTH POLICY, 2010

This policy establishes the environmental health priorities of the Government of Uganda and provides a framework for the development of services and programmes at national and local government levels. It has been developed in support of the National Health Policy and primarily concerns the role of the Ministry of Health. However, environmental health is a cross-cutting discipline and the policy therefore has implications for other departments and agencies.

Relevance: By ensuring availability of safe water supply and improved sanitation, the project will contribute to the reduction of water borne diseases thereby improving on the health of communities, especially the girl child and mothers who are mainly involved in collection of water.

THE NATIONAL ENVIRONMENT HEALTH POLICY 2010

This policy establishes the environmental health priorities of the Government of Uganda and provides a framework for the development of services and programmes at national and local government levels. It has been developed in support of the National Health Policy and primarily concerns the role of the Ministry of Health. However, environmental health is a cross-cutting discipline, and the policy therefore has implications for other departments and agencies.

Relevance: Environmental health encompasses a wide range of subjects but in the Ugandan context is concerned primarily with water supply, sanitation, and hygiene promotion; solid, liquid, hazardous waste management; air pollution control; food safety and hygiene; the control of insect vectors and vermin; occupational. The implementation of Kidera WSS project will contribute to the WSS and Hygiene promotion in the project area as provided for in the policy and during implementation the Environmental health requirements such as waste management, noise pollutions prevention and management, amongst others shall be complied with.

NATIONAL POLICY ON ELIMINATION OF GENDER BASED VIOLENCE, 2016

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.

Relevance: The prpoposed project has policy on eliminating gender-based violence through out the project. The contractor in will be required to mainstream measures to stem issues and forms of GBV in the project by ensuring that all workers sign E&S codes of conduct.

THE NATIONAL EQUAL OPPORTUNITIES POLICY 2006

The goal of the National Equal Opportunities policy is to provide avenues where individuals and groups' potentials are put to maximum use by availing equal opportunities form the project to all citizens in line with the applicable Constitutional rights and privileges.

Relevance: Discrimination and stigmatization, which acts as a barrier for marginalized and other groups of people in the project area in accessing employment and support opportunities will be eliminated throughout all project implementation phases. This project comes along with a lot of opportunities including service delivery, trainings

and employment. The project will avail equal opportunities and affirmative action where need be in the project area.

THE NATIONAL POLICY ON HIV/AIDS AND THE WORLD OF WORK, 2007

The policy obliges developing entities to mainstream HIV/AIDS interventions to their planned development interventions.

Relevance: The proposed project activities will lead to an influx of people into the project area in search for job opportunities. The HIV/AIDS policy requires that HIV/AIDS prevention measures are mainstreamed in project activities including among others HIV/AIDS sensitization and awareness creation, provision of condoms as well as availing Voluntary Counselling and Testing (VCT) services for both the workers and members of the nearby communities.

THE UGANDA GENDER POLICY 2007

The Uganda Gender Policy mandates the Ministry of Gender, Labour and Social Development and other line Ministries to mainstream gender in all sectors.

Relevance: In line wih the gender policy, women and men will to the extent possible be given equal oprotunity to work and be employed by the project during the project life cycle.

NATIONAL POLICY ON DISABILITY 2006

The National Policy on Disability in Uganda aims at promoting equal opportunities for enhanced empowerment, participation, and protection of rights of PWDs irrespective of gender, age, and type of disability. The Policy is to guide and inform the planning process, resource allocation, implementation, monitoring and evaluation of activities with respect to PWDs concerns at all levels.

Relevance: During recruitment of workers to be employed to undertake construction activities, some PWDs will apply for some jobs and the contactor should consider the PWDs applicants who qualify for such jobs.

THE UGANDA NATIONAL CULTURE POLICY 2006

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

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

UGANDA VISION 2040

Uganda's Vision is to have "A transformed Ugandan society from a peasant to a modern and prosperous Country within 30 years", from 2010. For the country to achieve its Vision 2040, it is necessary to increase access to appropriate and adequate sanitation as well clean and safe water.

Relevance: More water and sanitation facilities and sensitizations are going to be promoted in the project area while complying with environment and social requirements thereby contributing to the aspirations of the Vision 2040.

THE NATIONAL DEVELOPMENT PLAN III

Uganda's Vision is to have "A transformed Ugandan society from a peasant to a modern and prosperous Country within 30 years", from 2010. For the country to achieve its Vision 2040, it is necessary to increase access to appropriate and adequate sanitation as well clean and safe water.

Relevance: More water and sanitation facilities and sensitizations are going to be promoted in the project area while complying with environment and social requirements thereby contributing to the aspirations of the Vision 2040.

NATIONAL CLIMATE CHANGE POLICY, 2012

The goal of the policy is to ensure a harmonized and coordinated approach towards a climate-resilient and low-carbon development path for sustainable development in Uganda. The overarching objective of the policy is to ensure that all stakeholders address climate change impacts and their causes through appropriate measures, while promoting sustainable development and a green economy.

Relevance: The policy obliges the Developer to conduct an ESIA to ensure the project activities do not lead to adverse impacts that trigger climate change risks in the project areas and beyond. Secondly the project will adapt climate resilient designs that can mitigate impacts arising from increased peak flows and floods.

5.2 LEGAL FRAMEWORK

THE CONSTITUTION OF THE REPUBLIC OF UGANDA, 1995

The Constitution places obligations on both the state and the citizens of Uganda to among other things: a) protect the environment; b) protect important natural resources including land, water, wetlands and fauna and flora; c) promote sustainable development and conserve natural resources in a sustainable manner. Article 39 and 41 of the Constitution of 1995 provide that everyone has a duty to maintain a sound environment. It also stipulates that every person in Uganda has a right to a healthy and clean environment and as such can bring legal action for any pollution or disposal of wastes.

Relevance: The implementation of project activities will be undertaken while ensuring respect of human rights like right to own property such Land, right to safe and healthy environment among others as provided for in the Constitution

THE NATIONAL ENVIRONMENT ACT 2019

The Fourth and Fifth Schedules of the Act lists projects to be considered for ESIA. Schedule 4 listed projects requires Project Briefs (ESMPs) to be prepared whereas Schedule 5 lists projects for Mandatory detailed ESIA including Scoping. Specifically, this project falls under Schedule 5 hence, the need to conduct this ESIA.

Relevance: The proposed project falls under Schedule 5 for projects which requires mandatory ESIA before implementation. The environmental and social risks, benefits and negative impacts of the project has been identified and necessary mitigation measures proposed in the ESMP. This ESIA has been carried out in compliance with this Act.

WATER ACT, CAP 152

The Act provides for the use, protection and management of water resources and supply in Uganda. The Water Resources Regulations of 1998 established under this Act stipulates a requirement to apply for a permit to construct, own, occupy or control any works on or adjacent the land as per Regulation 10.

Relevance: The Act provides guidance for requirements of implementation of water supply projects especially on matters of water abstraction.

LOCAL GOVERNMENTS ACT, CAP 243

Local Governments Act, 1997 establishes a form of government based on district as the main unit of administration. Districts are given legislative and planning powers under this Act. (Sections 36- 45) They are also enjoined to plan for conservation of the environment within their local areas.

Relevance: *The implementation of Kidera RGC WSSP is consistent with Buyende DDP and it is to be undertaken with technical guidance of the district technical staff supported by the political wing of the district as the Act provides guidance for requirements of implementation of water supply projects.*

THE EMPLOYMENT ACT 2006

Is the governing legal statutory instrument for the recruitment, contracting, deployment, remuneration, management, sexual harassment, and compensation of workers.

Relevance: Persons shall be employed in the project need to be issued with contracts and their welfare taken care by employer. This Act is relevant in that, it addresses matters of engagement of workers and their rights while at work.

THE OCCUPATIONAL SAFETY AND HEALTH ACT, 2006

The Act makes provisions for the health, safety, welfare, and appropriate training of persons employed in workplaces.

Relevance: When implementing the project, the employers must provide for the protection of workers from accidents and adverse weather by provision of full PPE, and provision of a clean and healthy work environment, sanitary conveniences, washing facilities, First Aid and facilities for meals.

THE LAND ACT, CAP 227, OF 1998 AS AMMENDED

The land act, cap 227 of 1998 provides for the tenure, ownership, and management of land. Under section 44 the government or the local government shall hold land in trust for the people and protect natural lakes, ground water, natural streams, wetlands and any other land reserved for ecological purposes for the common good of Ugandans. The act also requires a person who owns or occupies land to manage and utilize the land in accordance with the environmental laws and other laws listed in section 43 including the water act and national environment act.

Relevance: *proposed project activities will be implemented with the footprint covering both private and public land. Therefore, the project will ensure sustainable management of ecological sensitive areas such as wetalnds, water bodies etc for example through obtaining wetland use permits, water abstraction permit among others.*

THE LAND ACQUISITION ACT, 1965

This Act provides for acquisition of land after its valuation and along approved procedures which ensure adequate, fair, and timely compensation to the landowners. The Act requires that adequate, fair, and prompt compensation is paid before taking possession of land and property.

Relevance: The key consideration regarding this Act in the project is to ensure landowners affected by the project are adequately and timely compensated for all land requirements for the project .

THE PUBLIC HEALTH ACT, CAP 281

Under Section 5 of this Act, every local authority shall take all lawful, necessary, and reasonably practicable measures for preventing the occurrence of, or for dealing with any outbreak or prevalence of, any infectious, communicable, or preventable disease; to safeguard and promote the public health; and to exercise the powers and perform the duties in respect of the public health conferred or imposed by this Act or by any other law.

Relevance: For the construction of workers camps and all ancillary infrastructures for the project shall be undertaken in cognizance of this Act and the Local Authorities will ensure compliance as by law established herein.

THE PHYSICAL PLANNING ACT, 2010 AND THE PHYSICAL PLANNING (AMENDMENT) ACT 2020

It is an Act to consolidate the provisions for the orderly and progressive development of land, towns and other areas, whether urban or rural. In respect of every area declared to be a planning area under section 5, there shall be a planning committee or planning committees. This planning committee shall be the municipal council or shall consist of such persons as the board, after consultation with any local authority concerned, shall appoint for town areas and rural areas respectively.

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.

Relevance: Act to the proposed solar-powered water supply and sanitation project under Kitenga RGC in Kaliro District. Different provision of this act will be implemented during the establishment and operations of the different proposed project components.

THE HISTORICAL MONUMENTS ACT, 1968

The Act requires that any chance finds encountered during project construction shall be preserved by the Department of Monuments and Museum in the Ministry of Tourism, Wildlife and Antiquities.

Relevance: Some objects of cultural and/or historical significance might be encountered/affected during project implementation and their preservation is called for by this Act.

TRAFFIC AND ROAD SAFETY ACT, CAP.361

Section 119 of the Traffic and Road Safety Act stipulates that every person who uses, parks or stands a motor vehicle, trailer or engineering plant on any road carelessly or without reasonable consideration for other persons using the road commits an offence.

Relevance: The contractor will ensure that all project machinery (construction equipment and material haulage fleet) observe traffic and road safety procedures including observing minimum speed limits, routine maintenance and observing road signs among others. In addition, more safety measures such as traffic guides/controllers, humps and road signage will be adopted to ensure safety of all road users during project implementation activities as guided by this Act.

ACCESS TO INFORMATION ACT, 2005

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

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

Relevance: ESIA has disclosed part of the critical information of the project to the project stakeholders and has documented stakeholder concerns which have formed basis of further stakeholder engagement and disclosure strategy. Upon approval of this ESIA Study by NEMA and the World Bank, the report will have to be disclosed on NEMA and MWE's on websites including World Bank Info Shop to enable stakeholder's access to the pertinent information

THE ROADS ACT, 2019

The Act prohibits erection of any building or planting of any trees or placing of pipelines within the road reserve except with a written permission of an appointed road authority. Article 16 (2) of the Road Act 2019 lists water pipelines amongst infrastructures that can be erected in a road reserve with written authority by UNRA.

Relevance: The project developer will apply to UNRA to carry out activity in the road reserve while also stipulating measures for restoration upon completion of project activity.

THE WORKERS' COMPENSATION ACT, CAP. 225

The Act outlines matters of compensation for injuries and accidents as well as the responsibility of employees to take care of their health and safety while on the project.

Relevance: The employer (contractor) must protect the health and safety of all project workforce by providing them with all requisite PPEs, safety training, clean and healthy work environment. The Act seeks to safeguard the workers and ensure that they are appropriately compensated in case of injuries resulting from project implementation activities.

CHILDREN ACT CAP 59

The Act defines a child as a person below the age of 18. It lists the right for children to be with their parents, circumstances under which they should not, foster care and adoption procedures as well as mandates of local authorities and roles of community.

Relevance: Child labour is to be prohibited during project implementation activities i.e., no employment of children below 18 years for all the project implementation activities.

DOMESTIC VIOLENCE ACT 2010

The Act provides for the protection and relief of victims of domestic violence; provides for the punishment of perpetrators of domestic violence and spells out procedures and guidelines to be followed by the courts in relation to the protection and compensation of victims of domestic violence as well as matters relating to cases of domestic violence in general.

Relevance: The Act gives guidance to the contractor and their workers on how to handle cases of domestic violence.

MINING ACT, CAP. 148 2003

Stone quarry sites and gravel borrow pits will be necessary for materials needed to construct the concrete works of the project components. The Act regulates mining developments including set up of new quarries and/or sandpits. It provides amongst others; the

environmental restoration plan shall include a detailed timetable for accomplishment of each major step to be carried out under the restoration plan for such sites.

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

5.3 REGULATIONS, STANDARDS AND GUIDELINES

THE NATIONAL ENVIRONMENT (ENVIRONMENTAL AND SOCIAL ASSESSMENT) REGULATIONS, S.I NO.143 OF 2020

The Regulations provide a framework within which ESIAs for projects are to be undertaken. It also emphasises that an environmental and social impact study for relevant projects be undertaken in accordance with section 113 of the National Environment Act and Schedule 5 of the same Act.

Relevance: The developer has undertaken this ESIA study with focus on the content specified within the First Schedule of these Regulations.

WATER RESOURCES REGULATIONS, 1998

The Regulations apply to motorized water abstraction from boreholes or surface watercourses or diverting, impounding, or using more than 400m³ of water within a period of 24 hours. Part II, Regulation 3 requires a water permit for operation of motorized water pump from a borehole or waterway. As such, the project shall acquire water abstraction permits in compliance with these regulations.

Relevance: DWD intends to abstract water from a ground water source (deep borehole) within a 200m L. Kyoga buffer zone in Nakibengo Village, Kidera Town Council, Buyende District and will therefore fulfil the requirements of these regulations. The Contractor will be required to abide by provisions of this law regarding water usage and conservation during use for construction civil works and associated project facilities such material yards, workers' camps among others.

WATER SUPPLY REGULATIONS, 1999

The Water Supply Regulations, 1999 are meant to guide in the management of the water supply works including:

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

THE NATIONAL ENVIRONMENT (WETLANDS, RIVERBANKS AND LAKESHORES MANAGEMENT) REGULATIONS 2020.

Regulation 12(1) prohibits any person from carrying out an activity in a wetland without a permit issued by the Executive Director of NEMA. Under regulation 34(1), a developer desiring to conduct a project which may have significant impact on a wetland to carry out an environmental impact assessment in accordance with sections 20, 21, and 22 of the National Environment Act 2019.

Relevance: Prior to any works in the wetland, DWD will seek a permit from NEMA, as provided for in these Regulations.

NATIONAL ENVIRONMENT (WASTE MANAGEMENT) REGULATIONS S.I. N^{O}. 49 OF 2020

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

Relevance: The Regulations promote cleaner production methods that enable the recovery and reuse of wastes, reclamation, and recycling and spell out how the project can manage its waste.

THE NATIONAL ENVIRONMENT (STANDARDS FOR DISCHARGE OF EFFLUENT INTO WATER OR ON LAND) REGULATIONS, 2020

These Regulations require that a permit is acquired before a developer discharges waste water into water bodies or on land. Maximum permissible levels for discharge of waste have been provided under Schedules 2, 3 and 4 of the Regulations which must be complied with.

Relevance: Effluent discharged from the water treatment works should conform to these regulations.

THE NATIONAL ENVIRONMENT (NOISE STANDARDS AND CONTROL) REGULATIONS, 2003

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

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

NATIONAL ENVIRONMENT (AUDIT) REGULATIONS, 2020

Schedule 3 provide projects for which an annual environmental compliance audit must be carried out by the respective developer. All projects listed in Schedule 5 of National Environment Act are among those listed in Schedule 3 of the Regulations and require a mandatory annual environmental compliance audit.

Relevance: Accordingly, after 12 months of its implementation, the Developer will conduct Environmental Audits to assess compliance of the project in line with NEMA Approval Conditions and other related provisions.

UGANDA NATIONAL ROADS AUTHORITY (GENERAL) REGULATIONS, 2017

The purpose of these Regulations is to provide for a) clear and transparent framework for the use of national roads and road reserves amongst others. With respect to the project infrastructures along the road reserves.

Relevance: The Developer will apply and sort permisions from UNRA/DLG in order to erect its transmission and distribution lines to pass through the road or within the road reserves.

WATER SOURCE PROTECTION GUIDELINES

The Water Sources Protection Guidelines for Piped Water Supply Systems describe steps to follow to prepare a Water Source Protection Plan. The Water Source Protection Guidelines help the user identify the risk to a water source and to engage the people and organisations responsible for the problem in a positive way that leads to a mutually beneficial outcome.

Relevance: The Guidelines recommend that for surface water sources from a lake or reservoir: consider the land area sufficient to address the catchment problems. A radius of not less than 10km from of the Source is recommended.

NATIONAL ENVIRONMENT (CONTROL OF SMOKING IN PUBLIC PLACES) REGULATIONS, 2004

According to WHO, Second-Hand Smoke (SHS) is a human carcinogen for which there is no "safe" exposure level 1. To avoid public health risk from SHS, Uganda enacted this Regulations to regulate smoking in public places. Under this law, a public place is defined as, "any place to which members of the general public or segments of the general public ordinarily have access by express or implied invitation and includes any indoor part of a place specified in this schedule". These places include, office buildings, workplaces, eating areas, toilets, and public service vehicles. The Regulations task owners of such places to designate "NO SMOKING" and "SMOKING AREAS" in premises.

Relevance: In this project, these regulations will apply to areas communally used by construction workers such as site offices, eating areas in camps and workers transport vehicles.

5.4 REQUIRED APPROVALS, PERMITS AND LICENSES

Several approvals and licenses will be required before commencement of construction activities while some prior to particular activities during project implementation. Securing of approvals requires preparation of the relevant documentation and payment of fees. This

needs to be done during mobilization to ensure that all approvals are secured in a timely manner to avoid construction delays. It is important to ensure that all materials (sand and aggregates) are sourced from quarries, borrow pits and sand mines approved by NEMA and compliant with environmental laws. For all new materials sites to be opened up, NEMA approval must be secured while all existing sites should undertake/provide proof of having undertaken environmental compliance audits. The following permits and licenses may be required by the project as presented in **Table** 5-1.

Table 5-1: Approvals, permits and licenses potentially required by the project

Approvals, Permits and Licenses Required	**Issuing Authority**	**Party responsible for acquiring permit/license**	**Legal Framework**
Water Abstraction Permit	DWRM	MWE & Contractor	Water Act, cap 152
Waste Disposal Permit	NEMA	MWE & Contractor	National Environment Act 2019; National Environment (Waste Management) Regulation 2020
Waste Transportation License	NEMA	Contractor	National Environment Act 2019; National Environment (Waste Management) Regulation 2020
ESIA Approval for Campsites and hoarding areas	NEMA	Contractor	National Environment Act 2019
Permit to carry out a Regulated activity in a Wetland, Riverbank, Lakeshore (River Nile)	NEMA	Contractor & MWE	National Environment Management (Wetland, Riverbank, Lakeshore) Regulation 2020
License to emit noise in excess of permissible noise levels	NEMA	Contractor	National Environment Act 2019
Mining Permit, Extraction of minerals, opening up of quarries and sand pits	DGSM/ MEMD/ NEMA approval	Contractor	Mining Act, Cap 148

Permit for Storage of Petroleum Products and dispensing license	PSD/MEMD	Contractor	Petroleum Act, Cap 2003
Work Place Registration Permit	MGLSD	Contractor	OHS Act, 2006
Work Permits	Ministry of Internal Affair	Contractor & Supervising, Consultant/ MWE	Immigrations Act, Cap 66
Statutory Certification of equipment	MGLSD, UNBS	Contractor	OHS Act, UNBS Act
Permit if the water transmission line is to cross the UNRA road (Road Permits)	UNRA	MWE	The Uganda National Roads Authority (General) Regulations 2017
Traffic Diversions consent	Uganda Police	Contractor	Traffic and Road Safety Act 1998
RAP approval conditions for this project	CGV	MWE	The Land Act Cap 227

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

AFRICAN CONVENTION ON THE CONSERVATION OF NATURE, 1968

Encourages individual and joint action for the conservation, utilisation and development of soil, water, flora, and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural, and aesthetic point of view. Considering the proximity of the water source of Kidera project to the lake and the wetlands the ESIA will recommend conservation measures that are applicable to protection of wetland and the lake e.g., ensuring preservation of all Wetlands plants/trees/fauna in project area.

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC), 1992

The Convention requires parties to avoid adverse effects on the environment and adopt measures and policies to control carbon dioxide emissions in technologies, considering their common, yet differentiated responsibilities, as well as their specific national and regional development priorities, objectives, and circumstances. They are required to take climate change considerations into account, to the extent feasible, in their relevant social, economic, and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimising adverse effects on the economy, on public health and on the quality of the environment of

projects or measures undertaken by them to mitigate or adapt to climate change. Therefore, all project works should maintain the ecological integrity of the habitat by avoiding activities that could enhance climate change especially massive tree cutting, Green House Gas Emissions, drainage of wetlands etc.

UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION (UNCCD), 1994

Binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. In the 10-Year Strategy of the UNCCD (2008-2018) that was adopted in 2007 with a view to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas to support poverty reduction and environmental sustainability. The ESIA has recommended restoration and enhancement measures for revegetation and tree planting where applicable.

MONTREAL PROTOCOL FOR THE PROTECTION OF THE OZONE LAYER, 1987

The Protocol was designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. All the ozone depleting substances controlled by the Montreal Protocol contain either chlorine or bromine (substances containing only fluorine do not harm the ozone layer). The provisions of the Protocol include the requirement that the Parties to the Protocol base their future decisions on the current scientific, environmental, technical, and economic information that is assessed through panels drawn from the worldwide expert communities. The ESIA does not recommend use of ozone depleting substances on the project

STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS, 2001

Protects human health and environment from Persistent Organic Pollutants that remain intact in the environment for long periods and can become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife, which can lead to serious health effects. The ESIA, therefore, recommends reduction of in intentionally released POPs through emission at source by promoting cleaner production methods and Best Available Techniques and Best Environmental Practices. Management of waste under the project will have to be undertaken in line with this requirement by avoiding burning of waste, among others.

STRATEGIC APPROACH TO INTERNATIONAL CHEMICALS MANAGEMENT, 2006

Fosters sound management of chemicals and to ensure that by the year 2020, chemicals are produced and used in ways that minimise significant adverse impacts on the environment and human health.

INTERNATIONAL LABOUR ORGANISATION (ILO) CONVENTION, 1998

Sets out basic principles and labour rights at work, based on international best practise.

5.6 WORLD BANK OPERATIONAL POLICIES (OPS)

The proposed solar powered piped water supply system and sanitation facilities to be constructed under IWMDP interventions were screened against the World Bank Operational Policies as follows:

Table 5-2: Summary of how the planned project activities trigger WB OPs

Safeguard Policies	Triggered/ Not Triggered	Remarks
Environmental Assessment OP/BP 4.01	Triggered	The project alignment goes through rural growth centres with several activities and therefore potential impacts relating to influx of labour, drainage, traffic, noise generation among others are likely. In general, the project falls under Category B of the World Bank´s classification of projects requiring an ESIA/ESMP given that its potential adverse environmental and social impacts will be site specific, few if any are irreversible, and in most cases mitigation measures can be readily designed.
Natural Habitats OP/BP 4.04	Triggered	The project will likely lead to uptake of parts of wetlands in terms of construction of its water abstraction facilities thereby triggering this policy.
Forests OP/BP 4.36	Not Triggered	The proposed site for project implementation and the immediate neighbourhood do not have any forest or land gazetted as forest reserve.
Pest Management OP 4.09	Not Triggered	No application of pesticides is envisaged in the project.
Physical Cultural Resources OP/BP 4.11	Triggered	The project will involve excavations and such civil works could lead to accidental encounter of materials of physical cultural values hence, this policy is triggered and Chance Finds Procedures have been prepared as part of this ESIA.
Indigenous Peoples OP/BP 4.10	Not triggered	No known Indigenous Peoples exist within the project area.
Involuntary Resettlement OP/BP 4.12	Triggered	The project will require land, hence land shall be acquired for water source pumps, WTP, reservoirs, and sump/ booster station, water office amongst others. A Resettlement Action Plan (RAP) has also been prepared

Safeguard Policies	Triggered/ Not Triggered	Remarks
		for the project and this shall be implemented by compensating or getting consents from the all PAPs.
Safety of Dams OP/BP 4.37	Not Triggered	This OP is not triggered because the project works do not involve dam related works.
Projects on International Waterways OP/BP .50	Not Triggered	The project does not affect international water ways.
Projects in Disputed Areas OP/BP 7.60	Not Triggered	There are no disputed areas along the project corridor.
World Bank Policy on Access to Information (2015)	Triggered	There is need for disclosure of information Project information will remain accessible through its disclosure to its stakeholders through the sharing of information with stakeholders such as district technocrats, Town council/ Sub County leaders, Local council leaders, and communities among others during the consultations process. .

5.6.1 WORLD BANK EHS GUIDELINES

The World Bank has a number of sector-based EHS guidelines below, many of which are applicable to various components of the proposed project namely; water and sanitation, air emissions, hazardous waste management, noise, occupational health and safety, community health and safety including traffic safety such as during project construction or disease prevention and construction and decommissioning.

Relevance: The study has to the extent possible, endeavoured to evaluate a range of the proposed project activities and identified impacts that will likely arise are typically covered in these EHS guidelines with appropriate mitigation measures have been identified to ensure compliance during implementation of the project.

WBG EHS GUIDELINES: WATER AND SANITATION

The EHS Guidelines for Water and Sanitation include information relevant to the operation and maintenance of potable water treatment and distribution systems and collection of sewage in centralized systems (such as piped sewer collection networks) or decentralized

systems (such as septic tanks subsequently serviced by pump trucks) and treatment of collected sewage at centralized facilities.

Relevance: In the ESIA, GIIP practices relating to establishment and operation of water and sanitation facilities have been built into the ESIA to ensure sustainability of the project.

WBG EHS GUIDELINES: AIR EMISSIONS AND AMBIENT AIR QUALITY

GENERAL APPROACH

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

Relevance: This ESIA study will exhaustively explore the air quality aspects relating to project implementation, most importantly, the major air pollutions sources (gaseous and dust emissions), receptors and elaborate on mitigation and monitoring measures to curb/prevent air quality impacts. The study further recommends continuous monitoring to regularly track the deviations in air quality parameters and thus apply appropriate mitigation measures in a timely manner.

WBG EHS GUIDELINES: WASTE MANAGEMENT

GENERAL APPROACH

In relation to the proposed water supply and sanitation project works, this guideline provides for construction waste generated by and throughout all implementation phases. The guidelines advocate for waste management planning where waste should be characterized according to composition, source, types, and generation rates. These guidelines call for implementation of a waste management hierarchy that comprises prevention, recycling/reuse, treatment, and disposal. The guidelines require segregation of *conventional waste* from *hazardous waste* streams. Examples of hazardous construction waste are waste oil from vehicles and machinery paint waste, thinners, and concrete wash water (e.g., from cleaning concrete mixers).

Relevance: The study recommends continuous monitoring to regularly track the waste categories and their amounts to have in place, appropriate mitigation measures in a timely manner. For instance, Improper management of construction waste would pose environmental and public health impacts. The contractor will have a contractual obligation to ensure proper construction waste management.

WBG EHS GUIDELINES: HAZARDOUS MATERIALS MANAGEMENT

APPLICATION AND APPROACH

These guidelines apply to projects that use, store, or handle any quantity of hazardous materials (Hazmats), defined as materials that represent a risk to human health, property, or

the environment due to their physical or chemical characteristics. Hazmats can be classified according to the hazard as explosives; compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials; radioactive material; and corrosive substances.

GENERAL HAZARDOUS MATERIALS MANAGEMENT

The main objectives of projects involving hazardous materials should be the protection of the workforce and the prevention and control of hazardous chemicals releases and accidents. These objectives should be addressed by integrating prevention and control measures, management actions, and procedures into day-to-day business activities.

Relevance: The ESIA recommends appropriate hazardous materials transportation, storage, handling and resulting waste management measures that meet the good international industry's best practices (GIIP).

WBG EHS GUIDELINES: CONSTRUCTION AND DECOMMISSIONING

These provide guidance, specific guidance on prevention and control of community health and safety impacts that may occur during new project implementation activities. By thematic categories, they address three major aspects (environment, OHS and community health and safety)

Relevance: The ESIA recommends the Developer to undertake decommissioning activities based approved decommissioning plans at the end of the project.

GAP ANALYSIS BETWEEN THE KEY WORLD BANK SAFEGUARD POLICIES AND GOVERNMENT OF UGANDA'S ENVIRONMENTAL AND SOCIAL REQUIREMENTS (AS ADOPTED AND UPDATED FROM THE IWMDP ESMF, 2018 AND UGANDA CLIMATE SMART AGRICULTURAL PROJECT ESMF, 2022)

The platform upon which Uganda´s country system has been built is the Constitution, which commits government to protecting natural resources on behalf of the people. It explicitly encompasses the concept of sustainability, including meeting the needs of present and future generations. The State is also committed to preventing or minimising environmental damage and upholding the right of "*every Ugandan to a clean and healthy environment*". This represents the highest-level commitment to sustainability. The NEA 2019 is the key legislation for environmental (and to a lesser extent, social) risk management.

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

It is worth noting that environmental management in Uganda has been largely supported by the World Bank, right from the development of the National Environment Management Policy

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

Some of the differences include the following: first and foremost, the Ugandan Laws do not provide for Framework Approach (ESMF and RPF) but rather only specific instruments (ESIA, ESMP, Environmental Audits, RAPs). Whilst Uganda´s ESIA systems are relatively strong on biophysical considerations, they are weaker regarding assessment of social and related issues. Whereas the WB Policies provide for independent review mechanism (the Inspection Panel), there is no explicit requirement for independent review of ESIA reports under Uganda's laws, though the ESIA Regulations (2020) provide for a reference to relevant experts who may be consulted to provide specialist knowledge and to assist with understanding and interpreting technical aspects of the project. Furthermore, there is no applicable legislation on a minimum wage. Aspects of the Employment Act contradict other Ugandan laws, by allowing for the employment of children aged 14 for "light work" under adult supervision, in contradiction to Section 7 of the Children (Amendment) Act (2016) which sets the employment age at 16. The Employment Act does not clearly define hazardous employment. The legal framework also fails to provide penalties for the violation of laws prohibiting the employment of minors, contributing to high school drop-out rates, teenage pregnancies, and health issues as children find work on project sites.[2]

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

The existing gaps are summarized in Table 5-3 & Table 5-4 below:

[2] Uganda Social Risk Management (SRM) Technical Paper (2019)

Table 5-3: Summary of Gap Analysis between Uganda and World Bank Safeguards policies.

World Bank's Safeguard Policies	Uganda's Legal and Regulatory Framework	Gaps identified in Uganda legal and regulatory framework and how it was addressed
Environmental Assessment (OP 4.01)	• National Environment Management Policy, 1994. • National Environment Act No.5 of 2019. • National Environment (Environmental and Social Assessment) Regulations, 2020.	• Independent review is not specifically provided for under ESIA Regulations of Uganda and as a result, the review of ESIAs is commonly reviewed by government agencies; • In the EIA review process, there is no specific legal/regulatory framework that caters for examination of the quality of the ESIA reports. Only conditions of approval/reasons for non-approval of ESIAs are provided by NEMA; • There are no administrative mechanisms for appealing a decision taken on an EIA. *The report had been reviewed at MWE by IWMDP Safeguards Staff and WB level to ascertain the quality of the ESIA before submission to NEMA. (See Page (i) for Document Control).*
Natural Habitats (OP 4.04) and Forests (OP 4.36)	• The Constitution 1995 as amended; • the National Environment Act No.5 of 2019; • The National Forestry and Tree Planting Act, 2003; • The Uganda Wildlife Act 2019; • The Land Act Cap 227; • The Fish Act Cap 197; • The Plant Protection Act Cap 31.	• There are general gaps which include lack of Regulations to implement the National Forestry and Tree Planting Act and the Wildlife Act. *The project is located in an area with conservation status (Wetlands), however, the protection of wildlife encountered during project implementation has been recommended including wetlands use permits.* *For trees likely to be affected by the project, recommendations on their management have been included in among which is* ***obtaining a permit for tree cutting*** *in case they fall within the project foot print, restorations and tree planting*

World Bank's Safeguard Policies	Uganda's Legal and Regulatory Framework	Gaps identified in Uganda legal and regulatory framework and how it was addressed
Physical Cultural Resources (OP 4.11)	• The Constitution1995 as amended • The National Environment Act, 2019 • The Historical Monuments Act, Cap 46 • The Institution of Traditional or Cultural Leaders Act, 2011	• The legal framework is limited in scope. For example, it does not cover certain aspects such as the intangible heritage; • There is no strong institution to regulate and manage heritage resources; • The sites and monuments are not adequately maintained, documented and in addition, some of the antiquities are not collected; • There is limited enforcement of the legal framework related to Physical Cultural Resources in Uganda because most developers and government officials do not understand the importance of conserving physical cultural resources. *This ESIA included the Chance Find Procedures to facilitate management and assign responsibility for identification, handling and preservation of both tangible and intangible physical*
The current Historical Monuments Act is being reviewed to provide for an efficient law for the protection of the cultural resources of the country. The new law shall be inclusive of all aspects of culture, the tangible, intangible heritage of the country. The revised Environmental and Social Impact Assessment Regulations provide that risk assessment should include risks to cultural heritage.		

Table 5-4: Gaps between World Bank and Ugandan legislation applicable to OP 4.12 Involuntary Resettlement

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
Land Owners	The Constitution of Uganda, 1995 recognizes four distinct land tenure systems, Customary tenure, Freehold tenure, Leasehold tenure and Mailo land tenure.	World Bank Policy recognises the rights of those affected people: • Who have formal legal rights to the land or assets they occupy or use.	The Ugandan law does not compensate those without legal right or claim to the land. WB OP 4.12 does not	Alternative land (wherever available) or Cash compensation at full replacement value or (based on market value + 15% to 30% disturbance allowance).

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
	Land is valued at open market value and a 15% to 30% disturbance allowance must be paid if six months or less notice is given to the owner. Cash compensation is the recommended option.	• Who do not have formal legal rights to land or assets, but have a claim to land that is recognized or recognizable under national law. • Who have no recognizable legal right or claim to the land or assets they occupy or use. Compensation of lost assets at full replacement costs. Cash compensation is recommended where there are active land markets and livelihoods are not land based.	consider disturbance allowance. Uganda laws and the WB OP 4.12 are consistent in compensation at full replacement cost and cash compensation.	All forms of tenancy based on formal or informal rights. In kind compensation should be offered as an option to the PAPs where (alternative land is available for the PAPs).
Land Tenants	Leasehold tenure is created either by contract or by operation of the law. The landlord grants the tenants or lease exclusive possession of the land, usually for a period defined and in return for a rent. The tenant has security of tenure and a proprietary interest in the land. Cash compensation is based upon market value of land and disturbance allowance (15-30%). Entitled to compensation	Must be compensated, whatever the legal recognition of their occupancy.	The Ugandan law does not compensate those without legal right or claim to the land.	Land owners Compensate for land and all assets at full replacement cost or replacement of land at equal/ greater value and compensate for other assets. World Bank OP 4.12 does not recognize depreciated value for replacement of assets (which should be replaced at market value).

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
	based upon the amount of rights they hold upon land.			Additionally, 15% disturbance allowance will be given to the PAPs on top of the compensation.
Land squatters	Leasehold tenure is created either by contract or by operation of the law. The landlord grants the tenants or lease exclusive possession of the land, usually for a period defined and in return for a rent. The tenant has security of tenure and a proprietary interest in the land. Cash compensation is based upon market value of land and disturbance allowance (15-30%). Entitled to compensation based upon the amount of rights they hold upon land.	Must be compensated, whatever the legal recognition of their occupancy	The Ugandan law does not compensate those without legal right or claim to the land.	Squatters are only entitled to compensation for the development on the land and ample time will be given to the PAPs to harvest their crops. Additionally, 15% disturbance allowance will be given to the PAPs on top of the compensation.
Owners of non-permanent buildings such as kiosks, butchery shops, wooden shacks for food vendors etc.	Cash compensation based upon rates per m2 established at District level, disturbance allowance (15% or 30%).	Recommends in-kind compensation or cash compensation at full replacement cost. Recommends resettlement assistance.	OP 4.12 does not provide for the disturbance allowance. Ugandan law does not provide for resettlement assistance.	District compensation rates + 15% disturbance allowance. Cash compensation. Livelihood restoration, including identification of alternative sites.

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
Owners of permanent buildings.	Valuation based on replacement value and guidance from CGV & disturbance allowance (15% or 30%).	Compensation at full replacement cost.	The Ugandan laws are consistent with OP 4.12 in regard to replacement cost.	Cash Compensation at replacement value + 15% disturbance allowance.
Perennial Crops	Cash compensation based upon rates per m2/bush/tree/plant established at District Level and disturbance allowance (15% or 30%).	Compensation at full replacement cost. Income restoration.	OP 4.12 does not provide for the disturbance allowance.	Cash compensation using affected District rates + disturbance allowance.
Seasonal crops	No compensation. 3-6 months' notice given to harvest crops.	No specific provision		No compensation is expected for crops to be harvested. However, in the event that livelihoods are lost compensation will be given.
Loss of income	No specific provision	Livelihoods and living standards are to be restored in real terms to pre-displacement levels or better	The Ugandan legislation does not provide for restoration of livelihoods.	In the context of this project, practical livelihood restoration measures have been proposed.
Vulnerable groups	The 1995 Uganda Constitution stipulates that: "the State shall take affirmative action in favour of groups marginalised on the basis of gender, age, disability or any other reason […] for the purpose of redressing imbalances which	Particular attention should be paid to the needs of vulnerable groups among those displaced such as those below the poverty line, landless, elderly; women and children and indigenous peoples and ethnic minorities.	Both the Ugandan Constitution and WB OP 4.12 favour vulnerable groups. However, the Ugandan law, vulnerable groups are not fully described in the context of	Special attention will be paid to vulnerable persons affected and necessary measures will be provided in the entitlement matrix of the RAP.

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
	exist against them". This regulation is not fully described in the context of resettlement and land acquisition.		resettlement and land acquisition.	
Relocation and Resettlement	Both the Constitution, 1995 and The Land Act, 1998 give the government and local authorities, power to compulsorily acquire land. The Constitution states that "no person shall be compulsorily deprived of property or any interests in or any right over property of any description except" if the taking of the land is necessary "for public use or in the interest of defence, public safety, public order, public morality or public health."	Avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	There is no requirement under the Ugandan law to minimize land acquisition.	Measures to minimize involuntary resettlement shall be considered in the RAP following a WB mitigation hierarchy.
Livelihood restoration and assistance	There are no explicit provisions under resettlement or relocation for livelihood assistance.	Livelihoods and living standards are to be restored in real terms to pre-displacement levels or better	Ugandan policy and legislation would need to be aligned with Bank policy to effectively guarantee rights of all affected persons of involuntary resettlement.	The project will provide transition allowance.
Consultation and	There are no explicit provisions for consultations and	Consult project-affected persons, host communities	While the consultation	No gap.

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
disclosure	disclosure but there are guidelines issued by separate ministries (e.g. roads and energy). The Land Acquisition Act, however, makes provision for an enquiry whereby the affected person can make formal written claim and the assessment officer is obliged to conduct a hearing before making his award.	and local NGOs, as appropriate. Provide them opportunities to participate in the planning, implementation, and monitoring of the resettlement program, especially in the process of developing and implementing the procedures for determining eligibility for compensation benefits and development assistance (as documented in a resettlement plan), and for establishing appropriate and accessible grievance mechanisms.	requirement is inherent in the ESIA, it contains several differences with the requirements of Bank policy.	
Grievance mechanism and dispute resolution	The Land Act, 1998 states that land tribunals must be established at all districts. The Land Act empowers the Land Tribunals to determine disputes and it provides for appeal to higher ordinary courts. The Land Acquisition Act provides for the aggrieved person to appeal to the High Court.	Establish appropriate and accessible Grievance Redress Mechanism.	GRC structures exist within the Local Councils of Governance in Uganda, but in most cases, they are dysfunctional and ineffective given the limited projects knowledge.	Grievance committees to be instituted within the procedure and will not replace the existing legal process in Uganda; rather it seeks to resolve issues quickly so as to expedite receipt of entitlements and smooth resettlement without resorting to expensive and time-consuming legal action. If the grievance

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

5.7 INSTITUTIONAL FRAMEWORK

MINISTRY OF WATER AND ENVIRONMENT

The Ministry of Water and Environment (MoWE) has the overall mission: to promote and ensure the rational and sustainable utilization, development and effective management of

water and environment resources for socio-economic development of the country. In relation to the Kidera RGC water supply system and sanitation project, MoWE shall take lead on implementation of the project and shall ensure all recommendations contained in the ESMP and monitored based on the monitoring plans.

DIRECTORATE OF WATER DEVELOPMENT

The Directorate of Water Development (DWD) is responsible for providing overall technical oversight for the planning, implementation, and supervision of the delivery of urban, rural water and sanitation services, and water for production across the country. DWD is responsible for regulation of provision of water supply and sanitation and the provision of capacity development and other support services to Local Governments, Private Operators, and other service providers.

RURAL WATER SUPPLY AND SANITATION

The department coordinates utilization of district water and sanitation grant that involves resource mobilization and allocation, technical support to districts, monitoring compliance and capacity building to the district local governments. In addition, the Division supports planning and development of water schemes that traverse local government boundaries, largely gravity flow schemes and large motorized piped water schemes. The proposed Kidera RGC Water Supply System and Sanitation project is being implemented by RWSS.

URBAN WATER SUPPLY AND SANITATION

The Umbrellas organisation is under the Urban Water Supply and Sanitation (UWSS) Department of the Ministry of Water and Environment and will effectively plan and manage budgets agreed within a contract framework. For Kidera RGC, the EUWS will use experience gained elsewhere in the region to extend services to rural & urban poor areas.

DIRECTORATE OF WATER RESOURCES MANAGEMENT

The Directorate of Water Resources Management (DWRM) is responsible for developing and maintaining national water laws, policies, and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction, and wastewater discharge permits; Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of transboundary water resources and peaceful cooperation with Nile Basin riparian countries. The project falls under the Kyoga Water Management Zone (KWMZ), a zone under DWRM. The Directorate is mandated issue a surface water user permit with conditions on volume of water abstracted, water quality, wastewater quality before release into the lake and source protection requirements.

WETLANDS MANAGEMENT DEPARTMENT

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

with a wetland tributary in Nakibengo Village, Kidera Town Council, Buyende District. The WMD will regulate and monitor the activities proposed by the project in that location.

NATIONAL WATER AND SEWERAGE CORPERATION

National Water and Sewerage Corporation (NWSC) has the overall mandate to operate and provide water and sewerage services in areas entrusted to it, on a sound, commercial and viable basis.

NATIONAL ENVIRONMENTAL MANAGEMENT AUTHORITY (NEMA)

The National Environmental Act 2019 establishes NEMA as the principal agency responsible for coordination, monitoring and supervision of environmental conservation activities. NEMA works with District Environment Officers and local environment committees at local government levels who also undertake inspection, monitoring and enforce compliance on its behalf.

In this project, NEMA will review and approve the ESIA report and through the Project District Environment Officer, undertake environmental monitoring during project implementation.

MINISTRY OF LANDS, HOUSING AND URBAN DEVELOPMENT

The Mandate is "To ensure a rational: sustainable and effective use and management of land and orderly development of urban and rural areas as well as safe, planned and adequate housing for socioeconomic development".

The MoLHUD, through the Office of the Chief Government Valuer, and the District Land Boards, will provide guidance on implementation of the Resettlement Action Plan conducted on the project.

UGANDA NATIONAL ROADS AUTHORITY

UNRA is a key stakeholder under the project because the distribution line components largely run along the road reserves. The project transmission and distribution lines will be laid within the reserve of a UNRA trunk road (Buyende-Kidera Road) and district access roads. One UNRA trunk road and 5 access (district) road crossings are envisaged in the project.

RWSS will request for authorisation to lay pipes along the road reserve and excavate the road for water pipeline crossings from UNRA before project commencement.

MINISTRY OF GENDER, LABOUR AND SOCIAL DEVELOPMENT

The Ministry has the responsibility to empower communities in diverse areas with respect to aspects of gender, labour, occupational safety and health, HIV/AIDS and wider vulnerable groups. *In the project has the oversight role to ensure effective and meaningful mainstreaming of cross-cutting issues into sectors activities as will apply to this project.*

MINISTRY OF LOCAL GOVERNMENT

The 1997 Local Government Act provides for decentralization and devolution of government functions, powers, and services from the central to Local Governments and sets up the

political and administrative functions of local governments. Specifically, local governments shall be consulted on projects to be located within their jurisdiction and on matters that affect their environment as was done during this ESIA study.

BUYENDE DISTRICT LOCAL GOVERNMENT

The District Local Government is mandated under the Local Government Act and the National Environmental Act to ensure that all project activities are implemented in accordance with the national legal and policy framework. Therefore, Buyende District Local Government is responsible for monitoring all the project implementation phases, to include construction and the functionality of the water system in Kidera Town Council.

6. ENVIRONMENTAL AND SOCIAL BASELINE

This section describes environmental and social baseline conditions of the area in which the proposed water supply project is to be located and in which impacts may be experienced.

6.1 PHYSICAL ENVIRONMENT

CLIMATE

Buyende district in the Eastern Region of Uganda has a Tropical monsoon climate which corresponds to the Köppen climate classification category "Am" (Beck et al., 2018). Tropical monsoon climates have monthly mean temperatures above 18 °C in every month of the year and a dry season. Over the course of the year, the temperature typically varies from 16.7 °C to 32.2 °C and is rarely below 15 °C or above 35.6 °C[3]. The hot season lasts for about 2 months, from late January to late March, with an average daily high temperature above 31°C. The hottest month of the year around this site is March, with an average high of 31.7°C and a low of 18.3°C. The cool season lasts for about 5 months, from late April to late September, with an average daily high temperature below 28.3°C. It is coldest in August, with an average low of 16.7°C and a high of 27.2°C.

The Kidera project area receives rainfall throughout the year. It rains the most in April, with an average rainfall of 167.6mm and the least in January, with an average rainfall of 33.0mm. Kidera experiences extreme seasonal variation in monthly rainfall.

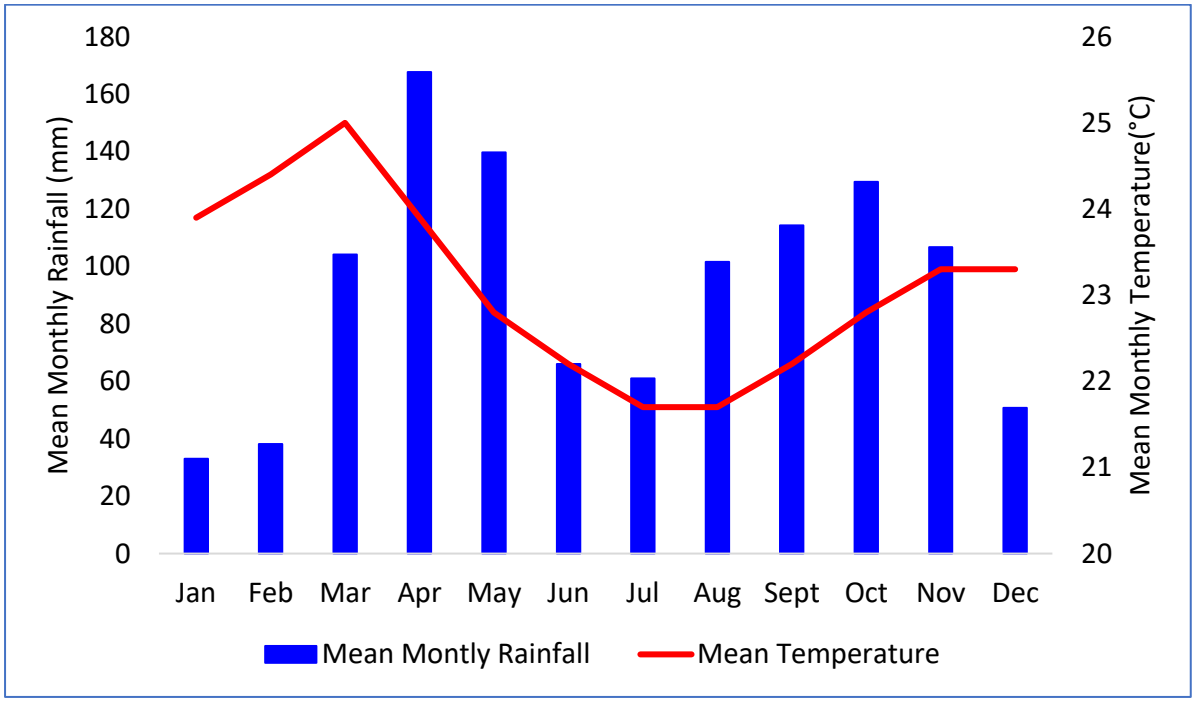


Figure 6-1: Mean monthly rainfall and temperature in Buyende district

[3] https://weatherspark.com/y/97615/Average-Weather-in-Buyende-Uganda-Year-Round

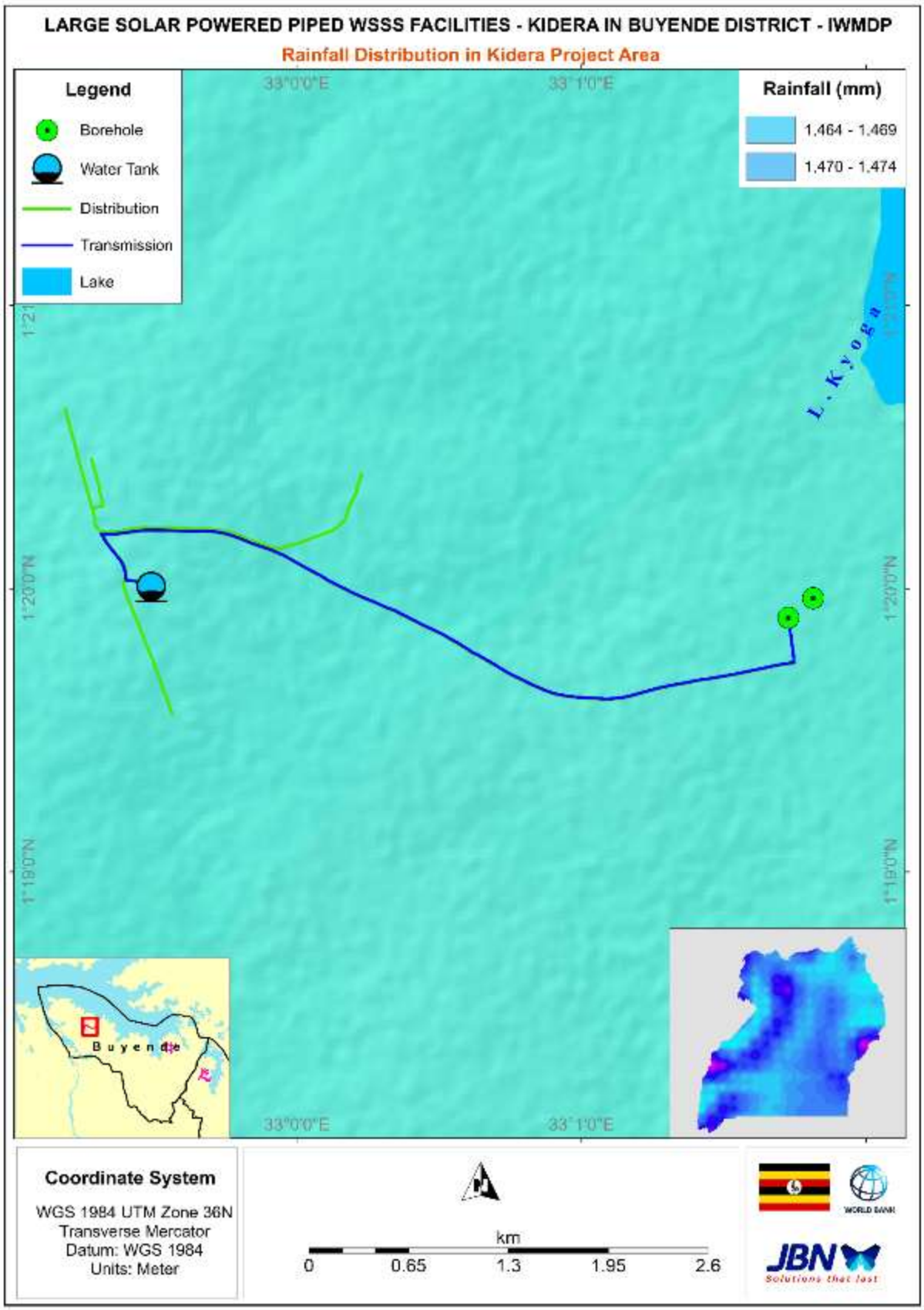


Figure 6-2: Annual rainfall distribution in Kidera Project Area

Relation of baseline to the project: Kidera experiences a conducive climate for implementation of the project both construction and operation phases. During the construction phase, works sensitive to climate, such as excavation and earth works are conducive in no or moderate rainy days and sunny days or months to reduce on the impact of soil erosion (silting and sedimentation), dust and air quality nuisance from the sites.

WATER RESOURCES AND HYDROLOGY

Uganda has four (4) main Water Management Zones (WMZs) (Upper Nile, Kyoga, Victoria and Albert) and eight (8) river basins (Albert Nile, Aswa, Kidepo, L. Kyoga, L. Victoria, L. Edward, L. Albert, and Victoria Nile). Buyende district is located in the Kyoga basin with its northern boundary within Lake Kyoga with its biggest portion lying along the L. Kyoga shoreline swamps (**Figure** 6-3). Kidera RGC project area is drained by mainly Nankulukuto stream into L. Kyoga - the largest surface water source in the district (**Figure** 6-3). There also a number of wetlands in form of Riverine vegetation and swamps along the waterbodies which severely face floods. The Kidera RGC boreholes (60870 and 61681) are located within and outside the 200m Lake Kyoga protection zone prescribed by the National Environment (Wetlands, Riverbanks and Lake Shores Management) Regulations, No. 3/2000, respectively.

Figure 6-3: Wetland at Borehole 60870 in Kidera RGC project area

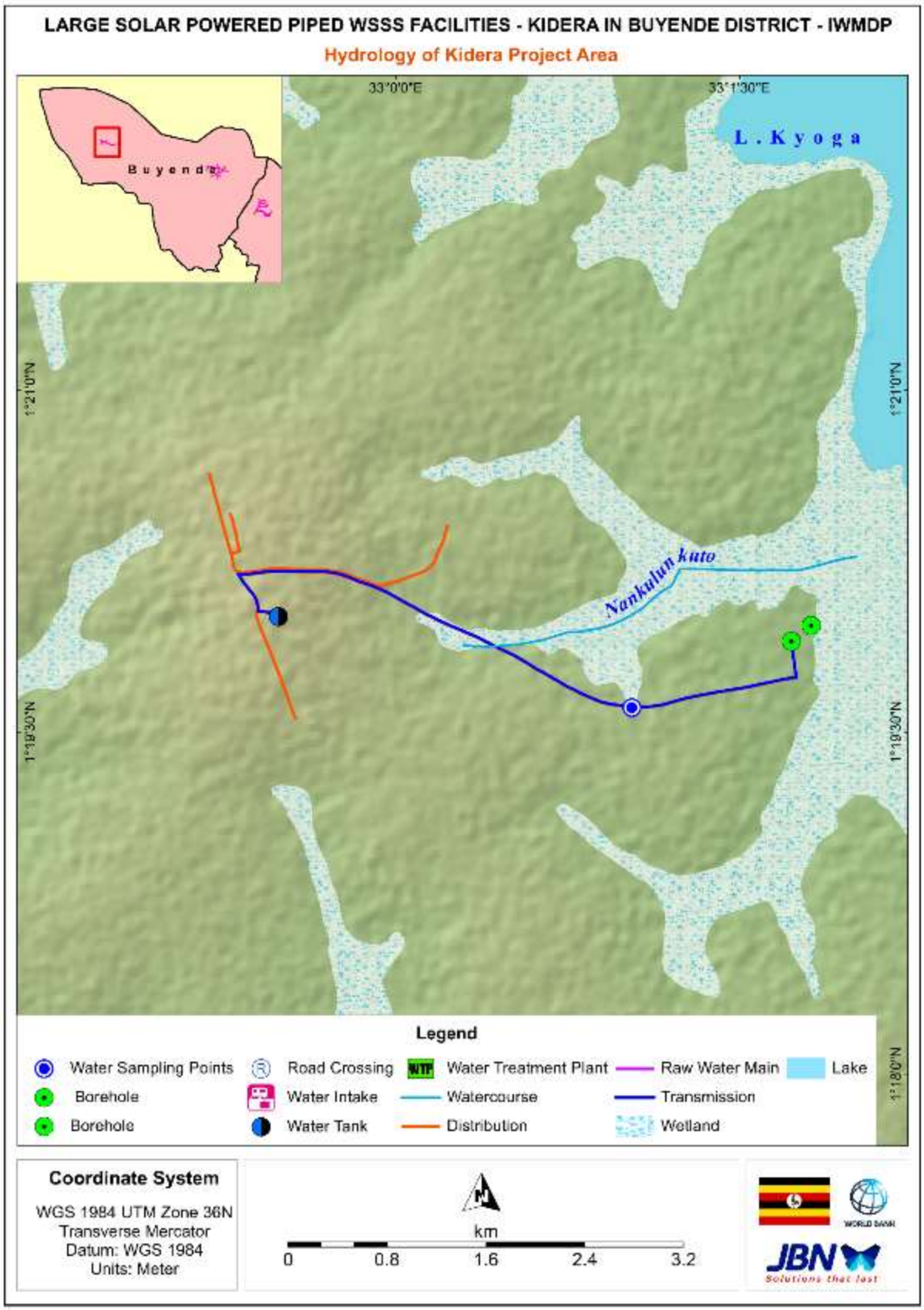


Figure 6-4: Hydrology of Project Area

GROUNDWATER

The proposed water sources for the Kidera RGC piped water supply system is ground water (drilled borehole DWD 60870 and DWD 61681) - (80% test pumped). DWD 60870 has a yield of 13.1 m3/hr, the abstracted yield will be 10.5 m3/hr. DWD 61681 has a yield of 12.0 m3/hr, the abstracted yield will be 9.6 m3/hr. The boreholes can meet the 2041 maximum day demand for the 4 project villages over 17 hours pumping regime.

BASIC FLOOD RISK ASSESSMENT

Flood risk is **the product of the vulnerability to flooding multiplied by the total value of the assets at risk to flooding**. Flood risk is determined by the summed probability of flood hazards, as well as the assets at risk of these hazards. A basic flood risk analysis was undertaken at the Kidera RGC borehole sites in Nakibengo Village using GIS. Results of the anlaysis indicate that the borehole 60870 has a 10% flood risk (Figure 6-5), and both borehole 60870 and 61681 at 50% and 90% flood risk.

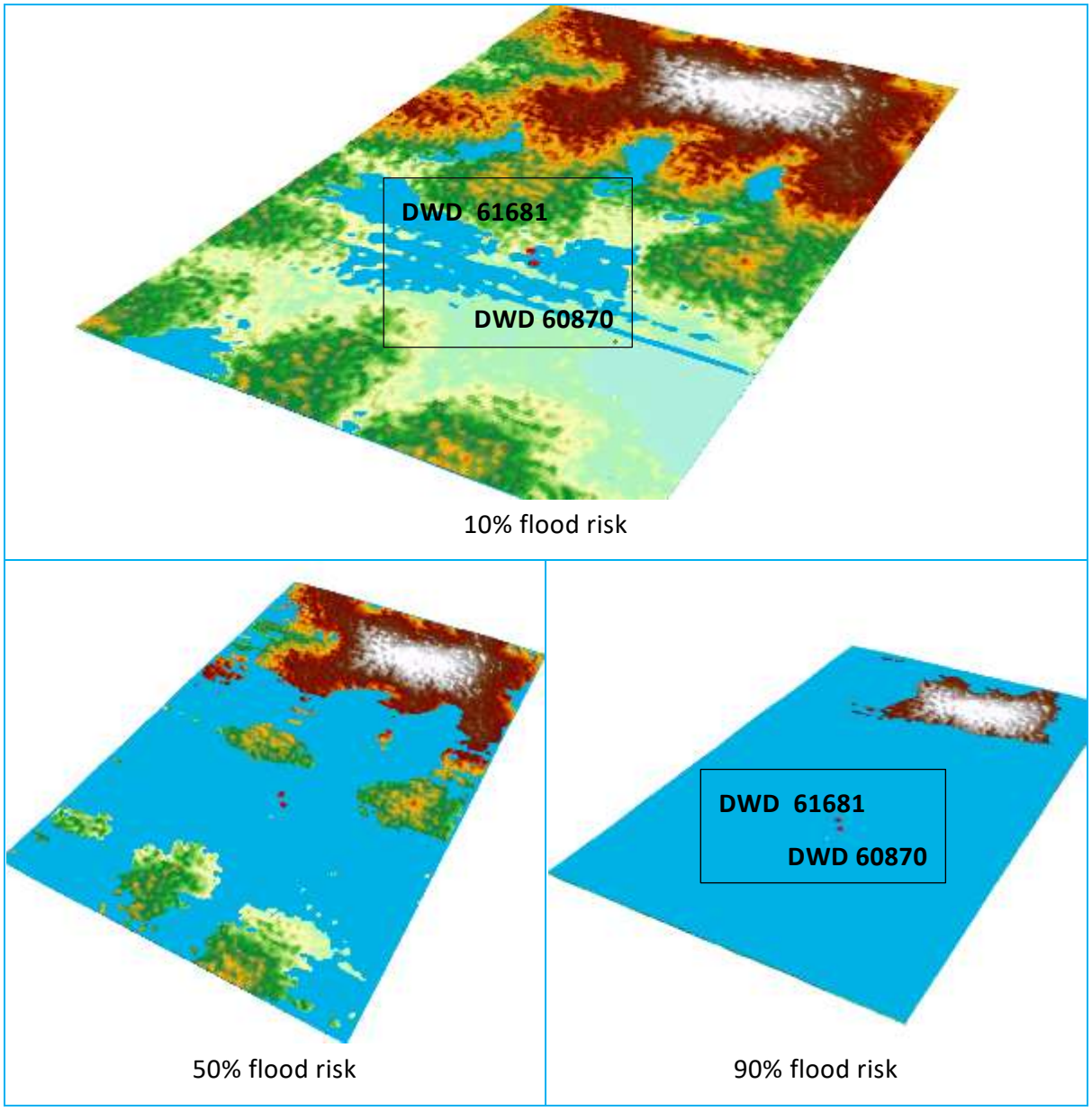


Figure 6-5: Basic GIS flood risk assessment at the location of borehole 60870 and 61681

Figure 6-6: Flooded wetland that submerged DWD 60870 borehole

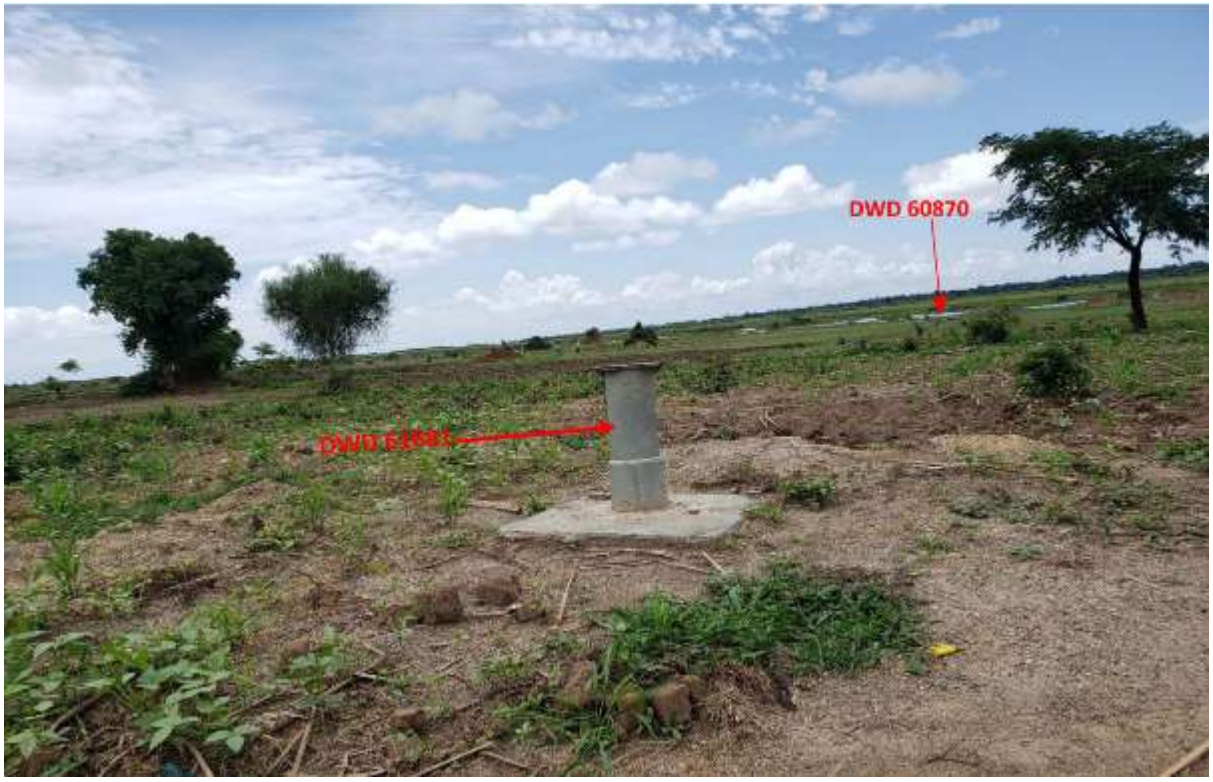


Figure 6-7: Borehole DWD 61681 at the edge of the floodplain

WATER QUALITY

A reconnaissance survey of the project area was undertaken to appreciate the existing water resources, their location in view of the proposed project components, and how they may be affected by the project. The reconnaissance survey further involved the identification and

delineation of the potential pollution sources that are likely to impact on the water resources. From the findings of the reconnaissance survey, it was identified that the water source (borehole) was the potential area of focus for water quality assessment, and thus, a detailed water quality assessment was carried out on groundwater.

The selection of sampling underground water source targeted the nearest community borehole to drilled borehole (**Figure** 6-8 & **Figure** 6-9**,**) in Nakibengo cell. Water quality assessment was done through water sample collection for laboratory analysis of parameters. A water sample from the nearby borehole to the project ground water source in Nakibengo village was collected using clean 1 L sampling bottle that was rinsed prior to sampling, and then kept in an ice-cooled box, and transported to the laboratory (MWE/National Water Quality Reference Laboratory - Entebbe) for analysis. The sample was delivered to the laboratory within 24 hours from the time of their withdrawal from the field. Water quality parameters that were analysed in the laboratory included; turbidity, pH, Electrical Conductivity (EC), total dissolved solids (TDS), total hardness ($CaCO_3$), fluoride, sulphates, chlorides, nitrate (N), Nitrites (N), Manganese, total iron and E. coli.

During water quality sampling and analysis, quality control was followed, according to the standard methods (APHA/AWWA/WCF, 2020). The results of water quality analysis were used to provide a baseline for monitoring future impact of the project on the water quality in the water resources assessed.

Figure 6-8: Water sampling from nearby borehole to the proposed water source in Nakibengo village

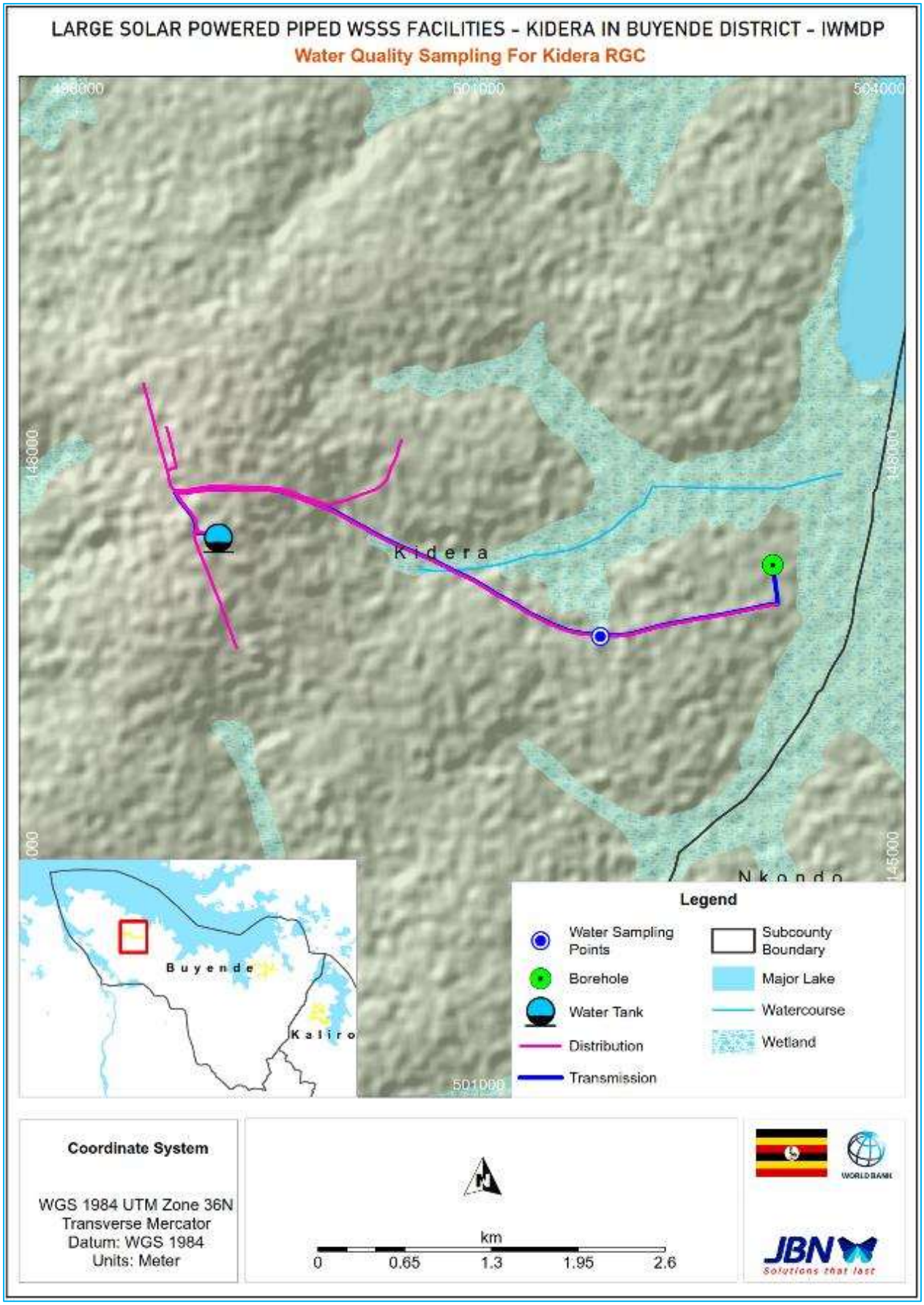


Figure 6-9: Location of the water quality measurement/sampling points

WATER QUALITY LABORATORY ANALYSIS RESULTS

According detailed engineering design, the water quality of the drilled borehole (DWD61681) meets the national standard for natural portable water as indicate in certifcate **Annex E**.

However, the ESIA team carried out water quality assessment from nearby lake (Lake Kyoga) which is a potential recharge for underground water. The results are presented in table 6.1 *Error! Reference source not found.**1***. All the parameters tested for water quality were within d rinking water standards (IDEAS 12 2018 Maximum permissible for natural potable water) except the Nitrite as in Annex E.

Table 6-1: Water quality of near hand pump bore hole

Parameter (unit)	**Test results**	**Uganda National Bureau of Standards - (**DUS ISO 24510:2007 - **Maximum permissible limits for potable Drinking water)**
Turbidity (NTU)	0.43	25
pH (Units)	6.79	5.5-9.5
Electrical Conductivity (µS/cm)	790	2500
Total dissolved solids (mg/L)	553	1500
Total Hardness as $CaCO_3$ (mg/L)	315	600
Fluoride (mg/L)	0.28	1.5
Sulphate (mg/L)	57	400
Chlorides (mg/L)	76	250
Nitrates as N (mg/L)	0.39	10
Nitrites as N (mg/L)	0.0201	0.003
Manganese (mg/L)	<0.0059	0.001
Total Iron (mg/L)	0.32	0.5
***E. coli* (CFU/100 mL)**	<1	<1

TOPOGRAPHY

Buyende district is a relatively flat district with a few undulating hills and valleys. The biggest part of the district forms the lake shoreline. The project area has high ridges and isolated hills and adulating lowlands due to its location along the shores of L. Kyoga (**Figure** 6-10).

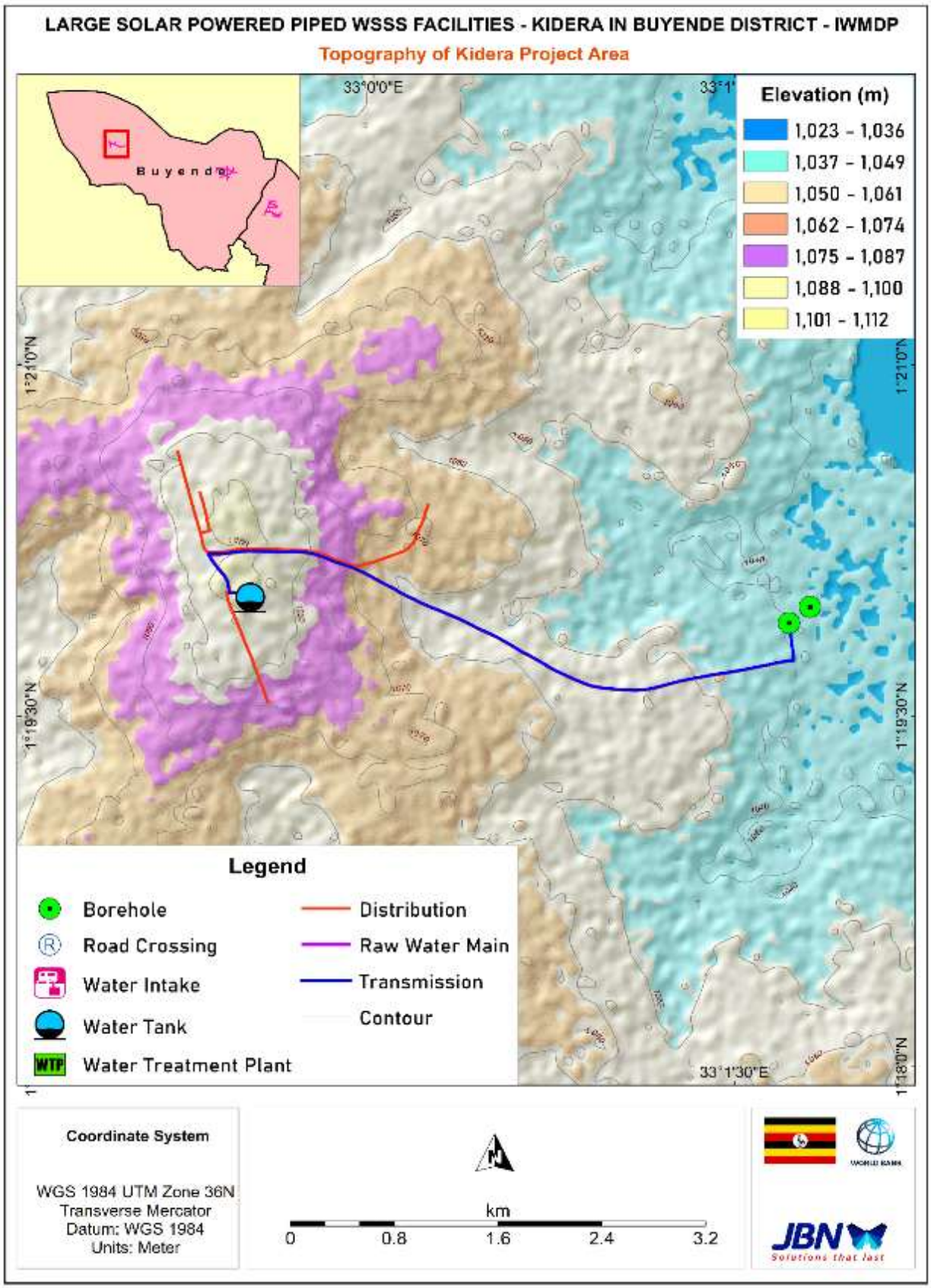


Figure 6-10: Topography of Project Area

This renders most parts of the project area flat since the whole northern and part of the west form lakeshore and wetland landscapes. The lowest and highest points in the project area are 1020 to about 1114 m ASL with a mean elevation of 1067m ASL. The entire slope of the project area drains towards the L. Kyoga being the largest water body.

GEOLOGY AND GEOMORPHOLOGY

Uganda is composed predominantly of Archaean basement rocks formed mainly between >3.08 Ga and 2.55 Ga. The West Tanzania Terrane (WTT) covers several districts including Buyende. This is a vast granite-gneissic-migmatitic terrane in Central - Southern Uganda. The WTT is divided into 3 major map units: (1) Tonalite-trondhjemite-granodiorite (TTG) gneisses, (2) Tororo Suite (with no project activities) and (3) Kampala Suite **(Figure** 6-11**)**.

Geologically Buyende like most of Uganda exists of "wholly changed rocks", a kind of Precambrian rocks". These are mainly gneisses and sediments rock types and around the Kiderasite, is undifferentiated gneiss. These are formed by the metamorphosis of granite or sedimentary rock. Only on the lakesides of Lake Kyoga one finds quaternary sedimentary rocks. The undifferentiated gneiss rock of the basement complex which is a high-grade metamorphic rock, formed by the metamorphosis of granite **(Figure** 6-12**)**. These are the variable gneissic granitoid (2591±27 Ma; 2652±8 Ma) (**Figure** 6-11**)**.

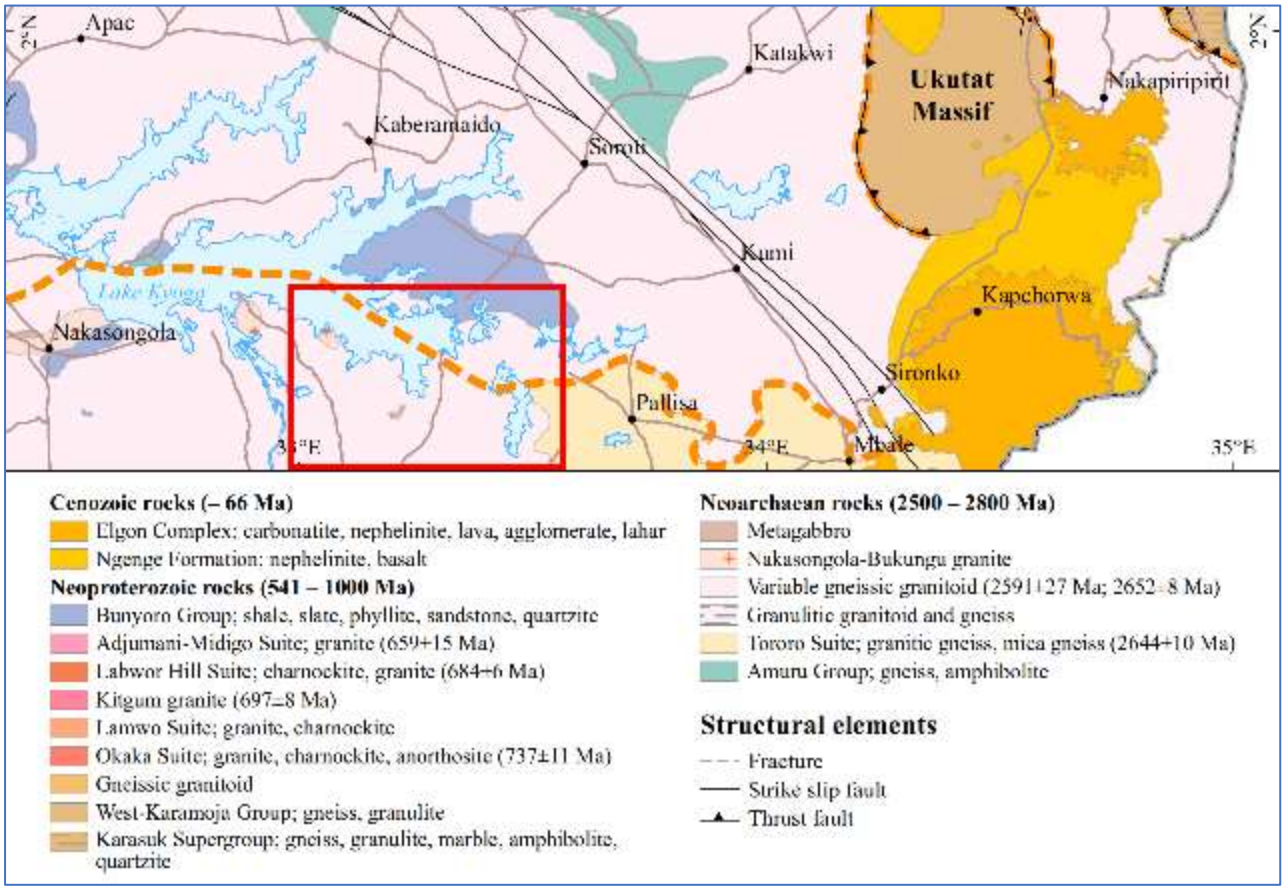


Figure 6-11: Geological map of Kaliro District in the West Tanzania Terrane (WTT)

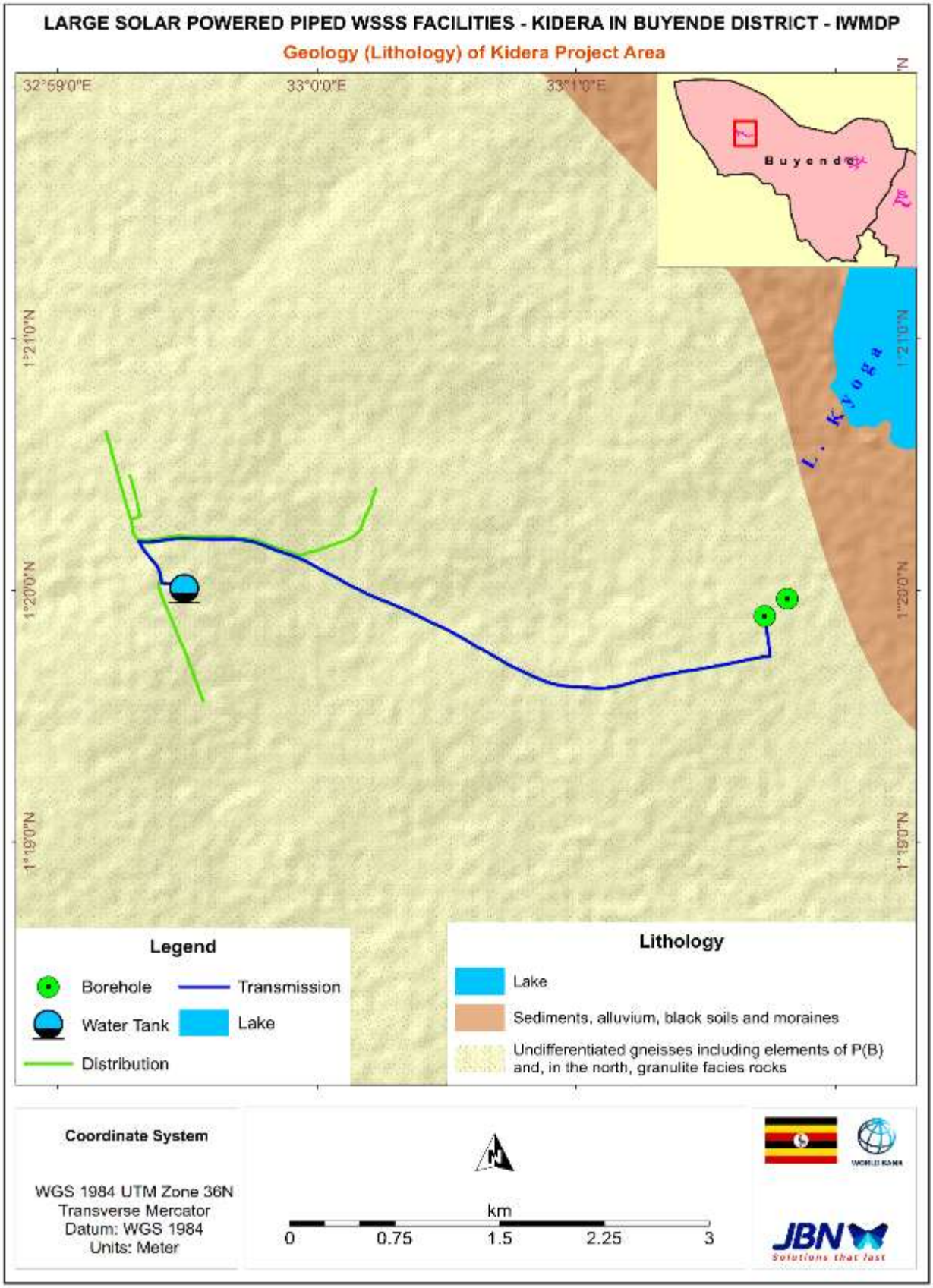


Figure 6-12: Geology (Lithology) of Project Area

SOILS

Buyende district is predominantly covered by Grey-brown and brown sandy loams over laterite, black and grey clays, and red and brown sandy loams. However, around the project area, the major soil type is "Grey-brown and brown sandy loams over laterite" (***Figure*** 6-13).

Grey-brown and brown sandy loams over laterite: these soils are grey-brown or reddish brown in colour, sandy loams and loams textured on laterite. The sandy soil particles in them are big in size and resemble tiny stones formed from Lake deposits derived from Basement complex granites, gneisses, among others. This is under the Mazimasa Complex Catena (categorized as Petric Plinthosols (Acric) by FAO). Being predominantly rich in sand, loam soils are coarse in texture. These soils are granular in shape and don't have a firm texture therefore they fall apart easily. These soils being more alkaline and less acidic, they don't provide a conducive environment for bacteria to produce carbonic acid hence there will be minimum corrosion on the pipes when installed on this site.

Black and grey clays; These are often calcareous in nature and have either self-mulching or at least strongly pedal surfaces of fine clay aggregates which grade into coarse and fine structured strongly pedal black (dominant) heavy clays. The surface soils are often slightly acidic becoming more alkaline with depth. Acidic soils usually facilitate the action of bacteria in the soil to produce carbonic acid which facilitates the corrosion of steel pipes. Therefore, the pipes will be better installed deeper into the ground to minimize corrosion. Therefore, based on the soil features around the project area, the pipes installed will have minimal chances of corrosion hence we commend that the project will be a success.

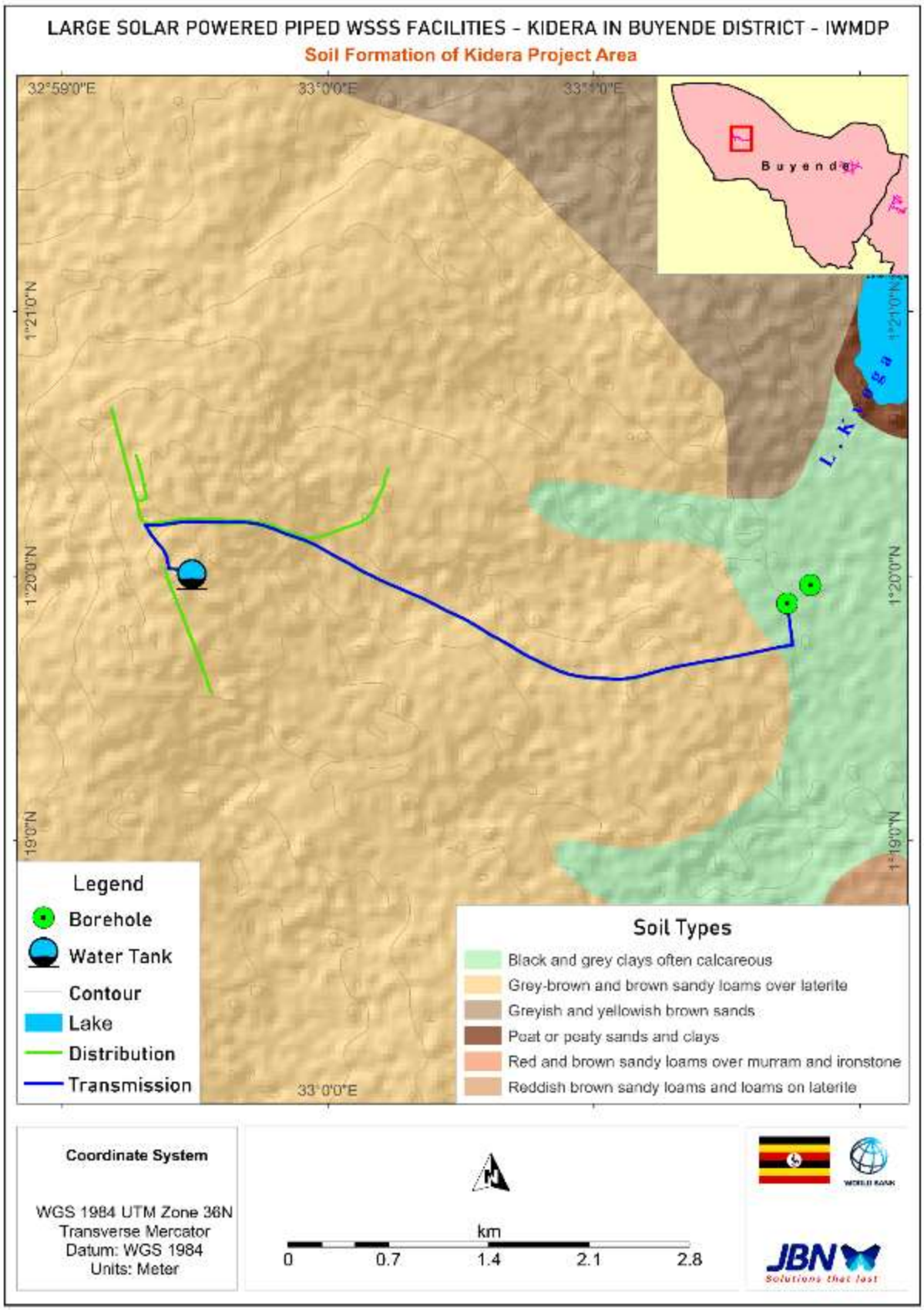


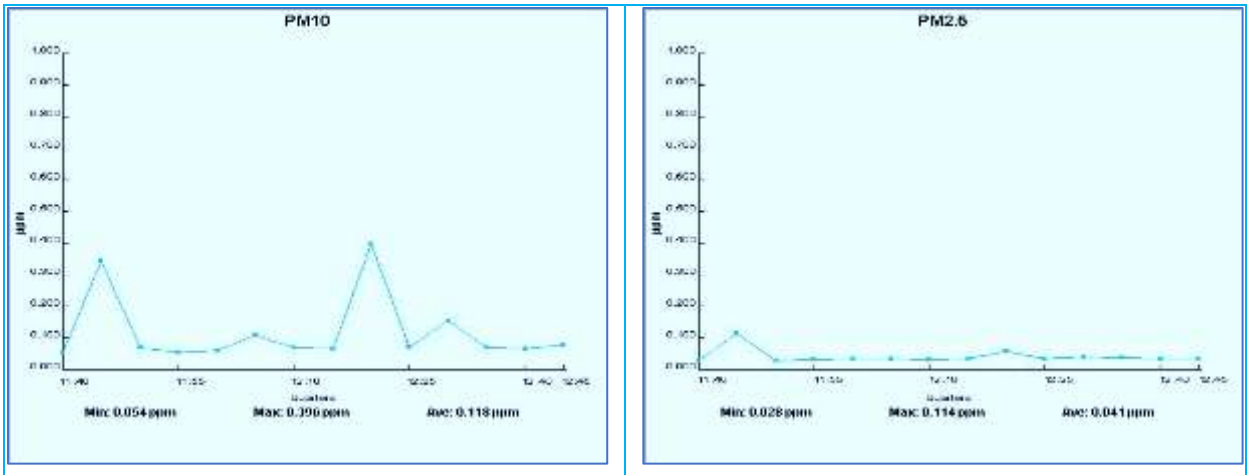
Figure 6-13: Soil in Project Area

PARTICULATE MATTER

Exposure to inhalable and respiratory particulate matter may result in a variety of health effects depending on the magnitude, duration and frequency of exposure. A number of sites (Kidera trading centre, Kidera Health Centre IV, Kidera Prison, St. Kizito Primary School, Shiloh Primary School and Nakibengo trading centre) were identified as sensitive receptors to potential impacts of the project footprints. However, Kidera Health Centre IV and Nakibengo Trading Centre were considered for the assessment due to the severity of the project impacts to the communities therein as discussed in Table 6-2 below.

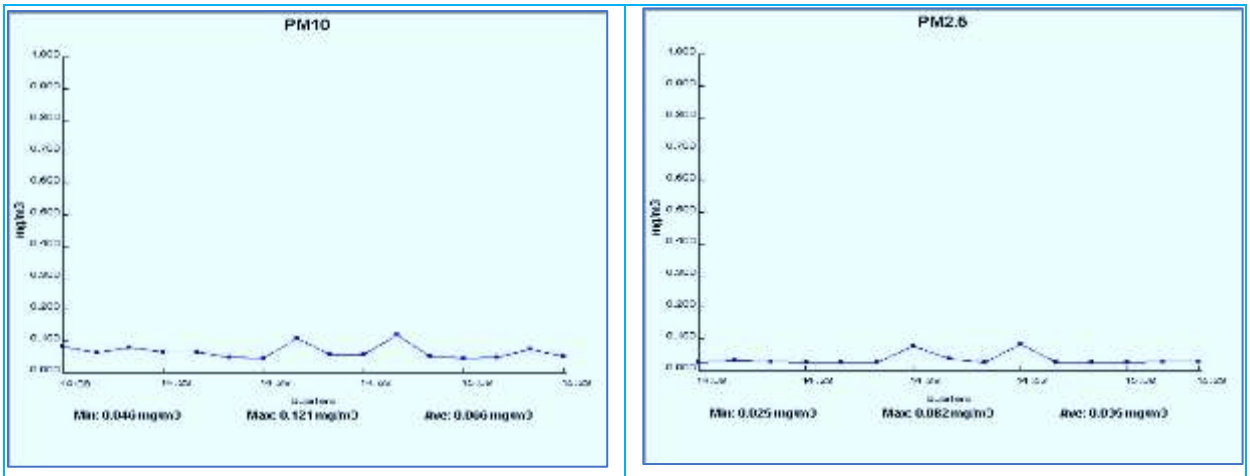
Table 6-2: Summary of baseline Particulate matter for Kidera RGC

Location	Date and Time	Coordinates 36N	PM10 (mg/m³)			PM2.5 (mg/m³)		
			Min	Aver	Max	Min	Aver	Max
Nakibengo TC	Date: 15/02/2022 Start: 10:22am End: 11:29am	0502589 E, 0146759 N	0.054	0.118	0.396	0.028	0.041	0.114
Kidera HC IV	Date: 15/02/2022 Start: 14:10pm- End: 15:30pm	0498732 E, 0147898 N	0.046	0.066	0.121	0.025	0.035	0.085
WHO AQG (2021) - 24hr averaging			0.015			PM10: 0.045		



PM10 measurements | PM2.5 measurements

Figure 6-14: Variation of Particulate matter with time of the day at Nakibengo Trading Centre



PM 10 measurements

PM2.5 measurements

Figure 6-15: Variation of Particulate matter with time of the day at Kidera Health Centre IV

The ambient average levels of PM 2.5 ranged from 0.035mg/m^3 to 0.041mg/m^3 whilst the average levels of PM10 ranged from 0.066mg/m^3 to 0.118mg/m^3. The values recorded at the two (2) sites were above the WHO Air quality limits for particulate matter. The dust emanated from movement of vehicles and motorcycles through Nakibengo Trading Centre along Nakibengo Marrum road to Kidera Health Centre IV, following an accident that attracted an increase in the number of road users at the time of the assessment. This therefore increased the amount of dust particles in the area surroundings.

GAS EMISSIONS BASELINE

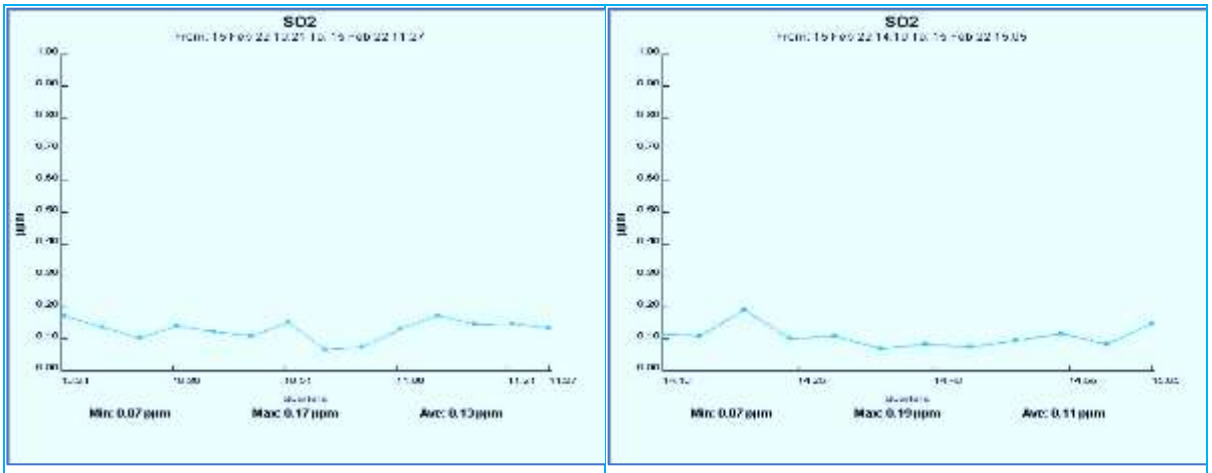
Four gaseous air pollutants including; CO, NO_2, SO_2 and VOC were considered during the assessment. Of the total volume of air in the atmosphere, 78.09% is Nitrogen, 20.95% Oxygen and the remaining 1% consists of a mixture of other gases including considered gases for assessment.

SO_2 a colourless gas with a sharp odour and NO_2 are produced from burning fossil fuels (coal and oil). These affect the respiratory systems and cause irritation of the eyes. On the other hand, Carbon monoxide (CO) an odourless and colourless gas is formed by incomplete combustion fossil fuels. VOC are emitted by Vehicles, solvents and industry. VOCs can also come from personal care products such as perfume and hair spray, cleaning agents, dry cleaning fluid, paints, lacquers, varnishes, and from photocopying and printing machines.

Table 6-3: Summary of Baseline Gas Emissions Readings for Kidera RGC

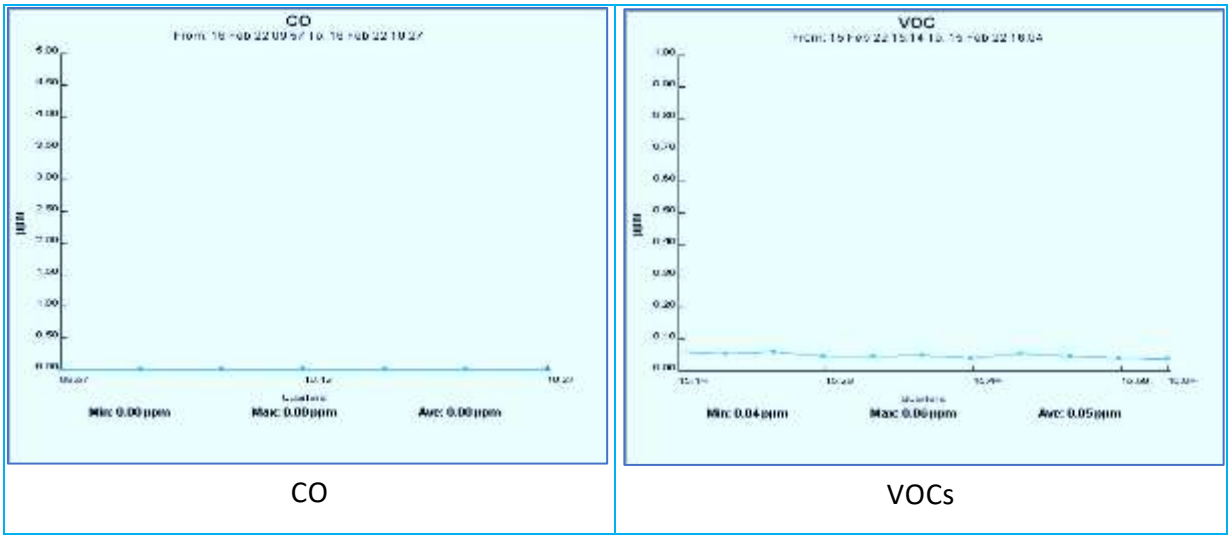
Location	**Date & Run time**	**Readings**			
		CO (ppm)	NO_2 (ppm)	SO_2 (ppm)	VOCs (ppm)
Nakibengo TC	Date: 15/02/2022 Start: 10:18am	Min: 0.00 Ave: **0.00**	Min: 0.083 Ave: 0.098	Min: 0.07 Ave: **0.13**	Min: 0.04 Ave: **0.056**

	End: 13:18pm	Max: 0.00	Max: 0.116	Max: 0.17	Max: 0.12
Kidera HC IV	Date: 15/02/2022 Start: 13:57pm End: 16:57pm	Min: 0.00 Ave: **0.26** Max: 1.32	Min: 0.046 Ave: **0.066** Max: 0.121	Min: 0.07 Ave: **0.11** Max: 0.19	Min: 0.04 Ave: **0.05** Max: 0.06
WHO AQG		10mg/m^3 or 9ppm (8-hr average)	0.2mg/m^3 or 0.106ppm (1-hour average)	0.5mg/m^3 or 0.2ppm (10-minute average)	None



SO2 | SO2

Figure 6-16: Variation of SO_2 levels with time of day at Nakibengo Trading Centre and Kidera HCIV



CO | VOCs

Figure 6-17: Variation of CO and VOC levels with time of day at Kidera Health Centre IV

The average values monitored at the two (2) sites ranged from 0.066ppm – 0.098ppm for Nitrogen dioxide (NO_2), 0.00ppm – 0.132ppm for Carbon monoxide (CO), 0.13ppm –

0.108ppm for Sulphur Dioxide (SO_2) and 0.048ppm – 0.056ppm for Volatile Organic Compounds (VOC).

All average values of gases were in conformity with WHO Air quality Standards during the assessment. However, there no clear or set standards for VOC. The sensitive receptors (Nakibengo Trading Centre and Kidera Health Centre IV) in which the different gases where monitored had limited economic activities, including but not limited to: - small scale retail shops, local restaurants, motorcyclists, saloons among others. This explains the low level of gases as indicated in **Table** 6-3**.**

NOISE MEASUREMENT RESULTS

Noise levels (LAeq) for the monitored sites ranged from 51.6dBA (Site 2: Kidera Health Centre IV, in a hospital area) to 56.8dBA (Site 1: Nakibengo Trading Centre in a Mixed residential setup). The noise levels recorded at these different sampled receptors varied depending on the noise sources (anthropogenic activities) at a specific monitoring time of the day. The baseline noise levels measured were slightly above the maximum permissible noise limits. These noise levels emanated from a range of activities for example in Nakibengo Trading Centre; high volume music from bars, local cinema halls, and shops, speeding vehicular traffic (heavy trucks and boda bodas) as well as noise generated by trading centre dwellers. For Kidera Health Centre IV noise levels were attributed to motorcycles and residents within Kidera town who were attracted to an accident that involved casualties as indicated in (**Table** 6-4**)** below.

Table 6-4: Summary of noise results at measured sensitive receptors

Location of sensitive receptors	GPS Coordinates	LAFmin (dB)	LAFmax (dB)	LAeq (dB)	Maximum Permissible Noise Limits Day (dBA)
Nakibengo TC	0502589 E, 0146759 N	40.4	90.2	56.8	55
Kidera HC IV	0498732 E, 0147898 N	37.8	80.2	51.6	45

VIBRATION MEASUREMENT RESULTS

The seismic occurrences were measured at an average velocity of 0.824 VEL mm/S at Nakibengo Trading Centre and an average velocity of 0.665 VEL mm/S at Kidera Health Centre IV. The vibration values within the measured receptors were insufficient with no severity to cause damage as indicated in **Table** 6-5 below.

Table 6-5: Summary of vibration results at measured receptors

Location	Date and Time	Coordinates 36N	VEL mm/S			
			Min	Aver	Max	Permissible limit for construction equipment/sites

Nakibengo TC	Date: 15/02/2022 Start: 10:33am End: 13:19pm	0502589 E 0146759 N	0.10	0.824	2.6	12.5
Kidera HC IV	Date: 15/02/2022 Start: 14:04pm End: 16:59pm	0498732 E 0147898 N	0.00	0.665	2.3	12.5

6.2 BIOLOGICAL ENVIRONMENT

LAND USE AND LAND COVER

The proposed project site lies within an area that has transformed from its natural setting into subsistence farming, and extension of infrastructure; therefore, the common landuse and land cover pattens in Kidera RGC are cropland, a mix of forest and grassland, human settlement and wetland (Figure 6-18).

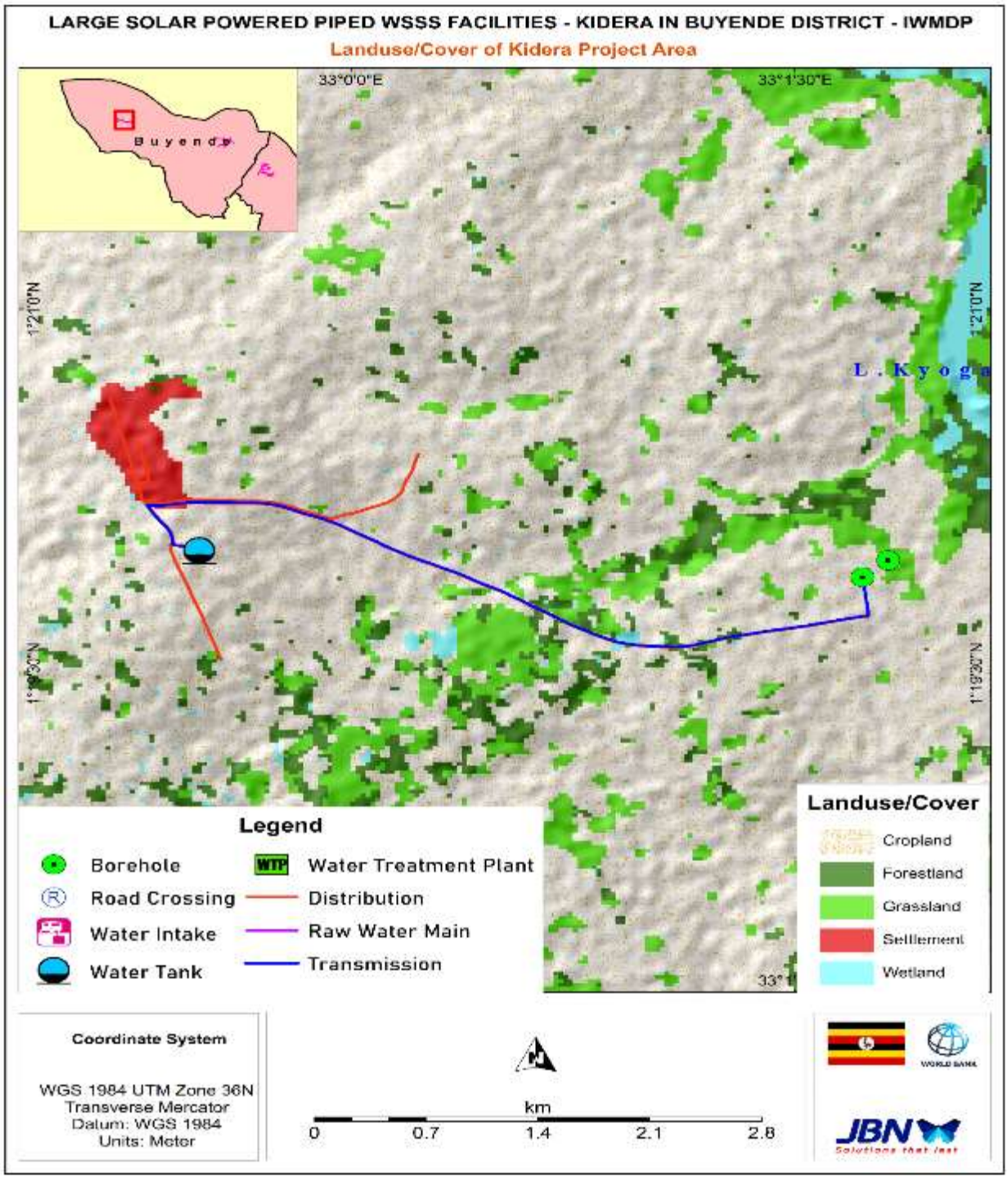


Figure 6-18: Land cover/ landuse in Kidera RGC

Crop land is mainly characterized by open fallows, and agriculture, about ninety (90%) is cultivated land with some remnant trees, with few species of forbs.

Forestland interchanges with grassland and consists of pockets of eucaryptus and pine plantations as the environment in the RGC has been modified.

Wetland land cover types are characterised by pockets of secondary regenerating natural vegations in pockets of the RGC, especially along the lakeshores and within wtelands that form the flood plains of L. Kyoga. Wetland form the extension of lake Kyoga shoreline vegetation with species of sedges and *Ficus stuhlmannii* which is already depleted due to scarcity of wood in the area.

Settlements: A significant proportion of the project foot print lies within areas that have undergone through several vegetation transform and currently the project area is considered as secondary with degraded habitats due to several types of infrastructures, with the larged settlement located in Kidera TC.

FLORA

VEGETATION COMPOSITION

The vegetation of a place is described from the species available and is influenced by the prevailing environmental conditions. Vegetation can be influenced by landform, soils, climate, and anthropogenic factors such as fire, logging, mining, and settlement. The vegetation recorded from the project area, has been plethora modified. The vegetation of the proposed site can be classified as secondary.

From all the surveyed sites, a total of seventy-five (75) individual species were recorded all the surveyed sites, from twenty-seven (27) families (Table 6-6). Herbs or grasses recorded the highest individuals with thirty-nine (39) contributing 52%, followed by trees/shrubs with thirty-two (32) representing 53%, and lastly liana with only four (4) species contributing only 5% of the species composition. All the study sites were not rich in terms of plant species diversity. Only 3 trees recorded along the transmission line are on the IUCN red list for conservation. Two trees of Milicia excelsa (Mvule) species were seen along the transmission to Kidera HCIV while one tree of Tamarindus indica (Fabaceae) species was located along the transmission just before Kapalasa St. Kizito Primary school.

Table 6-6: Individual plant species recorded per family

S/N	Family	No. of Species		S/N	Family	No. of Species
1	Asteraceae	11		15	Acanthaceae	1
2	Fabaceae	11		16	Asclepiadaceae	1
3	Moraceae	8		17	Caricaceae	1
4	Combretaceae	6		18	Cucurbitaceae	1

5	Lamiaceae	6	19	Lauraceae	1
6	Poaceae	6	20	Meliaceae	1
7	Amaranthaceae	3	21	Palmae	1
8	Anacardiaceae	3	22	Polygalaceae	1
9	Malvaceae	3	23	Rubiaceae	1
10	Rhamnaceae	3	24	Sapotaceae	1
11	Verbenaceae	3	25	Simaroubaceae	1
12	Bignoniaceae	2	26	Solanaceae	1
13	Capparidaceae	2	27	Typhaaceae	1
14	Euphorbiaceae	2			

The **Table** 6-6 reveals plant families with the highest to the smallest number of individual species are:

i) Asteraceae and Fabaceae registered the highest, each with eleven (11) species dominated by Bidens pilosa (69%) of the total percentage ground cover, followed by Ageratum conyzoides with (10%), Asteraceae and Indigofera hirsute with 16%, etc,
ii) Moraceae with 8,
iii) Combrataceae, Lamiaceae and Poaceae each, with six (6) species, and
iv) Amaranthacea, Anacardiaceae, Malvaceae, Rhamnaceae, and Verbenaceae each with only three (3) All the recorded plant species are a result of land degradation and it was very dry at time this was conducted.

Table 6-7: Shannon-Wiener and Alpha diversity values for plants from Kidera RGC

Index	Pipeline -tank	Reservoir Tank	Nakibengo Borehole
Shannon H' Log Base 10.	1.398	1.374	1.681
Shannon Hmax Log Base 10.	1.398	1.38	1.681
Alpha	275385.875	295.587	528740.875

The diversity of an area is considered the number of different species. From the field surveys conducted from the Nakibengo at the project boreholes, along the transmission line, at the proposed site for the reservoir, field office and the distribution lines (Figure 6-19), Kidera water project footprint, diversity was considered to be very low according to the log series.

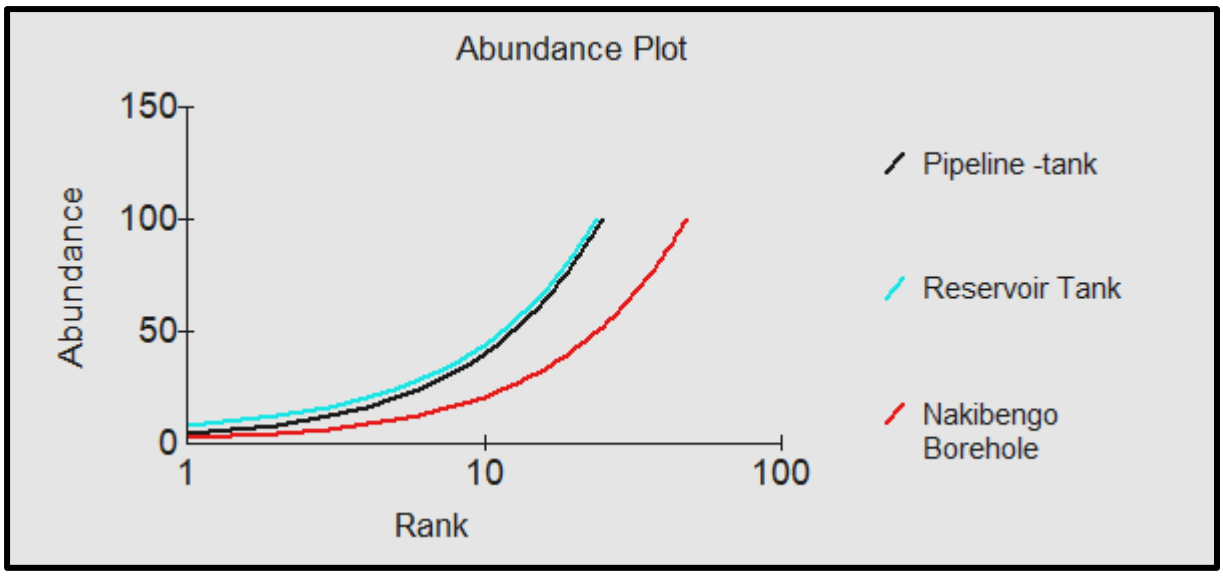


Figure 6-19: Rarefaction curve

Plant species abundance is simply the number of individuals of each species in a given location. Plant trait-species abundance relationships can be related to a range of single and multivariate environmental properties such as air humidity, soil moisture content, soil temperature, soil pH, soil organic matter, nitrogen (N), and phosphorus (P) contents. Kidera RGC registered a low number of species diversity and abundance. This is because the borehole sites had been highly degraded (Figure 6-20).

Figure 6-20: Poor palnt diversity at the borehole sites

CONSERVATION STATUS OF SPECIES

Out of the seventy-five (75) plant species encountered in Kidera RGC, only **TWO** species have been listed under IUCN Red List of Uganda as of 2018. Therefore, the species raises a great conservation concern in the country and in the region. (i) Milicia excelsa (Mvule) in Moraceae, globally listed as Near threatened and nationally as (EN A2acd,). About three large trees were recorded along the transmission to Kidera HC IV, (ii) Tamarindus indica (Fabaceae), globally as NE, and nationally as (VU A2acd), only one tree along the transmission to Kidera, before Kapalasa ST. Kizito Primary School. All the observed IUCN threatened species ranged between 10-25 meters from the road, therefore a linear project like the small water pipeline may not any major impact on trees of conservation concern.

INVASIVE ALIEN PLANTS

The term invasive has been defined differently. Cronk and Fuller (1995) refer to natural area weeds as invasive plants and the non-native plants as aliens. Mosango et al (1999) refer to weeds as invasive and any plant growing where it is not wanted and interfering with human activity to be a weed. Aliens (exotics) are non-endemic plants spreading naturally without the direct assistance of man in natural or semi natural habitat, to produce a significant change in terms of composition, structure or ecosystem processes.

Invasive species may be used to mean an alien species which becomes established in natural or semi-natural ecosystems or habitats, is an agent of change, and threatens native biological diversity (IUCN, 1999). Invasive alien species are species introduced deliberately or unintentionally outside their natural habitats where they have the ability to establish themselves, invade, out-compete natives and take over the new environments (CBD News, 2001). According to the above descriptions and IUCN, CBD, CABI compendium, and FOA, many of the recorded plant species have been categorized as invasive in some countries across all continents, but here in Uganda, those species have not caused a major impact to the plant biodiversity and some of them are very useful to the communities where they occur, therefore only twelve species were selected and have records of impacts to the habitats of Uganda. These include; - *Amaranthus spinosus, Bidens pilosa, Chromolaena odorata, Conyza sumatrensis*, all in Asteraceae), *Commelina benghalensis (Commelinaceae), Hyptis sualoense, Leonotis neptifolia (Lamiaceae), Sida acuta (Malvaceae), Melia azedarach (Meliaceae), Imperata cylindrical, (Poaceae), Lantana camara, Stachytarpheta indica, (Verbenaceae).*

INSECTS

BUTTERFLIES

Only three species of butterflies were recorded during the survey. The three include African Queen *Danaus chrysippus*, African Leopard Fritillary *Phalanta eurytis* and African Migrant *Catopsilia florella*. All the three species are categorized as migrants. The species were recorded at the Borehole Water Source site and along the distribution and supply pipeline areas. No species were recorded at the reservoir tank project site. All the butterfly species recorded during the survey are categorized as Least Concern (LC) by IUCN 2020 Red List of Threatened Species and the National Red List for Uganda published by Wildlife Conservation Society.

DRAGONFLIES

No dragonflies species were recorded during the baseline survey.

HERPETOFAUNA

AMPHIBIANS

Nine species of amphibians were recorded during the survey **(Table** 6-8**).** Two were toads and seven were frogs. The species were recorded around the Borehole water source site and along the distribution and supply pipeline areas. No species was recorded at the water reservoir tank project site. Most of the species were recorded around the Borehole Water Source due to the presence of permanent wetland located about 50m from the borehole site. Only one species was recorded along the distribution and supply pipeline areas. Eastern Groove-crowned Bullfrog *Hoplobatrachus occipitalis* is usually found near or in water (Rödel 2000). It is found practically in all freshwater habitats. The species tend to migrate during the dry season to the edges of rivers and in the wet season to surroundings of ponds (Spieler 1997). The abundance of the Eastern Groove-crowned Bullfrog *Hoplobatrachus occipitalis* at the nearby permanent wetland could be attributed to the migrations related to the dry season. Species of genus *Ptychadena* are adaptive species that can adapt easily to modified environment. Physiologically, the skin of genus *Sclerophyrs* is more adapted for dry weather than frogs.

No species of conservation significance was registered during the survey. All the species encountered are categorized as least concern by the 2020 IUCN Red List of threatened species. The IUCN regards the species as widespread and common over much of their range (Rödel. 2000). The Mascarene Rocket Frog *Ptychadena mascareniensis* and the Four-lined Spiny Reed Frog Afrixalus quadrivittatus are categorized as data deficient (DD) by the National Red List for Uganda (WCS 2016).

Table 6-8: Amphibian species recorded around Kidera Water Project Sites

Family	Species Scientific and Common Names	Red List Status	BH	RT	D&SL
Bufonidae	Sclerophrys gutturalis Guttural Toad	LC	R	0	0
Bufonidae	Sclerophrys steindachneri Steindachner's Toad	LC	1	0	0
Dicroglossidae	*Hoplobatrachus occipitalis* Eastern Groove-crowned Bullfrog	LC	10	0	0
Hyperoliidae	*Afrixalus quadrivittatus* Four-lined Spiny Reed Frog	LC (DD)	5	0	0
Hyperoliidae	Hyperolius kivuensis Kivu Reed Frog	LC	6	0	0
Hyperoliidae	Hyperolius viridiflavus Common Reed Frog	LC	3	0	0
Phrynobatrachidae	Phrynobatrachus natalensis Natal Puddle Frog	LC	2	0	0
Ptychadenidae	*Ptychadena anchietae* Anchieta's Rocket Frog	LC	0	0	2
Ptychadenidae	Ptychadena mascareniensis Mascarene Rocket Frog	LC (U-DD)	3	0	0

REPTILES

Two lizards, one crocodile, one snake and one skink were recorded during the survey of the Kidera water system project areas **(Table** 6-9**)**. The presence of three species was reported by residents and only two species were encountered during the survey. Presence of green snakes in the project area was also reported by residents. Four species were recorded at the Borehole water source, one at the water Reservoir Tank and two along the distribution and Supply pipeline areas. The *Agama agama* Red-Headed Rock Agama and *Trachylepis striata* Striped Skink were the common reptiles in the project area. This may be attributed to the fact that most lizards have well-developed limbs; the head is normally held high off the ground, and they are agile predators (Harold 1992). This increases their colonization success (Savage 1992). Many species belonging to family Scincidae (skinks) are generalists with a wide ecological tolerance (Gerlach, 2005).

None of the reptiles encountered and those reported by the community members are Red Listed. All the species are listed as least concern by IUCN 2020 Red List of threatened species. The Nile Monitor *Varanus niloticus* and Nile Crocodile *Crocodylus niloticus* are listed under

the Endangered Species Decree in 1975. The Species are listed under CITES Appendix II (Branch 1998) and international trade of the species is prohibited.

Table 6-9: Reptile species encountered in and around Kidera Water Project sites

Family	Species Scientific and Common Names	Red List Status	BH	RT	D&SL
Agamidae	*Agama agama* Red-Headed Rock Agama	LC	1	2	3
Elapidae	Naja melanoleuca Forest Cobra	LC	R	0	0
Scincidae	Trachylepis striata Striped Skink	LC	0	0	3
Varanidae	Varanus niloticus Nile Monitor	LC	R	0	0
Crocodylidae	Crocodylus niloticus Nile Crocodile	LC	R	0	0
Total number of species			4	1	2

AVIFAUNA

Nineteen species were observed and recorded during the survey of Kidera Water System Project areas (**Table** 6-10). The species represent fourteen (14) families and Eighteen (18) genera. As already mentioned, the project area in Kidera is highly modified making it an open habitat, almost devoid of trees. This explains the few bird fauna in the project area. Eleven species were recorded at the Borehole Water Source project site, ten species were recorded at the reservoir Tank project site and twelve species were recorded along the distribution and supply pipelines project areas.

On ecological characterization (**Table** 6-10), seven species are forest visitors, two species are water generalists, nine species are characteristic of open grasslands and One species (Black Kite *Milvus migrans)* is an Afrotropical migrant but also palearctic. The tropical populations of the Black Kite *Milvus migrans* are resident and is widely distributed in Uganda. The IUCN 2020 Red List of Threatened species categorizes all species as Least Concern (LC).

Table 6-10: List of Birds recorded in Kidera Water Project sites

Family	Species Scientific and Common Names	Red List Status	BH	RT	D&TL
ACCIPITRIDAE	75 - *Milvus migrans* Black Kite – pA (widespread)	LC - PM[4]	1[5]	6	1
APODIDAE	358 - *Cypsiurus parvus* African Palm Swift - G	LC	0	7	0

[4] Palearctic Migrant

[5] (many can't permit chicken rearing)

Family	Species Scientific and Common Names	Red List Status	BH	RT	D&TL
ARDEIDAE	17 - *Bubulcus ibis* Cattle Egret - G	LC	18	0	3
ARDEIDAE	26 - *Ardea melanocephala* Black-Headed Heron - w	LC	2	0	0
COLLIIDAE	369 - *Colius striatus* Speckled Mousebird - O	LC	0	0	3
COLUMBIDAE	284 - *Streptopelia decipiens* African Mourning Dove - O	LC	0	1	0
COLUMBIDAE	289 - Streptopelia senegalensis Laughing Dove - f	LC	2	0	2
CORVIDAE	858 - Ptilostomus afer Piapiac - G	LC	0	2	1
ESTRILIDIDAE	963 - *Lagonosticta rubricata* African Firefinch - O	LC	0	0	1
ESTRILIDIDAE	981 - *Spermestes bicolor* Black-and-White Mannikin - f	LC	5	10	0
HIRUNDINIDAE	507 - *Ptyonoprogne fuligula* Rock Martin – O	LC	0	2	1
HIRUNDINIDAE	509 - *Hirundo smithii* Wire-Tailed Swallow – w	LC	0	1	0
MALACONOTIDAE	843 - *Laniarius erythrogaster* Black-Headed Gonolek - f	LC	2	4	0
NECTARINIIDAE	790 - *Nectarinia kilimensis* Bronze Sunbird - f	LC	1	0	1
NECTARINIIDAE	802 - Cinnyris mariquensis Marico Sunbird - f	LC	1	0	0
PLOCEIDAE	908 - *Ploceus cucullatus* Black-Headed Weaver - O	LC	1	0	1
PYCNONOTIDAE	732 - *Pycnonotus barbatus* Common Bulbul - f	LC	5	2	8
STURNIDAE	872 - *Lamprotornis purpuroptera* Ruppell's Starling - O	LC	2	2	4
TURDIDAE	612 - *Turdus pelios* African Thrush - f	LC	0	0	1
Total number of species			11	10	12

Table 6-11: Ecological Characterization of birds encountered in and around Kidera Water project sites

Ecological description	Numbers	Descriptions
Forest visitors (f)	7	Non-forest birds
Water generalist (w)	2	Often found near water
Open habitat (O) and Grassland specialist (G)	9	Characteristic of open grasslands
Afrotropical palearctic (pA)	1	Species migrating within Africa but also palearctic

MAMMALS

Two species of mammals were reported by the residents as being common in the project area. They include Black Rat *Rattus rattus* and the Marsh mongoose *Atilax paludinosus*. The two represent the families Muridae (mice, rats, voles, gerbils, hamsters, etc.) and Herpestidae (Mongooses). The residents reported that the Black Rat *Rattus rattus* is common in people's homes and also in some bush surrounding people's homes. The marsh mongoose is a common animal that eats people's chicken in the villages.

The Black Rat *Rattus rattus* also occurs in the wild habitats, it is a pest and dangerous disease vector. It carries a flea which is the principal carrier of plague bacillus which killed 60,000 people in Uganda in the 1917 and 1942 (Kingdon J. 2015). The Water Mongoose has a wide distribution range within Uganda and the African region. It occurs in many protected areas, and is generally common in suitable habitat. It is relatively tolerant of modified or disturbed habitats, and there is no reason to believe that it is declining. Threats include developments that may affect water supply and quality. Climate change could also threaten it as water sources and systems are affected. The species are listed as Least Concern by the IUCN 2020 Red List of threatened species. The project area is in a highly modified environment. Keeping vegetation and wetlands in the vicinity of borehole water source, Reservoir water tank and along the distribution and supply pipeline areas will go a long way in conserving the recorded mammal species.

6.3 HEALTH AND SAFETY BASELINE

SECURITY ISSUES AROUND THE PROJECT AREA

The police station responsible for keeping law and order in the project area is Kidera Police Station. The most common registered cases are assaults, defilement, and theft. According to the statistics collected from Kidera Police Station, 31 assaults, 16 thefts, 26 domestic violence, 9 threatening violence, 1 simple robbery, 2 murders, 8 criminal trespass, 4 child abuse, 4 defilement, 2 abductions and 3 road traffic accidents were recorded between November 2021 to April 2022. The police station has one motorcycle (dysfunctional), and they use personal phones for communication. They have enough police officers since 4 other outposts are under their control.

FIRE EMERGENCY READINESS

Kidera Police Station does not have a fire station, fire engine, water tanker, and above all they do not have officers trained in firefighting and do not offer fire safety training. This implies that Kidera Police Station also depends on the Kamuli fire station to respond to any fire incidents. Between November 2021 to April 2022, no fire call was recorded in Kidera Subcounty.

TRAFFIC SAFETY SITUATION

The most common accidents in Kidera are; car to motorcycle accidents, car to car accidents. There are about 3 accidents recorded for a period between November 2021 to April 2022. The nature of the roads in Kidera RGC are marram roads and the traffic volume is about 500 motorcycles per day and 20 vehicles per day (estimate as per the OC Kidera Police Station). The main road users are pedestrians including school children, bicycles, motorcycles, and small cars.

STATE OF THE HEALTH FACILITIES AROUND THE PROJECT AREA

The health facility that serves Kidera RGC is Kidera Health Center IV and serves a population of about 49,709 people. This health facility faces a challenge of water because its boreholes dry out during the dry season. The main recorded illnesses are malaria and RTIs. This health facility doesn't have an emergency unit, but it has allocated a section in the general ward to emergency cases. About 5 beds have been reserved for emergencies. The health facility has only one ambulance and provides the following services to the population; VCT, HIV/AIDS testing and treatment, reproductive health education, antenatal and maternity services, blood transfusion, first aid training, and blood group test. This facility has a theatre that is not yet fully equipped and has 41 staff.

6.4 SOCIO-ECONOMIC BASELINE

This chapter examines into the socio-economic characteristics in the Kidera RGC project area such as, livelihood sources, employment, health and safety, vulnerable groups, and related gender issues. Additionally, the aim is to bring out the character of the economy where the water supply and sanitation infrastructure system traverses with a view of locating possible cultural and socio-economic impacts on local communities in Buyende district -Kidera RGC in the villages of Kitete, Kyauka, Ngulamubiri, Kiwambya, Kitaidhuba and Nakibengo among other areas and thus understanding the context of their mitigation and enhancement measures during project implementation and operation phases. The primary data collected during the socio-economic survey has been used to evaluate the baseline status of the project corridor area and attendant communities.

PROJECT AREA

The proposed project in Kidera will serve four villages; namely; Kitete B, Nakibengo A, Nakibengo B and Kiwambya all located in Kidera Parish, Kidera Town Coulcil as indicated in **Figure** 6-21 below.

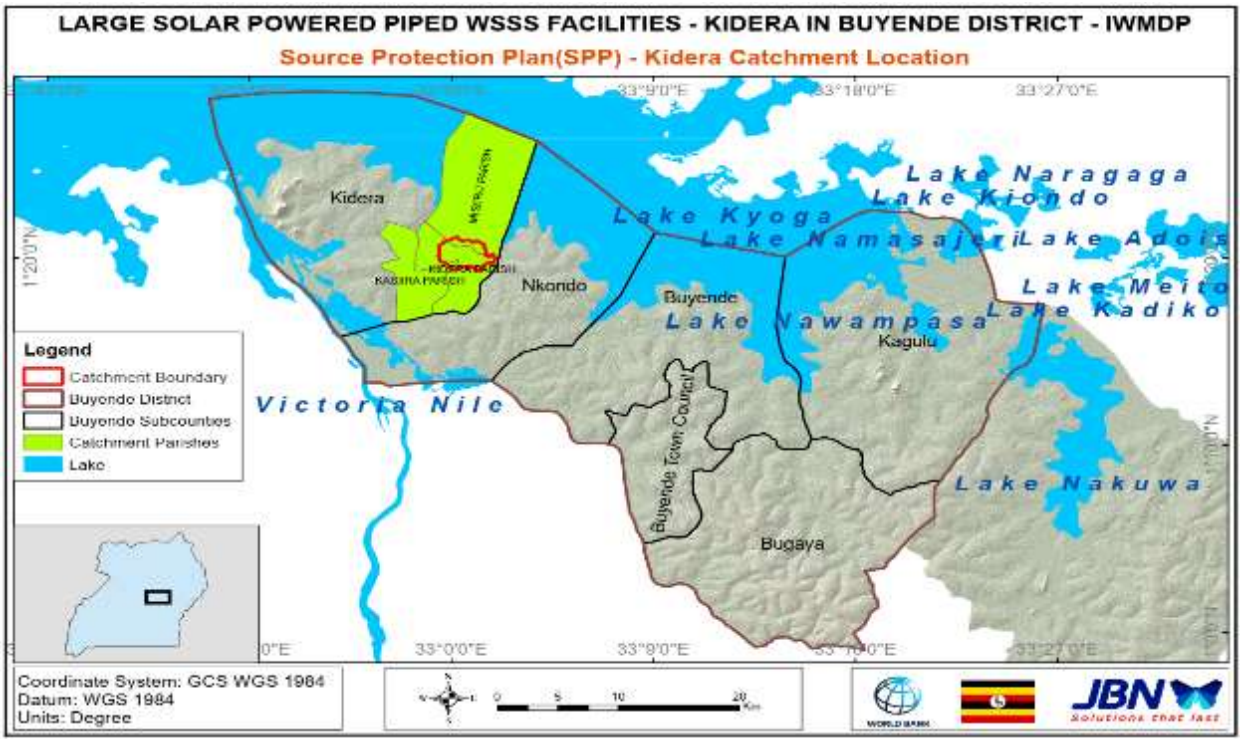


Figure 6-21: Villages to be covered by phase 1 of the Kitenga RGC WSSSP

POPULATION

The Buyende district population was estimated at 410,599 people with 208,995 females (50.9%) and 201,604 males (49.1%) grouped in 67,838 households with the household size at 5.7 and population density of 224.7 people per Km^2 (UBOS, 2020). Of the total district population, 65,777 live in Kidera Town Council, 32,561 of whom are males and 33,216 females (UBOS, 2020). The Sub County has a population density of 171.7 persons per Km^2 (UBOS,

2020). The population growth rate of Buyende is high at 4.4% percent compared to 3.5% in 2002 and the national average of 3.03%.

Accrding to UBOS 2021 popultion projections, the population of the four first phase target villages is 2,999 aggregated in 577 households as shown in **Figure** 6-22 below.

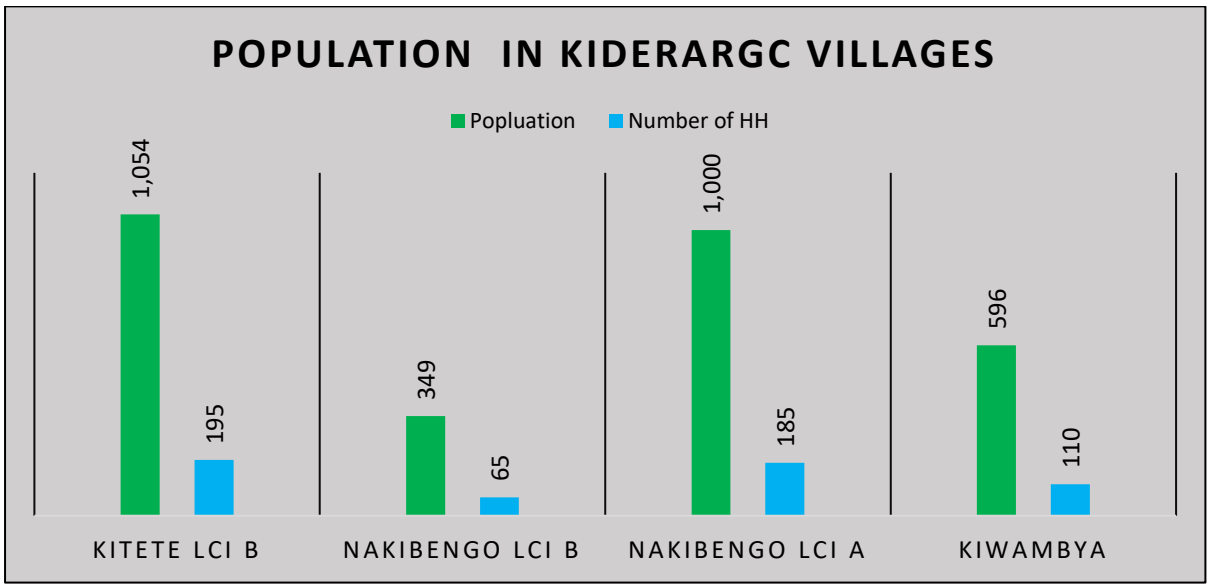


Figure 6-22: Population of Kidera RGC beneficiary villages

(Source: UBOS,2021)

Implications: According to the design report (water demand assessment) for Kidera RGC, its notable that two boreholes will meet the maximum day demand (325.26 m^3/day) for a projected population of 2,999 people in the ultimate year (2041).

A field socio-economic survey was conducted on sample size of 164 respondent out of the total population of 2,999 people and 577 households within 4 first phase target villages Kidera RGC. The sample was determined using Morgan and Krejcie (1970) Sample Size Determination included in **Annex C**. The results of the household survey are included in the sub sections that follow.

GENDER OF RESPONDENTS/ HOUSEHOLD HEADS

According to the UBOS, 2020 Statistical projections Kidera Town Council has a population of 65,777 of whom 32,561 are males and 33,216 are females (UBOS, 2020).

Results from the field survey (**Table** 6-12) conducted on 164 households indicate that 84.1% of the household heads were male while 15.9% were female. This is consistent with the patrilineal environment of most Ugandan households where men a considered to be the household heads and inheritance of property exclude women, in many cases as women who become heads of household following widowhood, divorce/separation, married or still single which is evinced by (2.4%), (6.1%), (4.3%) and (3%) in comparison to the men (1.8%), (0.6%), (73.8%) and (7.9%) respectively as shown in **Table** 6-13 below.

Table 6-12: Type of household head

Type of household head	Frequency	Percent (%)
Female headed	26	15.9
Male headed	138	84.1
Total	164	100

Source: Field survey

Table 6-13: Distribution of gender and marital status of household heads

Gender		Single	Married	Divorced/Separated	Widowed	Total
Female headed	Count	5	7	10	4	26
	%	3	4.3	6.1	2.4	15.9
Male headed	Count	13	121	1	3	138
	%	7.9	73.8	0.6	1.8	84.1
Total	Count	18	128	11	7	164
	%	11	78	6.7	4.3	100

Source: Field survey

Gender equity is critical for good governance as it ensures the effective participation of women and men in the democratization process, leadership, decision-making and law enforcement[6]. As such, there should not be any discrimination or unfair labour or employment practices against any gender, especially as is common in most construction sites to discriminate against women. Similarly, design and implementation of this water project should involve women, since at a local level in many societies, women play a central role in providing water supply and sanitation. They have primary responsibility for the management of household water supply, sanitation and health (UN Water, 2006) as should therefore be involved from the onset.

AGE-GROUP OF HOUSEHOLD MEMBERS

When asked about the age-group of people who live within the household, the field results connote a combined demographic structure with a large dependency population (56.4%) in the 0–19-year age group in comparison to the productive (adult) age bracket (43.7%) as shown in **Figure** 6-23 below. Such a demographic structure is amenable to poverty since considerable

[6] https://www.ubos.org/wp-content/uploads/publications/06_2018women_and__men_in_uganda_FF2016.pdf

household incomes are spent on non-working young dependents and constraints household resources. However, this is also an indication that there are a strong and young people who could provide local labor on the project that will affect them in the future because they are residents of these areas.

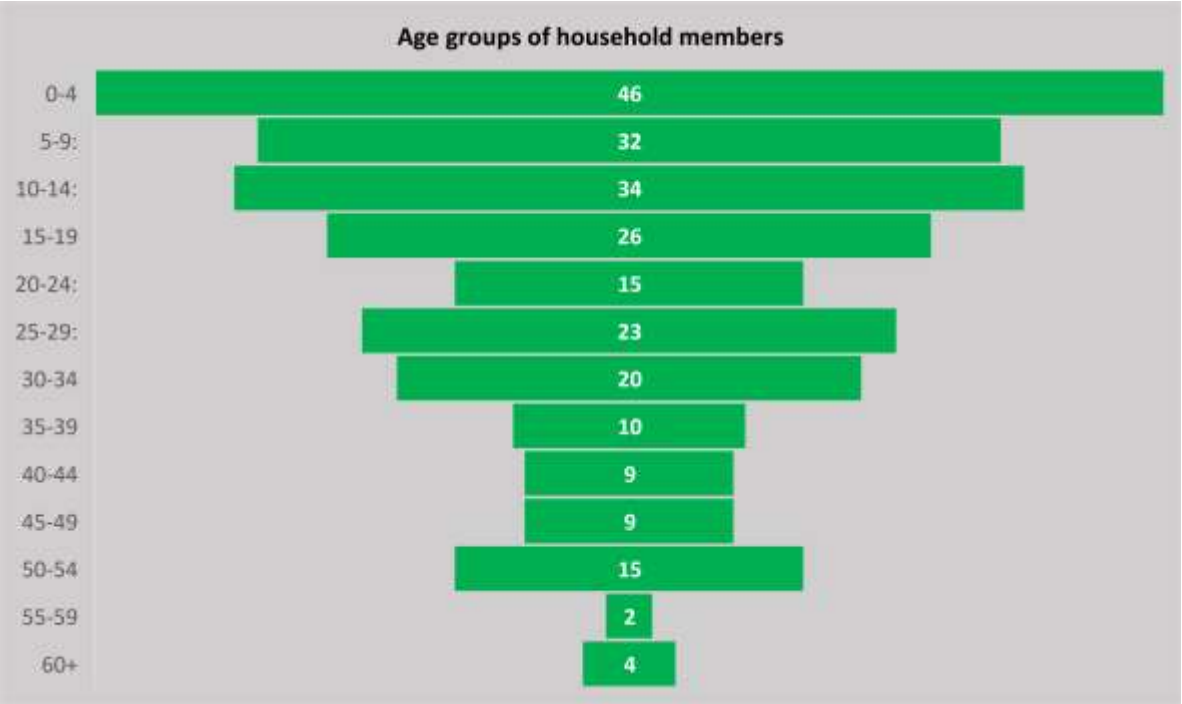


Figure 6-23: Age group of household members

Source: Field survey

VULNERABILITIES WITHIN THE HOUSEHOLD

Eleven percent of households that participated in the household survey live with members who have a vulnerability. This is lower than the national average of 12.5% (2014 National census). The most common form of disability reported was physical (4.3%). Other forms of disabilities noted in the community were blindness or sight impairment (0.6%), mental illness (including epilepsy) (0.6%), hearing impairment and speech impairment (0.6%). The elderly persons are also vulnerable (4.9%) because of their reduced ability to do manual work. Aspects of vulnerability shall be considered during the resettlement action planning process and also during the construction period. It is imperative that the construction project accrue benefits to all people including but not limited to availing gainful employment opportunities to the less affluent in society.

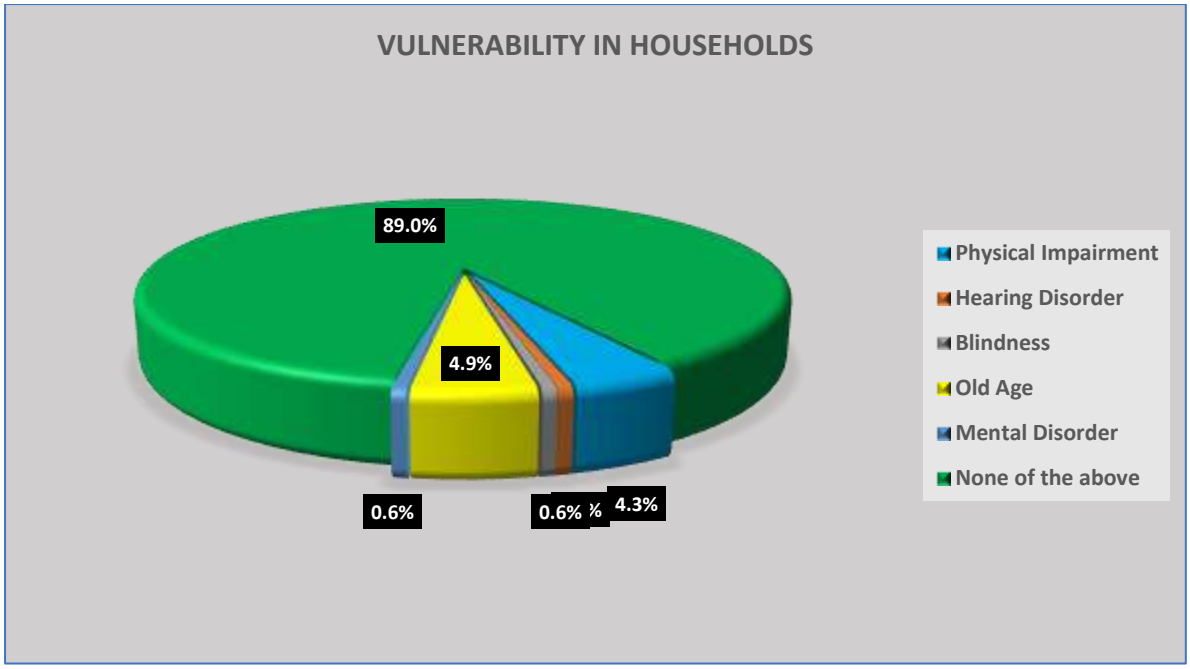


Figure 6-24: Vulnerability within household

Source: Field survey

ETHNICITY AND RELIGION

Ethnic composition in the project area was heterogeneous. The respondents living in the project beneficiary communities were dominantly Basoga (79.9%), followed by the Itesot (9.8%) and Banyole (8.5%). Other tribes recorded in the project area during the survey included; Basamia, Bagisu (0.6%) and Bagwere (0.6%) as shown in the **Figure** 6-25 below. Despite coming from different cultural backgrounds, it was observed that the communities were living harmoniously and had a sense of community life, sense of good human relations and good rapport.

The household survey conducted within Kidera RGC revealed that the population were predominantly of the Christian faith (79.3%). Several religions were recorded during household survey. Protestantism (37.9%) is the most commonly practiced religious faith followed by Catholicism (23.2%), Pentecostals at 14.6% Muslims at 20.7% and seventh-day Adventists represented 3.7%. (**Figure** 6-25) The fact that almost all of households reported that they have a religion implies that religious affiliation (belief in God) is a value in this community.

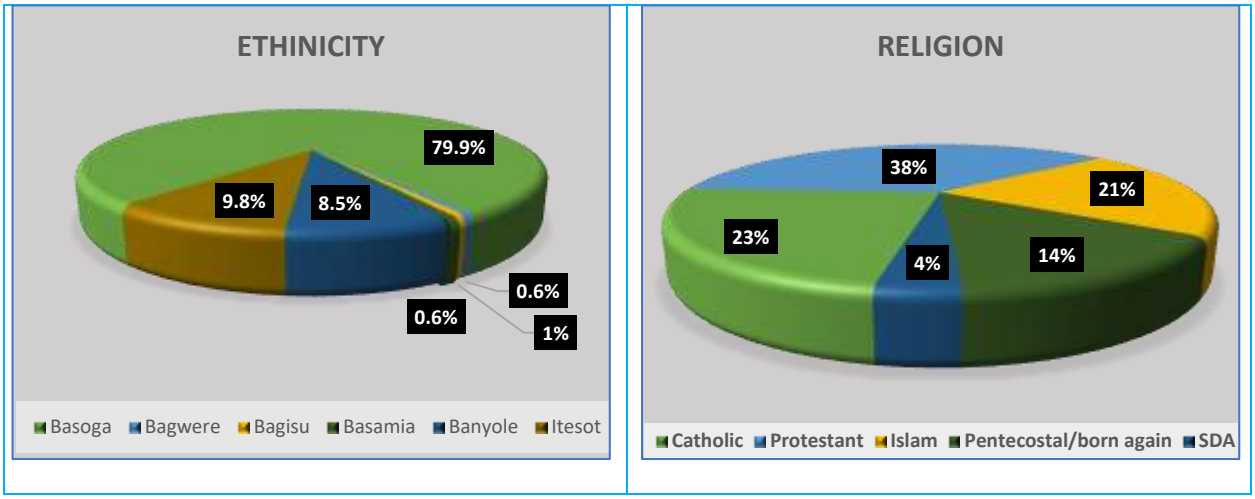


Figure 6-25: Ethnicity and Religious affiliation of households

Source: Field survey

SETTLEMENT AND HOUSING

SETTLEMENT

The major human settlement patterns in Kidera Town Council are, namely;

i) Compact or Nucleated settlements commonly observed in Kidera town, characterized by congested dwellings constructed very close to each other,
ii) Dispersed or dotted settlements with dwelling located far apart and often within a village landscape, as observed in Kabugudho A village, a beneficiary village for water supply (**Figure** 6-26), and
iii) Linear settlements along roads as observed in Nakibengo Trading centre, within Nakibengo village the location for the proposed water abstraction source (**Figure** 6-27**)**.

Figure 6-26: Settlement pattern in Kabugudho A village

Figure 6-27: Settlement pattern in Kidera Town

There is increasing rural-urban migration evidenced through rapid expansion of villages into urban agglomerations formations. A Historical Trend analysis of urbanization in for the last 50 years indicates a changing urban morphology[7] of Kidera RGC / Town Council (**Figure** 6-28). The area has over the years transformed from small human settlement (hamlet), into village and its now a growing town council gazetted under national law. There several satellite entities such as Nakibengo, Itimia, Kabugudho among others. There are observable characteristics of an expanding slum.

7 Urban morphology refers to the process of their formation and transformation of human settlement

Google Image of Nakibengo trading centre by 2014

Google image of emerging urban dwellings in Nakibengo T/C by 2022

Clustered dwellings in Nakibengo village

Nakibengo Trading Centre, located near the water source

Figure 6-28: Change in settlement patterns in Nakibengo trading centre over the years

OWNERSHIP OF PHYSICAL ASSETS

Ownership and control of physical and financial assets are essential to an individual's well-being. Assets generate and help diversify income; provide collateral to gain access to credit; alleviate liquidity constraints in the face of shocks; and provide status in society (Deere and Doss, 2006)[8] hence the importance of establishing asset ownership at household level. In economic terms, household assets are considered drivers of sustainable growth that lead to better economic, social, political, psychological, and intergenerational outcomes (Siegel 2005). As such, the ESIA study sought to establish the physical assets to assess the economic wellbeing of these households. From the field survey, respondents owned a variation of physical assets which included houses (23.9%), mobile phone (25.4%), domestic animals (14.5%), radios (14.3%) and bicycles (11.3%) among others **(**Figure 6-29**)**.

Assets promote the economic well-being of households by generating income, creating additional stocks of assets (e.g., animal husbandry), smoothing consumption during periods of uncertainty and hardship, and building resilience in the face of external shocks. Beyond such economic benefits, they provide personal and social benefits, including improvements in education, health, future orientation, and political participation[9].

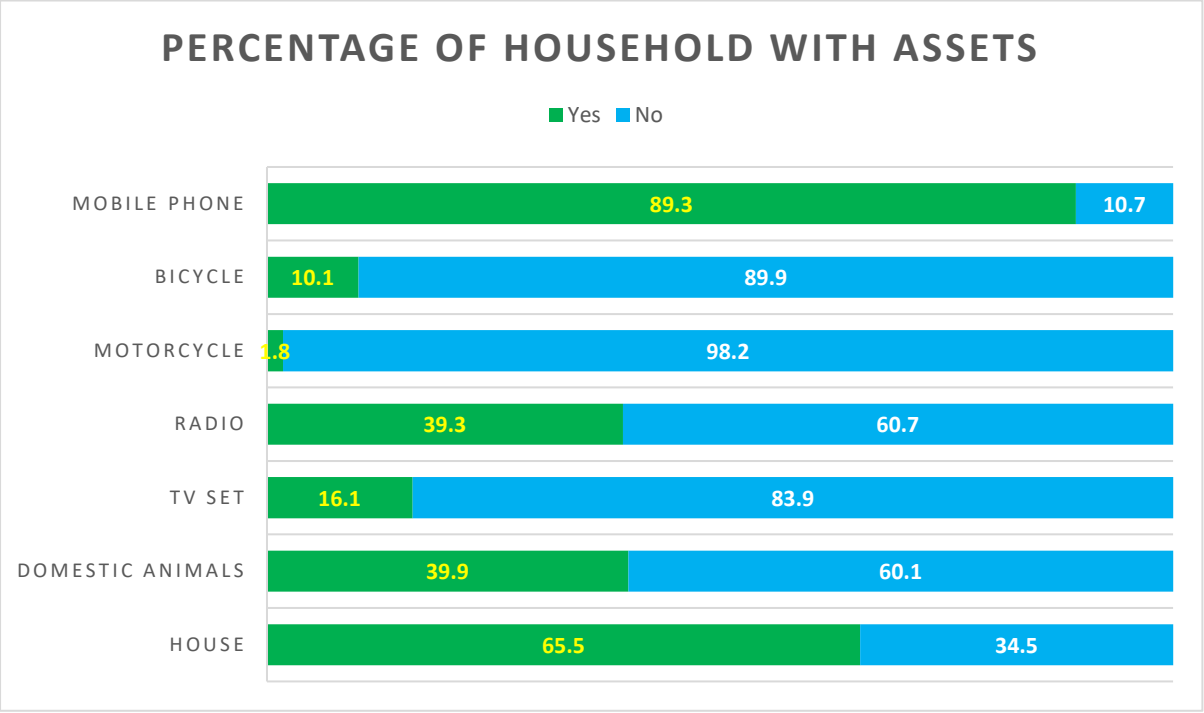


Figure 6-29: Ownership of physical assets

*Multiple response; Source: Field survey

[8] Deere, C. D., and Doss, C. R. (2006). "The gender asset gap: what do we know and why does it matter?" Feminist Economics, 12.1-2, pp. 1–50

[9] https://www.cgap.org/sites/default/files/publications/2020_02_WorkingPaper_Assets_Matter.pdf

Further analysis by gender indicates that men own more assets as compared to women. Discussions with the communities indicated that there is gender disperaty as result of socio-cultural set up where men are more engaged in paid work while women are more engaged in unpaid work which hinders them to own productive assets. The table 6-15 below shows asset ownership by genders.

Table 6-14: Asset ownership by genders

Assets owned by household	Male	Female	Total
House	90	17	107
Domestic animals	55	10	65
TV set	22	4	26
Radio	54	10	64
Motorcycle	2	0	3
Bicycle	14	3	17
Mobile phone	123	23	146

LAND TENURE AND METHOD OF ACQUISITION

The project will acquire land to locate water related facilities, especially for the borehole, access road to the borehole, reservoirs tank, access road to the reservoir tank, water field office, and sanitation facilities as indicated in **Table** 6-15 below.

Table 6-15: Land requirements on the project

Project Component	**Size Of Available Land (Acres)**	**Land Requirement by Project (M^2)**	**Village**	**Owner (Name, Contact)**	**Land Tenure**
Water Source Site,	2	900	Nakibengo Cell	Government	Lake Buffer Zone
Reservoir Site	0.2224	900	Kiwambya Cell	Kidera Town Council	Customary
Public Toilet Site	0.0247	100	Kyauka Cell	Kyauka Market	Customary

Source: RAP report

Land in Buyende district is predominantly owned under customary tenure. Survey results indicated that the majority (78%) were land owners,16.5% tenant Kibanja owners and licensee (5.5%) – see **Table** 6-16 below. This might present a challenge at the stage of compensation/paying some easement fees, especially for Kibanja owners because there is likelihood of project affected persons claiming ownership of land which is not rightfully theirs. Construction of project facilities such as the pipeline will require easement in some cases while permanent footprint of project facilities might also be required in some cases.

Regarding the method of acquisition, majority of the respondents (50.6%) indicated that they bought it, 34.8% inherited from parents and 14.6% are renting the land.

Table 6-16: Land ownership and acquisition

Land ownership	Frequency		Land acquisition method	Frequency
Landowner	78% (128)		Bought	50.6% (83)
Tenant (Kibanja)	16.5% (27)		Inherited from parents	34.8% (57)
Licensee[renting]	5.5% (9)		Renting (tenant)	14.6% (24)
Total	100% (164)		Total	100% (164)

ECONOMIC ACTIVITIES

SOURCES OF INCOME

According to Buyende DDPIII 2020/2021 - 2024/2025, over 80% of the district population is employed in the agricultural sector, which is dependent on the climatic and soil conditions, which is uncertain due to climate change and unpredictable weather conditions. Climate change has had adverse impacts on agricultural production and food security. The prolonged dry spells have their toll especially on the peasant farmers whose livelihoods over rely on agriculture. This has a significant effect on employment levels particularly in Agriculture sector, where over 70% of Uganda's population is engaged. They entirely depend on rain for their agriculture which of late delays to come. This is consistent with field findings which revealed that 62.2% of the respondent household are engaged mainly in agriculture, followed by trading (15.9%) and 11.6% fishing (**Figure** 6-30).

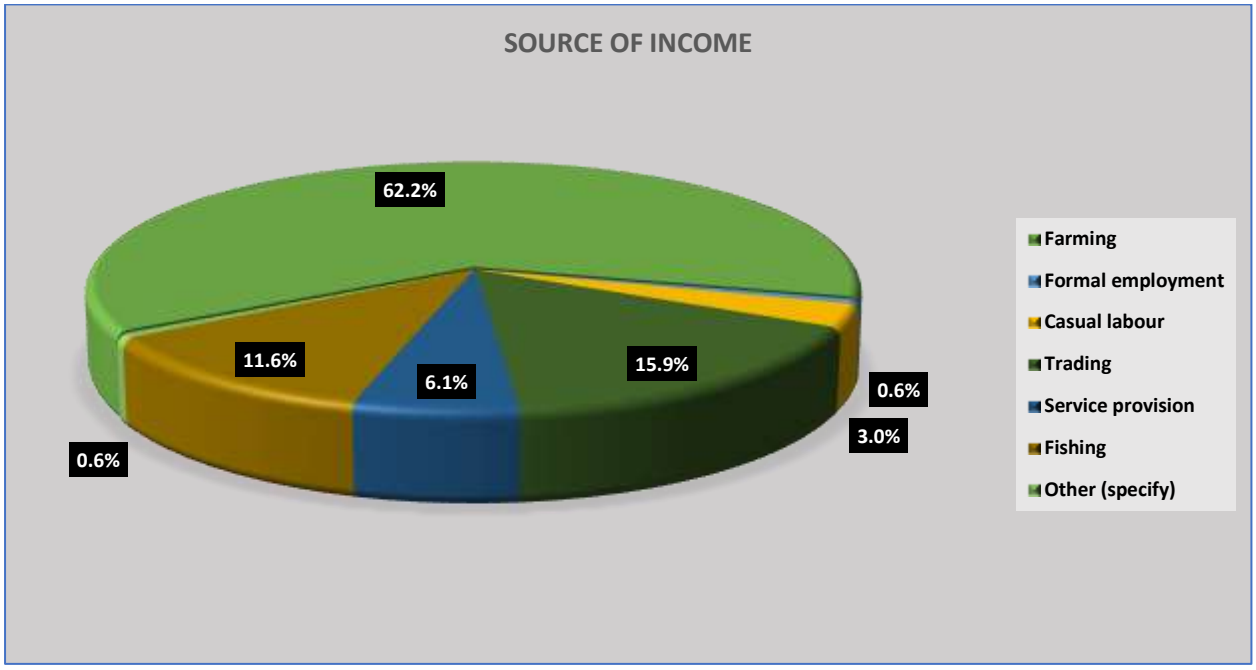


Figure 6-30: Main income sources in the project area

Source: Field survey

TYPICALLY GROWN CROPS AND COMMONLY REARED LIVESTOCK

Commonly grown crops in the proposed project area include maize (27.5%), beans (11.6%), and some grain such as rice (3.2%). Root tubers were also common in the area with Cassava (23.5%) and sweet potato (15%) being among the most grown food commodities in the farmland of the respondents (**Table** 6-17). Sugarcane fields, although common in the project area, were mainly developed on leased land by farmers originating from outside the project area. Regarding livestock rearing, predominantly reared livestock within communities traversed by the proposed water project include, poultry (37.5%), goats (36.6%), cattle (23.2%) and rabbits (1.8%). During the assessment herdsmen were observed grazing the livestock especially the cattle and goats along the road.

Table 6-17: Typically grown crops and animals reared

Crops grown	Percentage (%)		Animals reared	Percentage (%)
Beans	14.2		Goats	35.6
Maize	29.7		Cattle	23.3
Irish potato	0.6		Poultry	34.4
Sweet potato	13		Pigs	6.7
Cassava	26.9			
Sorghum	5.1			
Vegetables	5.4			
Banana crop	0.3			
Rice	4.0			

Source: Field survey

Maize field

Cassava field

Cattle grazing in Nakibengo

Figure 6-31: Crops grown and animals reared in Nakibengo Village, Kidera TC in Buyende District

AVERAGE ANNUAL INCOME OF RESPONDENTS

Data collected from the field indicates that majority of the respondents (43.8%) earn more than 1,403,000, followed by 29% who ern less than 503,000, and 27.2%, between 503,000 - 1,403,000. as shown in **Table** 6-18 below. This generally shows that the income levels are generally low for persons with families to feed, clothe, pay for medical care and take to school. Average yearly household incomes earned among the respondents was way below the national indicator (Ugx. 3,636,000) for the rural population for 2017/18 (UBOS,2018)

Table 6-18: Annual Household Income Levels

Average annual income (Household head)		Frequency	Percent (%)

Less than 503,000 (Low)		47	29
503,000 - 1,403,000 (Medium)		44	27.2
More than 1,403,000 (High)		71	43.8
Total		162	100

*Income ranges adopted from the MWE Water Supply Design Manual 2000

ACCESS TO WATER

SAFE WATER COVERAGE

Globally, Sustainable Development Goal (SDG) 6.1 targets to achieve universal and equitable access to safe and affordable drinking water for all by 2030. Nationally, the Uganda National Development Plan (NDP) III and Vision 2040 target to attain rural access to safe water at 85 percent by 2025 and 100 percent by 2040, respectively (Uganda National Planning Authority (UNPA), 2020). By 2020, the population of Ugandan using safely managed drinking water services the global indicator was 17 percent, and the proportion of the population using an improved water source at 83 percent (UN Water, 2020). According to Uganda Water Atlas, the rate of access to safe water as ratio of people served by a safe water point to the total population in Uganda stands at 66 percent (MWE/ Water Atlas, 2022).

The rate of access to safe water (as ratio of people served by a safe water point to the total population) stands at 38% in the entire Buyende district, with rural access at 37% while urban access at 53% as of year 2021 (MWE/ Water Atlas, 2022). In Kidera Town council (project area), the rate of access to safe water stands at 30%.

There are 83 functional water source points of different technologies in Kidera Town council. Of these, 88% (73 out of 83) are deep boreholes; 5 rain water harvesting tanks (RWHTs), 4 water kiosks (2 PSPs in Kitete at St. Joseph vocational Institute; 2 in Bukungu Town council) and one valley tank. There are 9 non-functioning water sources that include 7 deep boreholes and 2 RWHTs. Further to the above, communities also rely on open sources of water especially ponds, rocks, swamps, wetlands and Lake Kyoga as shown in **Figure** 6-32 below.

Figure 6-32: A young girl fetching water from an open pond near the water source

According to Buyende DDPIII 2020/2021 - 2024/2025 Kidera RGC has 94 boreholes and 4 kiosks from where members of the community are able to access water with about 80% of the water sources functional. Results from the field also indicate that the majority of the community member draw their water from community bore holes (90.9%) which stand at 90% functionality rate. Approximately 1% of the respondents fetches water from Lake Kyoga (**Figure** 6-33).

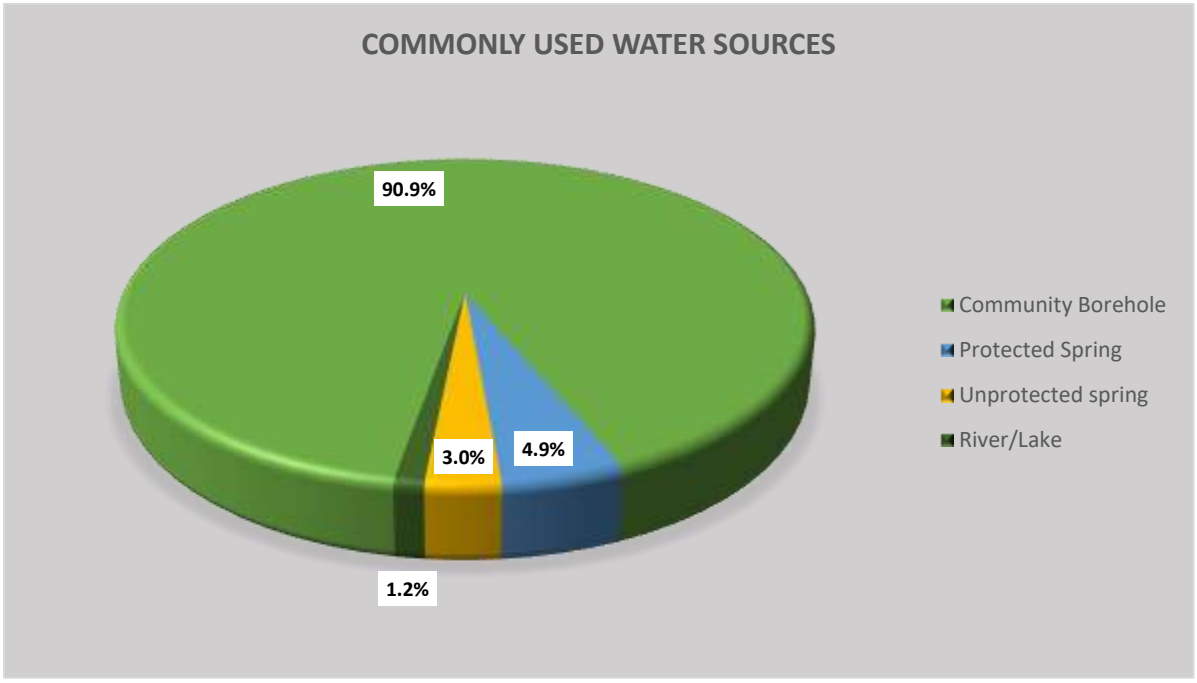


Figure 6-33: Commonly used water sources in Kidera RGC

PREFERRED WATER SOURCE

When asked about their preference of water sources, 56.1% of the respondents indicated that they liked their current water source mainly due to proximity to their residence and while 43.1% didn't like their water sources from where they collected water (**Table** 6-19).

Table 6-19: Preferred water source

Preference of water source	Frequency	Percentage (%)
No	72	43.9
Yes	92	56.1
Total	164	100

DISTANCE AND TRIPS MADE TO A WATER SOURCE

Relating to distance from water source, the majority 37.2% of respondents reported travelling 100-500 meters to access the water source while only (34.8%) travelled 1-1.5km to access the nearest water source in the proposed project area, (21.3%) travel 100m and (6.7%) travelled above 5km (**Figure** 6-34).

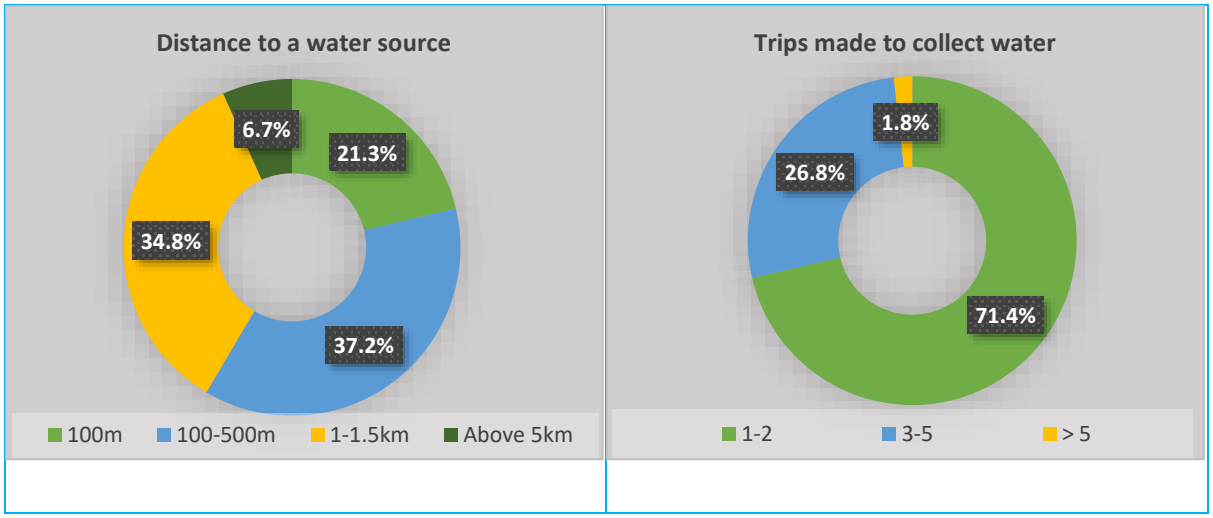


Figure 6-34: Distance and trips made to water source

With regards to the number of trips made to collect water, most respondents (71.3%) indicated making 1-2 trip, 26.8% making 3-5 trips and only 1.8% making more than 5 trips.

TIME TAKEN TO COLLECT WATER

Time spent fetching water reduces the time that can be devoted to generating livelihoods or in remunerated work, whether in the formal or informal economy. Poor households rely heavily on the time its members have for formal and informal work. As a result, time poverty due to the need for fetching water and other domestic chores cause trade-offs putting food security, child nutrition, health, and education at risk (Kes and Swaminathan, 2006). When asked about the time taken, majority of respondents 59.8% indicated spending 1 hour, 20.7% 1-2 hours and 9.8% 3-5 hours and above 5 hours respectively (**Table** 6-20). Survey respondents attributed the longer time taken at boreholes to their slow recharge rates at the end of the

dry season, coupled with long waiting queues which are usually used by a large number of the community.

Table 6-20: Time taken to collect water

Time taken (Hrs)	Percentage
1	59.8
1 - 2	20.7
3 - 5	9.8
Above 5	9.8

Source: Field survey

RESPONSIBILITY OF FETCHING WATER

Data from the field survey indicates that most gender roles and responsibilities place the burden of water fetching on women. This is evinced by 36% of the respondents revealed adult male to be involved in water collection,26.2% adult female,25 boy children and 12.8% girl children. Regarding water usage the vast majority 66.2% mentioned that they used 50 litres and above ,13.9% 10-20 litres and 31-40 litres respectively (**Figure** 6-35).

Figure 6-35: Women, men and children collect water in Kidera RGC

QUANTITY OF WATER FETCHED

Water planning and management requires an understanding of all the parts of the system to ensure the water system work together to maintain sustainable water supply in the project area. As such the project collected data on water usage to inform the planning and design on the indicative quantities used by each household in the project area. From the field survey it was established that the vast majority 67.1% mentioned that they used 50 litres and above, 17.1% 41-50 litres and 11% 10-20 litres, 4.3% 31-40, and 0.6% 21-30 (**Table** 6-21).

Table 6-21: Amount of water used by households daily

Amount of water used in HH/Business daily	Frequency	Percentage (%)
10-20 litres	18	11
21-30 litres	1	0.6
31-40 litres	7	4.3
41-50 litres	28	17.1
50 litres and above	110	67.1
Total	164	100

Average amount of water used per day per household: Assumption: Based on the average number of trips made per day (1-2 trips a day – taking 1.5 trips as an average) and the average amount of water fetched per trip (50+ litres per trip – taking 50l as the average water fetched per trip). **Amount of water used per HH per day:** Most households use an average of 75l of water per day. The average household size in the project core villages is 5.2 (see **Section 6.4.2 above**). Therefore, on average, an individual in a household is allocated approximately 14.7l of water per day. This is consistent with the Mellor et al study 2012 which established that

Ugandans use an average of 15.4 ± 0.5 litres per person per day regardless of their perceived effort in terms of collection times or distances travelled[10].

WATER USES

The social economic baseline also sought to establish the main water uses among the rural households in Kaliro (**Table** 6-22). Respondents gave a variation of water uses to include; drinking 33.1%, food preparation 26.1%, bathing, washing clothes 31.9% and dishes, and livestock 8.1%.

Table 6-22: Uses of water

Main uses of water	Frequency	Percentage (%)
Water for drinking	164	33.1
Washing clothes	158	31.9
Cooking food/tea	129	26.1
Livestock	40	8.1
Business (saloon, shop, restaurant)	4	0.8
Total	432	100

*Multiple response allowed, Source: Field survey

PAYMENT FOR WATER AND NUMBER OF TIMES IT IS SUPPLIED

Current trend in payment for water: When interviewed about payment for water, 44.5% indicated that they pay for water while 53% do not pay (**Table** 6-23). On the issue of frequency of payment for water supplied, 54.8% revealed that they get daily supplies, and 45.2% monthly. All respondents who noted daily payments indicated use of water vendors to access water, while monthly payments were user fee payments at water sources, for instance at a borehole. Related to the above was the vendor of water to the household, field results show that 51.2% of the respondents revealed accessing water from a bicycle vendor while 47.9% fetched their own water.

Table 6-23: Payment for water

Does the household (or business) pay for water?	Frequency	Percentage (%)
Yes	73	44.5
No	87	53
Don't know	4	2.4

[10] Rural water usage in East Africa: Does collection effort really impact basic access?2012

Total	164	100
Frequency of water supply charge payment		
Daily	40	54.8
Monthly	33	45.2
Total	73	100
Seller of water to the household		
Water vendor on bicycle	38	52.1
Fetched own water	35	47.9
Total	73	100

Source: Field survey

Ability to pay for water: If on average, households in Kidera RGC earn between Ugx. 503,000 and Ugx. 1,403,000 annually – averagely: Ugx 953,000 (see Section 6.4.3.3 above), and on average each household uses 50 L of water per day (see Section 6.4.4.4 above), which translates into 18,250 L a year, thus 912.5 jerry cans (20L) of water a year. If a jerrycan of water is Ugx. 83 (adopted from the project feasibility report). A household would spend Ug. 68,450. This translates to a household spending 7.2% of their annual income on water compared to the adopted tariff, where the target community spend 5% of their annual income on access to water.

Amount paid to access water: Regarding the cost of a majority 42.5 percent indicated paying more than UGX 600 for a jerrycan, 31.5 percent more than UGX 600, 11 percent UGX 200, (**Table** 6-24), while 8.2 percent less than UGX 100 to get access to water.

Table 6-24: Cost of water

Cost of a 20-liter jerry can of water	Frequency	Valid Percentage
Less than 100/=	6	8.2
200/=	8	11
300/=	3	4.1
400/=	2	2.7
500/=	31	42.5
600/=	23	31.5
More than 600	6	8.2

Total	73	100

Source: Field survey

PREFERRED SERVICE OPTIONS

Among the services that they would be able to afford, 45.1% of respondents preferred a house connection 43.3% Yard tap connection, and 11.6% public stand pipe. (**Figure** 6-36**)**. Before project roll out, it is pertinent to establish the preference of services in line with the social economic indicators such as household income, business establishment levels of a given community and socio-cultural practices to assess the feasibility of planned interventions by the project proponent.

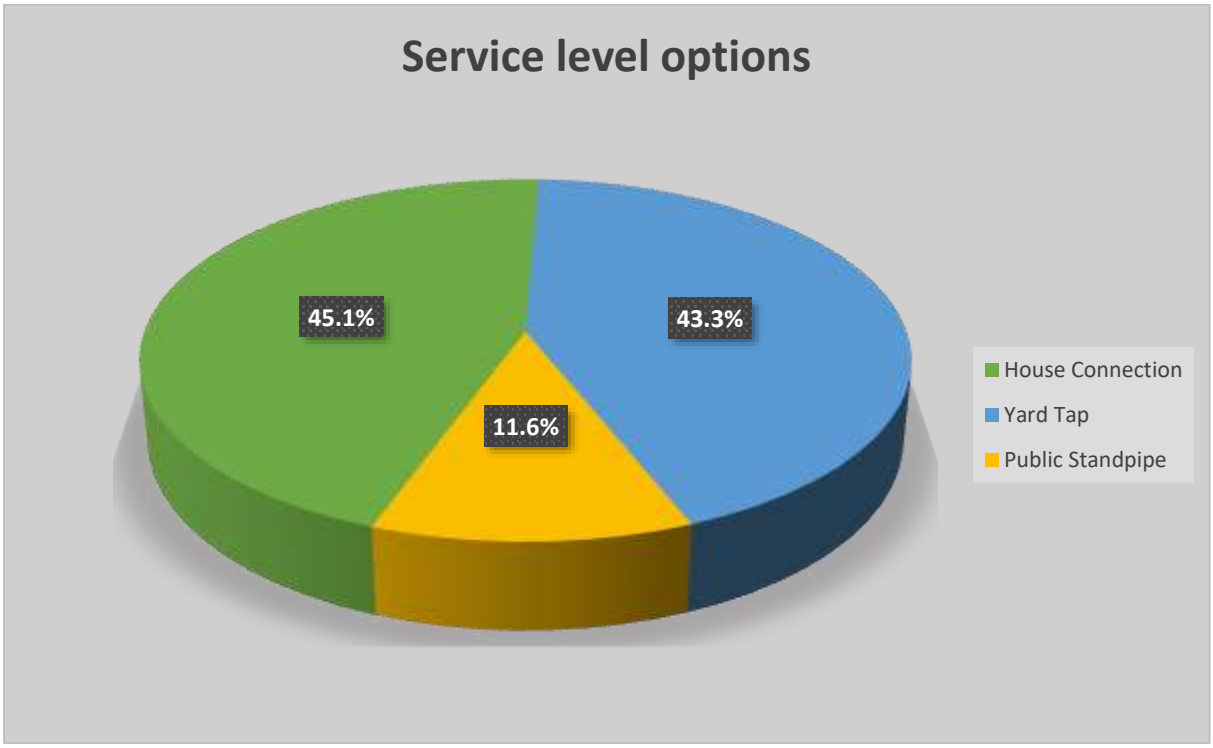


Figure 6-36: Willingness to pay and preferred connection

Source: Field survey

WILLINGNESS TO PAY

Respondents were also interviewed about the amounts that they would be willing to pay for a new house connection for water supply services. Survey results included that 32.4% % indicating 5,000-10,000/= 24.3%, 10,000-20,000/=, 13.5% 20,000-30,000 and 3000-5000 Uganda shillings for a house connection. A variation of fees respondents is willing to pay is presented in **Table** 6-25 below.

Table 6-25: Amount prepared to pay for house connection

Amount prepared to pay for house connection	Frequency	Valid Percentage
50,000 – 60,000	3	4.1
30,000-40,000	4	5.4
20,000-30,000	10	13.5
10,000-20,000	18	24.3
5,000-10,000	2	32.4
3,000-5,000	9	12.2
2,000-3,000	3	4.1
1,000-2,000	2	2.7
Don't know	1	1.4
Total	74	100

Source: Field survey

Further assessment on willingness to pay for a jerrycan of water reveals that 42.3% of the respondents were willing to pay UGX 100, 31% - UGX 50, 8.5% - UGX 200 and 5.6% for UGX300 and UGX30 for a 20l jerrycan respectively (Table 6-26). In comparison, the project feasibility study (MWE, 2019) proposed a Ugx.83/20 litres water tariff, a computation based on ability of the consumers to pay (ATP) 5 percent of the household monthly income on an improved water service.

Table 6-26: Willingness to pay for a jerrycan

Willingness to pay for a jerrycan	Frequency	Valid Percentage (%)
600	2	1.1
400	15	7.9
300	25	13.2
200	15	7.9
100	67	35.3
50	40	21.1
40	7	3.7
30	8	4.2
20	10	5.3

Willingness to pay for a jerrycan	Frequency	Valid Percentage (%)
Don't Know	1	0.5
Total	190	100.

Source: Field survey

OWNERSHIP OF MOBILE PHONE AND ACCESS MONEY PAYMENT

Mobile payments have been adopted for urban water payments in most area with access to telecommunication services in Uganda. Respondents were also interviewed on issues related to access to possession of mobile money accounts and access to mobile money payments as modes of mobile payments for utilities. Most (89%) of the respondents indicated having mobile handsets and (96.9%) indicated having access to mobile money payments which is indicative of increasing financial inclusion[11]. This is indicative of the adoption of the mobile phone as a means of accessing financial services by the growing number of low-income earners in rural areas (**Table** 6-27).

Table 6-27: Ownership of mobile phones and money accounts

Ownership of mobile phone	Frequency	Percentage (%)
No	18	11
Yes	146	89.3
Total	164	100
Access to mobile money payment in your area		
Yes	159	96.9
No	5	3.1
Total	164	100

Source: Field survey

HEALTH SERVICES

ACCESS TO HEALTHCARE

According to Buyende DDPIII 2020/2021 - 2024/2025, the district has 21 health facilities providing general health services of which one is HC IV and it is located in Health Sub District, 6 are HC III, and 11 are HC IIs. Two sub counties (Buyende and Nkondo) do not have HC IIIs. Less than 35% of the population has access to health services within 5Km walking distance.

[11] Financial Inclusion (FI) which is the process of ensuring access to appropriate financial products and services at an affordable cost to the underprivileged and low-income groups (Ddumba Sentamu, 2009)

About 65% of the population has no access to health services within 5 Km walking distance. Specifically, Kidera SC has a Health Centre IV which accessed by most of the members of the community. Respondents indicated that mainly used Privately run clinic /drug shop (51.8%) and community health centre (26.8%) to access healthcare services (**Table** 6-28).

Table 6-28: Health facilities within the project area

Type of nearest health facility	Frequency	Percentage (%)
Health Centre III	31	18.9
Community Health Centre	44	26.8
Privately run clinic /drug shop	85	51.8
Others	4	2.4
Total	164	100

Source: Field survey

DISTANCE TRAVELLED TO ACCESS HEALTHCARE SERVICES

Distance to a health facility has a strong influence on access to healthcare which influences the outcome of health conditions. Patient travel to attend medical clinics in many cases is reliant on the distances they must travel. Ministry of Health Uganda recommends a maximum distance of 5 km to the nearest health facility. From the field survey (**Table** 6-29), 53% of the respondents indicated walking 100m-500m to the nearest health facility, 23.2% 100m, 22.6% 1-1.5km and 1.2% above 5km to access healthcare services from health facilities in the project area.

Table 6-29: Distances to the nearest health facility

Distance to nearest health facility	Frequency	Percentage (%)
100m	57	14.3
300-500m	119	32
1-1.5km	132	35.5
Above 5km	64	17.2
Total	372	100

Source: Field survey

COMMON DISEASES

Disease Prevalence refers to the number of individuals who have an illness or condition at any moment (WHO, 2004). Water scarcity and/or overabundance are directly linked to incidence

and prevalence of water related illnesses. Water borne illness can be both communicable and non-communicable attributed to poor water, sanitation, and hygiene conditions.

Health information for the year 2019/20 was obtained from the district local government health department. From the data it was observed that top common ailments differ at different health centres; within Malaria is within 61.2% and common cold/cough 17.4% are within top five ailments reported for all health centres. Similarly, from the field survey, Malaria and cough were the most common diseases mentioned by respondents in the project area (**Table** 6-30).

Table 6-30: Common Diseases in Kidera RGC

Most common diseases	Frequency	Percentage (%)
Malaria	160	43.8
Cough	121	33.2
Cholera	27	7.4
Dysentery	12	3.3
Intestine infections	5	1.4
Ulcers	15	4.1
Skin disease	15	4.1
Others	10	2.7
Total	365	100

STATE OF THE HEALTH FACILITIES AROUND THE PROJECT AREA

Kidera Health Centre IV is the nearest government aided health facility to the project area (figure). The facility serves the entire population in Kidera Town Council with a catchment population of 46,503 people registered in January 2022.

Figure 6-37: Kidera HC IV in Kidera Town Council

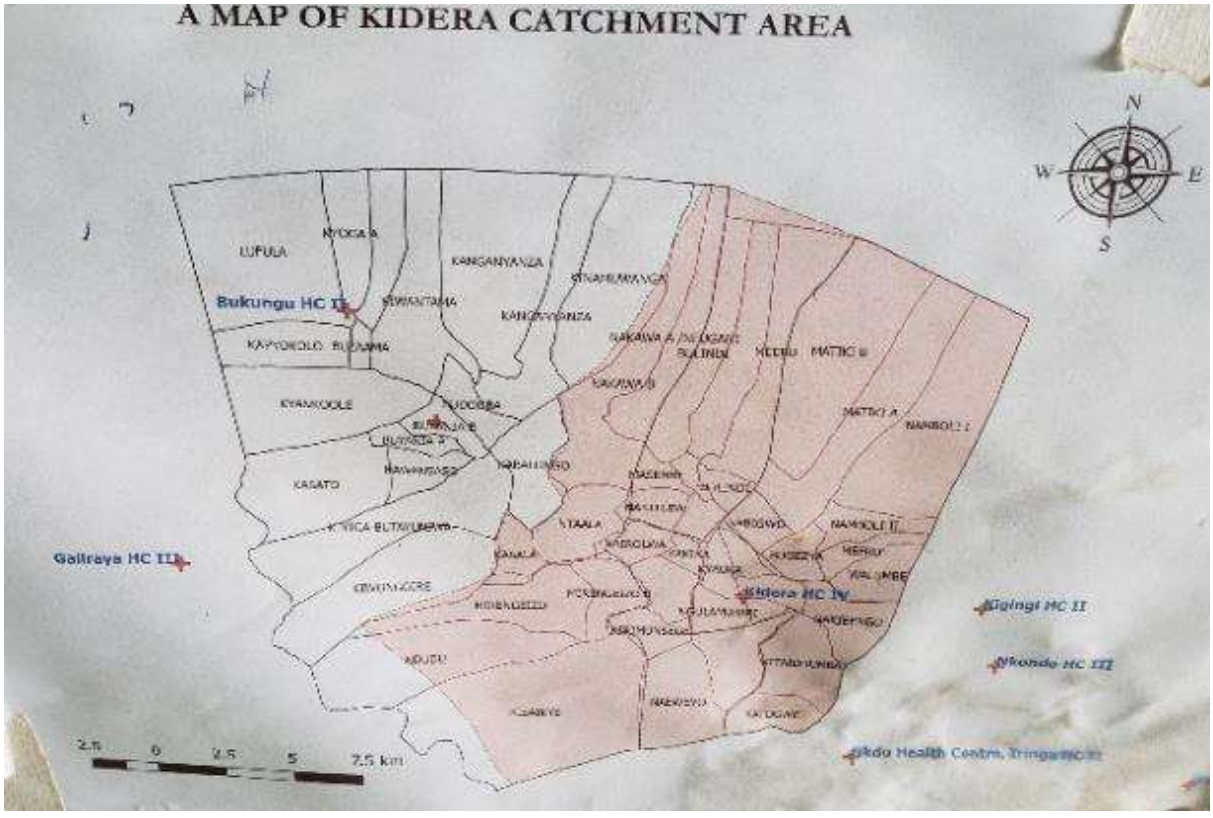


Figure 6-38: Kidera RGC catchment area

The most common illnesses treated and registered at the facility are; Malaria, common colds (flue and cough), TB, diarrhoea, dysentery bilharzia and typhoid (at a low rate). The facility also registers high rates of HIV and STIs with low rates of medical services vailed to patients. Services offered at the facility include; Maternity (antenatal, family planning, Immunisation

and gynaecology), Out-patient (dental, laboratory, ophthalmic, HIV (testing and counselling), In-patient, and theatre for major and minor surgeries.

WATER IN HEALTH CARE FACILITIES

Nationally, 33% of health facilities in Uganda have basic water supply (WHO Global Baseline Report, 2019). According to UNICEF/JMP[12], Uganda ranks highest in terms of 'Limited" water at HCF at 65.15% in Sub Saharan Africa in terms of indicators on Water in Health Care Facilities (WinHCF). It ranked 6th in terms of having 'Basic' water at 30.81% and 10th rank for having 'No Service". In Buyende district, there are 24 health facilities (13 Gov't; 11 PNFP; no PFP). Out of the 24 health facilities, there are 16 HC II, 7 HC III and 1 HC IV. According to Buyende District Health Inspector, only 10% (3 out of 24) of the health facilities have access to reliable water source. From the field survey, Kidera HCIV has 2 deep boreholes, however, only one is functional and seasonal. The borehole is shared by the nearby communities. The facility has also got rain water harvesting tanks (RWHT) 10,000 and 5000 litres but these dry out during the dry spells. The Health Assistant stated that ***"At Kidera HC IV, patients are made to buy and/or come with their own water. They also don't know where to get clean water. The situation is very bad",*** said Mr. Kibuuka, Health Assistant.

Figure 6-39: Deep borehole and RWHT at Kidera HC IV in Kidera RGC

The project should provide improved supply of safe and clean water to Kidera HCIV. It has been proposed that a Yard Tap (YT), PSP can serve the health facilities better. Additional water storage tanks (>50,000 liters) can potentially be useful for each facility. It is anticipated that the piped water will make a positive impact on the health service delivery, hence contributing to achievement of health sector targets under NDP III 2020/21- 2024/25, as well as 'SDG 3 - Ensure healthy lives and promote well-being for all at all ages. By emphasis, the WHO notes that "Achieving SDG 3 will depend on progress in other SDGs – e.g., clean water and

12 UNICEF Joint Monitoring Programme (JMP)

sanitation, poverty reduction, education; nutrition; gender equality; sustainable energy and safer cities" (WHO[13], 2017).

EDUCATIONAL SERVICES

LITERACY LEVELS

Results from baseline data regarding the education level of respondents in the project area of influence indicate that most respondents had attained primary education (48.2%), and ordinary level education (29.3%). Few respondents had attained advanced level (3.7%), vocational education (1.8%) university education (3%). Some respondents (14%) had never gone to school (**Table** 6-31). It is imperative to consider this low level of literacy in the project area as it can affect the project implementation especially in terms of communication. Therefore, the way information is presented for informative and/or discussion purposes should be geared towards more visual/oral means for the less educated rather than written communications for better understanding by the project affected/beneficiary communities. Additionally, most stakeholders engaged emphasised the need for employment of local labour during the project; however, education levels of the population limit employment to unskilled labour due to the literacy levels in the project area.

Table 6-31: Education level of household head

Education level of household head	Frequency	Percentage (%)
Primary Education	79	48.2
Ordinary level	48	29.3
A' level	6	3.7
Vocational	3	1.8
University/college	5	3
None	23	14
Total	164	100

Source: Field survey

DISTANCE TRAVELLED TO ACCESS EDUCATION SERVICES

Among key barriers that have the most effect on school attendance and learning outcomes is the distance travelled to access education services. This survey, therefore sought to establish the distances travelled by children and teacher to access education services in the project area as it impedes constructive learning. Data from the field shows that most households

13https://www.who.int/docs/default-source/searo/hsd/hwf/01-monitoring-the-health-related-sdgs-background-paper.pdf?sfvrsn=3417607a_4#:~:text=The%20health%20goal%20(SDG%203,one%20must%20be%20left%20behind%27.

were able to access secondary schools located within walkable distance to residence and, most respondents indicated that they most travel 1-1.5km (33.6%) 100m (12.6%), 100-500m (32.9%) and (21%) of the respondents indicated travelling over 5km, to access secondary schools (**Table** 6-32).

Table 6-32: Distance travelled to nearest primary and secondary schools

Distance travelled	Frequency	Percentage (%)
Distance to nearest secondary school		
100m	21	12.6
100-500m	54	32.9
1-1.5km	55	33.6
Above 5km	34	21
Total	164	100

Source: Field Survey

ACCESS TO WATER IN SCHOOLS

The global target of achieving universal access to basic WASH services in schools by 2030 aims at extending water beyond the household to include institutional settings, such as schools, healthcare facilities and workplaces (UNICEF[14], 2020). Its notable that water in schools has direct impact on education outcomes in primary secondary and tertiary levels (MOES, 2020).

There is severe water scarcity among schools in Kidera RGC. For instance, in Kidera Town Council, all the 12 schools face challenges of water scarcity with only 16.7% (2 out of 12) with rain water harvesting tanks (RWHTs) namely Kabugudho PS and St. Jude Katogwe PS located in Kasiira and Kidera wards respectively (non-beneficiary area under phase 1).

Capacity of RWHTs: The total water tank capacity in the 2 schools is 7,000 litres serving a school population of 2,320 learners and teachers as shown in **Table** 6-33 below.

Average distance to water source: The average distance to a water source (borehole / Lake Kyoga) is minimum of 1km and maximum of 5km. Itimia PS in Meeru cell is the only school with an on-site borehole. However, there is very low yield and takes between 3-4 waiting hours to pump water.

Water storage: Water is mainly collected using plastic jerrycans and stored in plastic drums as the case in Kabugudho Primary school.

14 https://gdc.unicef.org/resource/drinking-water-sanitation-and-hygiene-schools

Table 6-33: Status water supply in schools in Kidera Town Council

No.	Kidera RGC	Village / Cell	Ward / Parish	Owner ship	School Popn	Major Source of water	Distance to Source	No. of Water Tank	Capacity in Liters	Remarks
	Core Beneficiary Area under Phase 1 (4 cells - Kitete B, Nakibengo A, Nakibengo B and Kiwambya)									
1	S. Kizito Kidera PS	Kiwambya	Kidera	Gov't aided	1,194	Borehole	<1km	none	none	Share borehole with community
2	Mac & Mau PS	Kitete A	Kidera	Private	426	Borehole	<1km	none	none	Share borehole with community
Total Population					1,620	17%				
	Influence Zone (Non-beneficiary area under Phase 1)									
3	Kidera CU PS	Kamagu		Gov't aided	1,449	Borehole	<1km	none	none	Share borehole with community
4	Itamia PS	Meeru	Miseru	Gov't aided	1,257	Borehole	Onsite	none	none	Dry borehole, waiting time is above 3 hours
5	Kabugudho PS	Kabugudho A	Kasiira	Gov't aided	803	Borehole	4km	1	5,000 ltrs	Concrete water tank
6	St. Jude Katogwe PS	Katogwe A	Kidera	Gov't aided	1,268	Borehole	<1km	1	2,000 ltrs	Plastic tank

7	Kitaidhumba Parents PS	Kitaidhumba	Kidera	Private	811	Borehole	2km	none	none	To be coded into Gov't / MoES system
8	Nabiweyo PS	Nabiweyo	Kasiira	Private	455	Borehole	2.5km	none	none	
9	Ashraf Islamic PS	Nakabembe	Kasiira	Private	384	Borehole	1km	none	none	
10	Trinity Joy PS	Green zone - KabugudhoB	Kasiira	Private	622	Borehole	1.5km	none	none	
11	Bright Star PS	Kyauka	Kasiira	Private	391	Borehole	2.5km	none	none	
12	GOD's Grace	Kamagu		Gov't aided	497	Borehole	3km	none	none	
Total school population					7,937	83.0%				
Overall, School Population					9,557	65.3%				
School Going Age Population in Kidera RGC Area (Kasiira, Kidera, Miseru, Bulembo wards)					14,640					

Source: Field Survey

SANITATION AND HYGIENE

HYGIENE

Consultations with residents in the project area in Kidera RGC revealed that approximately 98.8% of households in the project area have access to their own toilet facilities which they use for disposal of human waste. Only 0.6% used Ecosan and Double vault toilets (improved saniation facilities). Traditional pit latrines (basic saniation facility) are dominant excreta management system in most of the rural growth centres.

Table 6-34: Type of sanitation facility the household uses

Type of toilet the household uses	Frequency	Percentage (%)
Pit Latrine	162	98.8
Ecosan	1	0.6
Double Vault Latrine	1	0.6
Total	164	100

SHARING OF SANITARY FACILITIES

When asked about the issues of sharing toilets, 71% indicated that they don't while 29% indicated that they do. Those who share sanitary facilities cited the challenge of keeping shared toilets clean which exposes them to the risk of disease and infections. The main reason for sharing sanitation facilities included (i)lack of HH owned facility, and (ii) sharing with visitors/travellors as there are no public sanitation facilities in the RGC.

Table 6-35: Sharing of toilet facilities

Sharing of toilet facilities	Frequency	Percentage (%)
No	116	71
Yes	48	29
Total	164	100

Awareness and handwashing practice is good amongst the surveyed population with 86.6% of the respondents being able to mention at least 3 critical times for hand washing. This should be promoted further. The focus should shift to monitoring actual hand washing practice rather than knowledge.

Table 6-36: Hand washing practice

Hand washing practice	Frequency	Percentage (%)
No	21	13.4

Yes	136	86.6
Total	157	100

TIME TAKEN BY HOUSEHOLD FOR EMPTYING OF TOILET/SEPTIC TANKS

On the issue of emptying the toilets 93.2% of the respondents indicated taking more than 2 years, 5.1% Every after two years and 1.7% Less than a year

Table 6-37: Time length taken for HH to empty toilet/septic tank

Time length taken for HH to empty toilet/septic tank	Frequency	Percentage (%)
Less than a year	2	1.7
Every after two years	6	5.1
More than two years	110	93.2
Total	118	100

SOLID WASTE MANAGEMENT

Waste in Buyende district can be categorized as domestic waste, urban council and health facility waste. Although waste is inevitable, human activities such as use of resources wastefully, lack of methods of reuse of resources and lack of waste disposal places and facilities have enormously increased waste in our environment.

Table 6-38: Disposal of solid waste methods

Disposal of solid waste methods	Frequency	Percentage (%)
Dug-pit	150	64.9
Farm as manure	73	31.6
Collected by Town Authority or Private Company	3	1.3
Communal Dump	4	1.7
Others	1	0.4
Total	231	100

PREVALENCE OF GBV IN THE PROJECT AREA

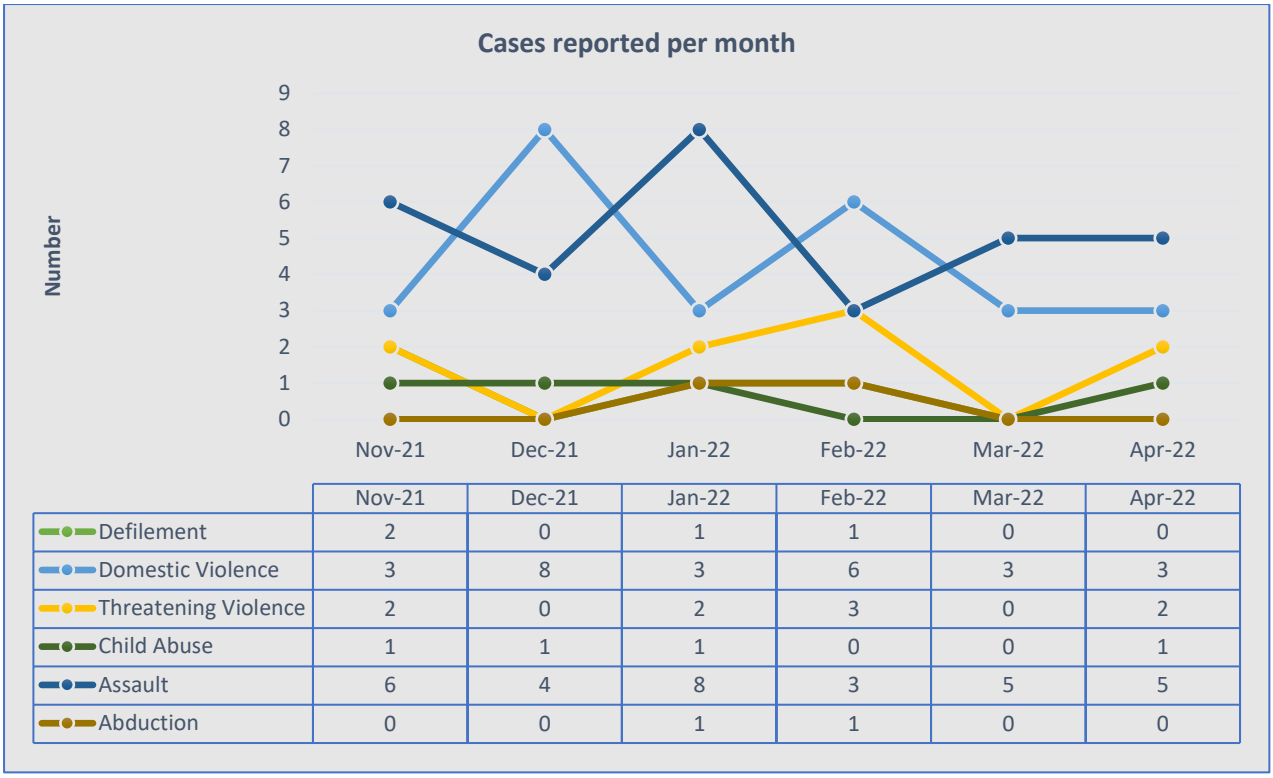
Gender Based Violence, is an umbrella term for any harmful act that is perpetrated against a person's will and that is based on socially ascribed gender differences. GBV includes acts that inflict physical, mental, sexual harm or suffering; threats of such acts; and coercion and other deprivations of liberty, whether occurring in public or in private life. GBV disproportionately affects women and girls across their lifespan and takes many forms, including sexual, physical,

and psychological abuse. It occurs at home, on the streets, in schools, workplaces, farm fields, and refugee camps; during times of peace as well as in conflicts and crises.15 According to the UDHS 2016, 64% of females of ages 15-49 having experienced physical, sexual, or emotional violence perpetrated by their current or most recent spouse or partner. Similarly, according to UNFPA 2013 ,61.1% of the females between 15-24 years think it is justified to beat a wife. The term GBV is most commonly used to underscore systemic inequality between males and females —which exists in every society in the world—and acts as a unifying and foundational characteristic of most forms of violence perpetrated against women and girls (VAWG). The term GBV stems from the 1993 United Nations Declaration on the Elimination of Violence against Women, which defines violence against women as "any act of gender-based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women." Discrimination on the basis of sex or gender identity is not only a cause of many forms of GBV, but also contributes to the widespread acceptance and invisibility of such violence—so that perpetrators are not held accountable and survivors are discouraged from speaking out and accessing support. Therefore, as a project deliberate effort has to be made by the contractor through Action plans and codes of conduct to mitigate against GBV.

PREVALENCE OF GBV IN THE PROJECT AREA

The information collected from the project area for the period of 2020 by the Uganda Police crime indicates that there 217 reported cases of sexual assault ,20 cases related to child abuse and 102 cases of common assault. Field consultation with Kidera police also indicated that there are several forms of GBV shown in the **Figure** 6-40 & Error! Reference source not found. below.

[15] World Bank Good Practice Note: Addressing Gender Based Violence in Investment Project Financing involving Major Civil Works 28 September 2018



	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
Defilement	2	0	1	1	0	0
Domestic Violence	3	8	3	6	3	3
Threatening Violence	2	0	2	3	0	2
Child Abuse	1	1	1	0	0	1
Assault	6	4	8	3	5	5
Abduction	0	0	1	1	0	0

Figure 6-40: Monthly trend analysis for cases reported

Source: Kidera Police,

VICTIMS OF DOMESTIC VIOLENCE IN THE AREA

When asked about the victims of GBV in the community majority of them were Married women (39.2%). girls (37.2%) 7.2% respondents also indicated that children of the are also victims of GBV (Error! Reference source not found.).

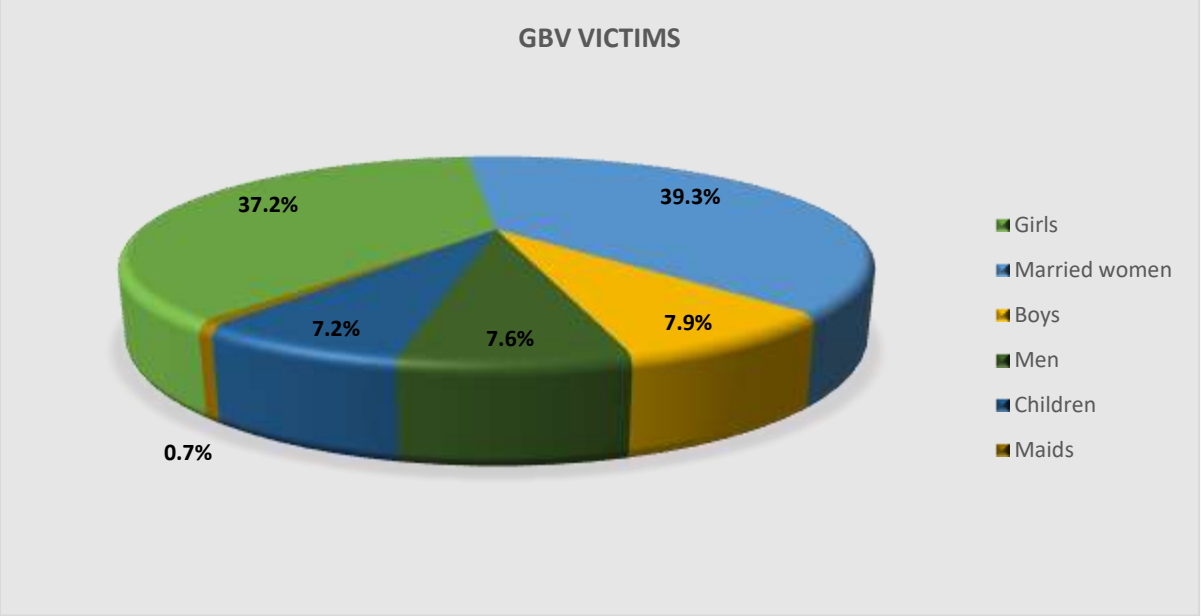


Figure 6-41: GBV Victims

COMMON TYPES OF ABUSES THAT RESPONDENTS ARE AWARE OF.

Regarding common forms of GBV known in the community, 36.3% cited battering/beating ,26.5% verbal insults and abuses, threatening violence against spouse or children 4.4% 4.1% burning ,7.3% unwanted touches and marrying of young girls as shown in the Error! Reference source not found. below.

Table 6-39: Forms of GBV known by respondents

Form of GBV	Frequency	Percentage (%)
Battering/beating	115	36.3
Burning	13	4.1
Verbal abuses/insults	84	26.5
Attempted murder	4	1.3
Forced sex	2	0.6
Unwanted sexual touches	23	7.3
Marrying off girls early	12	3.8
Threatening violence against spouse or children	14	4.4
Use of proceeds/money without spouse consent	7	2.2
Preventing spouse from owning property	6	1.9
Preventing spouse from using family land	6	1.9
Stop spouse from talking/community meetings	11	3.5
Preventing spouse from working outside home	8	2.5
Engaging children in work instead of school	4	1.3
Not economically supporting family	7	2.2
Locking spouse or children out of house	1	0.3
Total	317	100

PERPETRATORS OF THE ABUSES

Sexual & Gender -based violence (SGBV) is not a new phenomenon. 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, 51.5% mentioned male spouses ,25.7% female spouses and strangers as the main perpetrators of gender-based violence.

Table 6-40: GBV perpetrators

GBV perpetrators	Frequency	Percentage (%)
Male spouse	140	51.5
Female spouse	70	25.7
Other relative	18	6.6
Clan elder	3	1.1
Community leader	4	1.5
Stranger	25	9.2
Employer/boss	5	1.8
Male teacher	2	0.7
Community member	2	0.7
Police man/soldier	3	1.1
Total	272	100

HIV/AIDS

According to the Uganda HIV/AIDs country progress report July 2016-june 2017[16], the country has made great strides in reducing HIV incidence, HIV related mortality, infant HIV infection and HIV prevalence where the National HIV/AIDS Strategic Plan (NSP) targets were surpassed. The Uganda Population HIV Impact Assessment (UPHIA) results revealed that the country has made significant progress in reducing the HIV prevalence from 7.3% in 2011 to 6% in 2017. More still according to UNAIDS report, there are 1,400,000 people living with HIV and AIDS in Uganda of which 84% know their HIV positive status and 72% of people living with HIV were on treatment. Women are disproportionally affected by HIV in Uganda: of the 1 300 000 adults living with HIV, 770 000 (59.23%) were women. New HIV infections among young women aged 15–24 years were more than double those among young men: 14 000 new infections among young women, compared to 5000 among young men. HIV treatment was higher among women than men, however, with 79% of adult women living with HIV on treatment, compared to 63% of adult men (UNAIDS 2018[17]). According to the UGANDA

[16] https://www.unaids.org/sites/default/files/country/documents/UGA_2018_countryreport.pdf

[17] https://www.unaids.org/en/regionscountries/countries/uganda

POPULATION-BASED HIV IMPACT ASSESSMENT UPHIA 2016–2017 the HIV/AIDS prevail of Buyende is 4.7% since it lies within the East Central region.

FACTORS LIKELY TO CONTRIBUTE TO THE SPREAD OF HIV/AIDS IN THIS AREA

Regarding factor that contribute to the spread of HIV/AIDS, respondents indicated lack of information 22.5%, poverty 19.65%, peer pressure 16.1% prostitution 8.6% and alcohol/drug abuse 6.8%. Numerous factors likely to contribute to the spread of HIV/AIDS are presented in the table below.

Table 6-41: HIV factors

HIV factors	Frequency	Percentage (%)
Poverty	89	19.6
Lack of information	102	22.5
Peer pressure	73	16.1
Alcohol abuse	31	6.8
Drug abuse	29	6.4
Parental neglect	26	5.7
No antenatal care service	16	3.5
No HIV service providers	17	3.8
GBV	14	3.1
Prostitution	39	8.6
Early marriage	17	3.8
Total	453	100

STRATEGIES TO CURB HIV/AIDS SPREAD

When interviewed about strategies of controlling HIV/AIDS, respondents revealed various ways in which it can be controlled such as sensitization activities, Bylaws against prostitution, Promotion of ABC and Bylaws against drug/alcohol abuse among others as shown in the table below.

Table 6-42: HIV Control

HIV Control	Frequency	Percentage (%)
Sensitization activities	83	20.5
Prevention of GBV	50	12.4

Bylaws against prostitution	43	10.6
Promotion of ABC	46	11.4
Bylaws against drug/alcohol abuse	27	6.7
Improve antenatal care services	30	7.4
Engage HIV service providers	35	8.7
Engage HIV service providers	24	5.9
Gender empowerment	25	6.2
Testing & counselling	39	9.7
Other	2	0.5
Total	404	100

*Multiple response allowed

IMPACTS

When asked about the impacts of constructing the water supply system, field results show that 38.9% of the respondents envisage improvement in the quality of life, 20.9% provide electricity accessibility,20.5% increase job opportunity and 14.3% agricultural productivity among others (**Figure** 6-42).

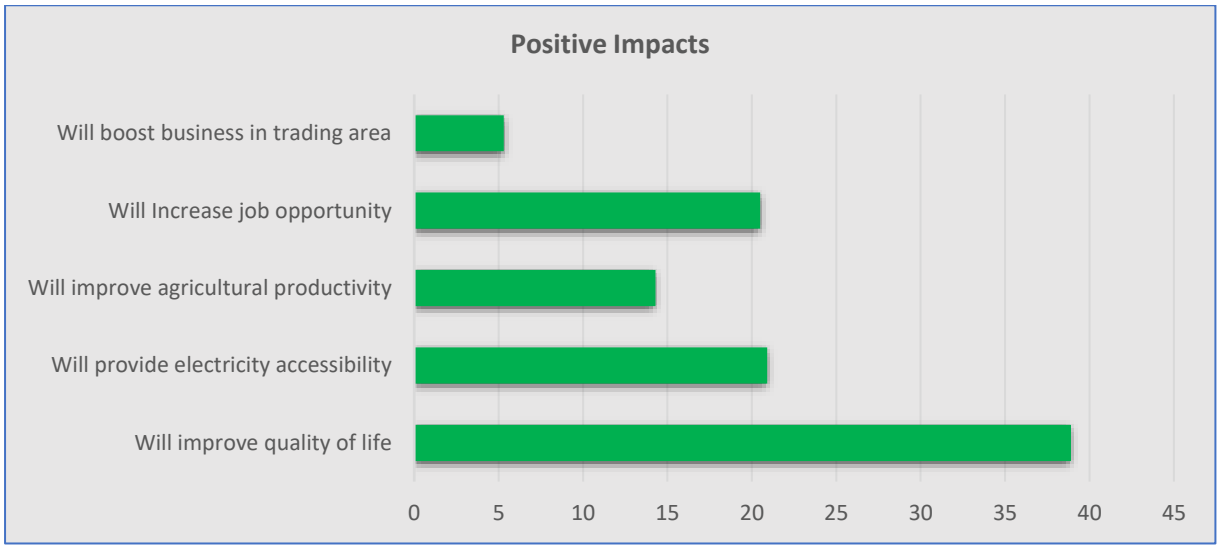


Figure 6-42: Positive impacts expected from the project

7. STAKEHOLDER ENGAGEMENT

This section of the report presents the objectives, process, and the outcomes of the stakeholder involvement in the process of this ESIA. Emphasis has been placed on a fully inclusive, open and transparent public participation process and the transfer of information regarding the proposed construction of Large Solar Powered Piped Water Supply System and Sanitation Facility in Kidera RGC, Buyende District to interested and affected persons (I&APs).

The provision of sufficient and useful information on an on-going basis to I&APs to allow them to participate in the project and offer comments is a cornerstone of this Environmental Assessment process. Meetings were also held with disadvantaged and vulnerable groups affected by the project such as, women, PWDs, youth, elderly, among others. During meetings with the key stakeholders, key issues discussed included; proposed project component, benefits, likely environmental and social risks, impacts and mitigation measures, grievance redress mechanism at community, construction site, Sub County, District and MWE levels covering communities and workers and its importance and role during project implementation among others.

The ESIA process started with a scoping exercise aimed identifying relevant issues to form focus of the ESIA study and refine the terms of reference provided by the project proponent. This chapter presents the results of stakeholder engagement activities undertaken during February 2022 for the scoping stage and for the final ESIA during March and April 2022.

OBJECTIVES OF CONSULTATION AND DISCLOSURE

Relevant and adequate project information were provided to stakeholders to enable them to understand project risks, impacts and opportunities. Consultation targeted relevant stakeholders, communities, government ministries, surrounding business/commercial entities and aimed at:

a. Generate a good understanding of the project.
b. Understand and characterize potential environmental, socio-economic risks/impacts of the project.
c. Developing effective mitigation measures and management plans.
d. Enhance local benefits from the proposed project.
e. Enable affected communities to provide views hence participating in or refining project design, where applicable.

SUMMARY OF STAKEHOLDERS ENGAGED

The list of stakeholders engaged is as follows:

- Buyende District Chief Administrative Officer, Deputy Chief Administrative Officer, District Water Officer, Asst. District Health Officer, District Health Inspector, District Natural Resources Officer,
- District Community Development Officer, Resident District Commissioner;
- Kidera Town Council Local Council III Chairperson, Senior Assistant Secretary,

- In-charge Kidera HC IV, Secretary Finance, Secretary for Production, Secretary for Health
- Chair persons LCIs of Kitete B, Nakibengo A, Nakibengo B and Kiwambya C/P – Kamugoya,
- Head of Design – Roads and Bridges - Uganda National Roads Authority
- Directors: Occupational Safety and Health - Ministry of Gender Labour and Social Development
- Directorate of Water Resources Management, MoWE
- Wetlands Department – MoWE, and
- Beneficiary villages community members of Kitete B, Nakibengo A, Nakibengo B and Kiwambya C/P – Kamugoya.

SUMMARY OF KEY ISSUES RAISED FROM STAKEHOLDER CONSULTATIONS

The main issues raised from stakeholders engaged in relation to the Kidera RGC water supply system and sanitation facility project were mainly:

- Proper coordination of the project among the consultants/contractors, MWE, District officials and village authorities should be emphasized;
- Community ownership of the project should be a key component enshrined in project development. The roles and responsibilities of district technical and political teams, sub county, parishes and villages authorities to support the functionality of the project should be defined throughout the project lifecycle;
- Proper documented processes on land acquisition and compensation for proposed project component sites;
- Recruitment for available job opportunities on the project should prioritize community members; especially youth in Kidera TC;
- The price of piped water and connection to individual households should be affordable; and
- There is a cultural tree about 100m from the abstraction point where some of the resident go to worship ancestral spirits. Activities of the project implementation should not disturb the peace and cultural beliefs at the site. Furthermore, the drilling trucks almost destroyed our grave yards. The project should consider compensation for the graveyard to facilitate relocation.

CONSULTATIONS WITH BUYENDE DISTRICT LOCAL GOVERNMENT OFFICIALS

Discussions were held with district officials on aspects relating to the proposed project components which all will be useful in the subsequent planning and execution of the assignment. Key stakeholders met during the preliminary visit were among others:

No.	Concern	Remark
1	Created in 2009, Buyende is among the new districts in Uganda. The district social and development sectors are still nascent. The population in the district is young and growing at a fast rate. There are several mushrooming small towns, rural growth	Noted, the LGs and communities are encouraged to participate and

No.	Concern	Remark
	centers and landing sites with higher populations compared to the rural areas in the district that require access to social and public services such as water and sanitation. Buyende District needs numerous development projects to reach its full potential. Therefore, the rural water supply and sanitation projects proposed for Kidera Rural Growth Centre are highly welcome.	support project implementation.
2	Access to safe drinking water is a big problem in Buyende district, 62% of communities lack access to safe drinking water. The problem is greater in the budding small towns, rural growth centres and landing sites. The selected rural growth centre in Kidera Town Council is among the most affected. Although the Ministry of Water and Environment directed phasing out point sources of water in small towns, rural growth centres and landing sites, the main sources of water in these locations remains boreholes. The boreholes are only functional during the wet season and tend to dry up during the dry season. The borehole yields are in themselves not sufficient to cover the demand for water in these budding urban centres. Some boreholes have low yield while others produce hard and/or saline water. Other sources of water include valley dams and unprotected springs; whose water is not safe for domestic consumption. The proposed project is therefore timely and will benefit the growing populations in Kidera RGC.	The Kidera RG CWSS project will contribute to increased access to safe, clean and affordable water within Kidera TC. The first phase of the project will cover 4 villages, and by the ultimate year 2041, over 35 villages will have access to water in the RGC.
5	Access to proper sanitation in Buyende District is low. Communities in the district practice open defecation and many households do not own standard sanitation facilities, mainly latrines. Issues of sanitation, therefore, need to be streamlined on the project. Good sanitation strategies, such free conditional individual connections upon evidence of proper sanitation facilities (latrines) at household level should be prioritized as an incentive for increased ownership and use of sanitation facilities on the project.	The project will support Kidera RGC with one public water borne toilet to be located at Kidera Town Council Market near the proposed park. The proposed sanitation facility will contribute to increasing access to proper and

No.	Concern	Remark
		improved sanitation in Kidera RGC
3	Coordination of the project among the consultants/contractors, Ministry of Water and Environment, District officials and village authorities should be emphasized	The project will have a coordination committee including district, sub county and village officials both at construction and operation phases.
4	Community ownership of the project should be a key component enshrined in project development. The roles and responsibilities of district technical and political teams, sub county, parishes and villages authorities to support the functionality of the project should be defined throughout the project lifecycle.	The roles and responsibilities of the different stakeholders have been clearly stipulated in the ESMP.

Figure 7-1: Meeting with Buyende District Officials on 3rd February 2022

CONSULTATIONS WITH KIDERA TOWN CCOUNCIL OFFICIALS

No.	Concern	Response
1	The project should ensure the security of the people of Kidera Town Council from migrant workers during the project construction phase	Construction shall enfornce E&S codes of conduct to regulate workers behaviour and any deviant worker shall handle in accordance with laws of Uganda.
2	Who will pay the cost of extending water to households? and how much is it likely to cost?	The pricing of water on the project is discussed in the project feasibility reports and will be discussed further during the ESIA studies for individual RGCs.
3	How much will a unit of water costs?	According to the project feasibility report, a 20l jerrycan of water will costs Ugx.83.
4	Who will manage the operations and maintenance of the water system and sanitation facility?	The proposal for the piped water systems to be managed by the Eastern Umbrella of Water and Sanitation.
5	For recruitment of skilled and unskilled labor on the project, priority should be given to the youth in Kidera Town Council.	The ESIA will assess available jobs on the project and make recommendations on employment of skilled and unskilled community members
6	What is the project coverage in Kidera Town Council?	The project is ultimately designed to cover 30 villages in Kidera TC by 2041. However, the first phase of the project will cover 4 villages, namely; Kitete B, Nakibengo A, Nakibengo B and Kiwambya
7	Communities (local authorities such as the LCI) should be engaged on recruitment of locals for available jobs, security of project resources and sourcing of local materials	Continued community engagement on the project to be recommended in the ESIA
8	Will there be compensation for land take on the project?	Compensation will mainly cover land acquisition for the borehole and water reservoir, water office, sanitation facility sites and access road to the borehole. Easement is recommended for land requirements for the transmission and distribution pipelines.

Figure 7-2: Meeting at Kidera Town Council offices

COMMUNITY CONSULTATIONS AT KIDERA TRADING CENTRES

The meeting was jointly conducted on 7/05/2022 with community residents of Kyauka, Kitete, Kiwambya, Ngulamubiri, and Kidera in the presence of the respective Parish Chiefs.

No.	Concern	Response
1	The community expressed concern on the deceitful people who have continuously given them false hope on water supply in their area and it is hard for them to discern if the project will successfully be implemented.	ESIA team is here to disclose the project as part of assessment. MWE to undertake continous engagements throughout the project cycle.
2	There is limited water at Kidera Health Centre IV as during the dry season, patients are required to buy water from water vendors at a fee of UGX 1000 for a 20 litres jerrycan.	The HCIV is amongst the inistitution to benefit from this project
3	Most of the nearby villages within Kidera parish share water from the seasonal borehole located in Kidera H/CIV with the Health Centre patients and staff. Besides the seasonality of the water, the water is said to be saline.	This project is here to improve access to safe and clean water for the community.
4	Kidera trading centre is densely populated with slums and therein a few sanitation facilities. The district provided only one pit latrine which cannot serve the huge population hence more sanitary facilities are required.	The project has provision for public sanitation facility.

5	The community complained about poor solid waste management in mainly the trading centre especially Kaveera that has claimed lives of livestock in the area. Measures should be put in place to mitigate the issues of solid waste management.	The contractor shall develop and implement proper waste management plan
6	The youth community requested to be offered opportunity for work as casual labourers and play a role in the development of their community	The contractor shall provide employment opportunity to the local people who qualify.
7	How soon will the water supply process start? Is the piped water going to be at a cost or free? If yes how much will be charge per jerrycan?	There will be a fee charged on water as a measure to maintain water supply in the communities. The feasibility study has proposed Ugx.83 for every 20litres of water collected from the water supply system.
8	Will the community member be considered for job opportunities?	At the time of recruitment, community members will be considered of opportunities at local area leader's recommendation
9	Are people's land going to be affected? If yes, will they be compensated?	Few people will be affected, especially at the location of the borehole, transmission, reservoir distribution line, location of the sanitation facility and water field office. The transmission and distribution mains will be laid along road reserves. The RAP report will assess compensation requirements on the project and propose compensation rates with guidance from the chief govt valuer based on Buyende District Local Government rates.

COMMUNITY CONSULTATIONS IN NAKIBENGO VILLAGE

No.	Concern	Response
1.	The community collects water from open water sources with which they share with their livestock. Water supply will improve the quality and access to clean water.	The project aims at provision of safe and clean water for the communities
2.	Some community members raised concerns on whether the water yields from the borehole will be able to supply the huge demanding population.	An assessment was done and the design is based on the demand for water in the area.
3.	The chairperson LC1 Nakibengo also raised concerns on whether land owners at the abstraction point will be compensated, and what procedures will be followed.	RAP is being prepared to ensure that eligible PAPs are compensated.
4.	The youth in Nakibengo requested to be offered job opportunities to do casual labour rather than offering the jobs to external workers	The contractor shall provide employment opportunity to the local people who qualify.
5	Where shall we go to apply for job opportunities? How can one have water extended to their house? How much money will be charged per jerrycan? What will be the payment procedure for the use of water?	Contractor shall establish an office to handle recruitment.

Figure 7-3: Community meeting in Nakibengo village

COMMUNITY CONSULTATIONS AT KABUGUDHO PRIMARY SCHOOL

The meeting included teachers of Kadugudho Primary School.

No.	Concern	Response
1.	The teachers welcomed the project and were optimistic for the information on the project. The school teachers noted that at school water is mainly used for bathing, washing and drinking. On a daily basis, each teacher fetches more than 50l of water. The school kitchen also uses water for cooking student and staff meals, and has a person assigned to fetch water.	Schools are part of the institutions to benefit from this project.
2.	Children have to wait for community members to fetch water before them, regardless of who comes first. Due to congestion at the borehole and fights, children's safety is minimized.	with more access to water points the time and distance travel will be reduced.
3.	The teachers raised a concern of child labour especially on Friday. Pupils fail to attend school because it is a market day and they have to help their parents with fishing, digging and market vending.	Child labour is strictly prohibited on the project

4.	Teachers informed that children come late and others miss school because they have to first fetch water for home use.	with more access to water points the time and distance travel will be reduced.

Figure 7-4: Meeting with teachers of Kabugudho Primary school

COMMUNITY CONSULTATIONS AT KABUGUDHO TRADING CENTRE

The meeting was shared with community residents of Kabugudho A, Kabugudho B and some from Nabweyo, coordinated by the area local council chairperson.

No.	Concern	Response
1	The Community members welcomed the project and appreciated the MoWE for the proposed development planned for Kidera and Kabuguudo A village in particular	The community is encourage to participate and support project implementation.
2	The community members stressed that they have only one borehole which is located in 100 meters from Kabuguudo Trading Centre and it is shared with 5 LCs, anmely; Nabweyo A, Bwinakwita, Kabugudo Main, Kabugudo B and Kamasila. They further noted spending a lot of time at the borehole, sometimes up to 2 hours, which reduces time allocated to other chores like washing, cooking.	Project intends to improve access clean and safe water
3	They informed the meeting that in Kabuguudo A they have about 500 households which is close to 1200 population and they all share one borehole which brings	Project intends to improve access clean and safe water

	about congestion due to high population depending on a single source.	
4	The one borehole in Kabuguudo A was constructed in 1995 by Buwasa company up to date, there isn't any other water source in the area. The community member mentioned that they had a dam which dried up 3 years ago.	Noted, Project intends to improve access clean and safe water
8	90% homesteads own toilets which has boosted good hygiene in their area. However, most households do not boil water or treat water for drinking.	Project intends to improve access clean and safe water
11	The community noted willingness to pay for piped water, since they already pay to access water at the borehole.	This is encouraging and with provision of the pipe water, the cost per jerrycan will be lower
13	The community members expressed a concern about compensation for those people whose land would be affected by water pipes	RAPs is being prepared to ensure that eligible PAPs are compensated.

Figure 7-5: Community meeting with residents in Kabugudho Trading Centre

MEETING WITH MGLSD

No.	Issues and concerns raised	Remarks
1	**Land acquisition:** For water supply system issues, land will have to be secured especially for intake, WTP, reservoir and along transmission and distribution networks. Consent forms from local leaders and other concerned authorities on land ownership should be availed to address the issues of land ownership.	The project RAP will incorporate the requirement
2	Permits and approvals: • All certification from concerned ministries and authorities i.e.; Directorate of water resources etc., should be acquired. • Site layout plans and architectural designs for solar powered piped water system and all that is entailed therein, should be submitted to the ministry for approval. Additionally, geotechnical survey/ study reports on bearing ratio to hold the pipes should be submitted	The list of permits and approval shall be recommemded in the ESIA
3	Design considerations: • The design lifespan of the sanitary facilities should be based on the size of the septic tank and the target population.	design has taken care of expected population
4	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.) • The employees should be pre-medically examined to determine mental capabilities before they are engaged or assigned with different tasks. • HIV/AIDS services should be extended to the employees through provision of contraceptives and allowing them to optionally share among themselves.	MWE to ensure that the Contractor implements health management plan
5	Health and safety considerations: • Emergency preparedness should be in place, emergency contacts displayed to know whom to contact e.g., red cross has Ambulances to attend to emergencies on road accidents. There should be internal preparedness in case of emergencies.	MWE to ensure that the Contractor implements OSH management plan

	• Firefighting mechanisms especially in camps e.g., Assembly points, fire extinguishers and smoking places should be designated. • Personal Protective equipment should be provided based on the risk assessed. • 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. • During digging of ditches, sites should be hoarded off with clear signage. • Traffic control through signage / flagmen and diversions should be done with the aid of Police and other concerned stakeholders. • Traffic management plans, excavation methods (machines), dust pollution and emanating noise should be addressed. • Driver competency, vehicle maintenance schedules should always be assessed and safe operating distances from the road addressed (50m for borrow pits and 15-20m for transmission mains)	
6	Pollution and environment management: • Restore the site to a more likely pristine nature, revegetate and encourage tree planting along the mains and more should be planted around the sludge treatment plant to curb the odour.	MWE to ensure that the Contractor implements measures for pollution control and environmental restoration plan
7	Community engagement: • The vulnerable groups should be planned for especially during the design of sanitary facilities • The redress mechanism plans should be in place to address challenges among workers, workers to community. A committee should be formed therein having natives of the area especially LC chairperson to bridge the gap between workers and community.	MWE shall deployed a team to under take continuous community engagement.

8	Employment: • The employment policy of the country should be followed; contracts, payment mechanisms, appointment letters should be in place. Children should not be employed • The contractor should be gender sensitive during employment for gender equality. And when employing, some percentage should be from the local people as part of ownership and sustainability of the project.	There will be no child labour allowed on the project and MWE to ensure the contractor complies with relevant employment laws

MEETING WITH UNRA

No.	Issues and concerns raised	Remarks
1	Where there is proposed road crossing, the project design team should provide definite crossing points especially at town junctions called service ducts	The road crossings on the project have been noted. MWE will consult UNRA before construction across road crossings
2	There is lack of consultations with UNRA as decisions are made to cross roads without notification and inputs to UNRA	MWE to consult URNA regarding road crossings.
3	There is no interface from Ministry of Water and Environment to update UNRA on their master plan for water networks or other specific requirements for decisions to be made collectively	
4	There is extortion of money from UNRA due to co-existence in the roads right of way. In most cases, UNRA is required to pay money for relocation of utilities located in their right of way during road upgrades. There should be agreements on who undertakes re-establishment of utilities in the roads right of way for better implementation of projects	UNRA to be consulted throughout project Implementation.
5	If there is need to be in road's right of way, considerations should be established for issues to be discussed before implementation as described in UNRA's new regulations	
6	In case there is need of implementing water works with crossing points on UNRA proposed road constructions, consultations should be made to harmonize works and prevent cutting of pipes during the initial road works.	
7	The design team should submit their typical road crossings and typical valves so as they can be synchronized with UNRA's class of concrete and to know the size of ducts required especially in big towns.	
8	Liaise with UNRA to know future road constructions especially bridges / right of way are not in proximity with water abstraction points so as not to contaminate the quality of water sources during road upgrades	

MEETING WITH MWE (DWRM & DWM)

No.	Issues and concerns raised	Remarks
1	What are the possible solutions to location of the borehole within 30m to household latrines? This was in line with the ground water abstraction sources for Kidera RGCs.	The ESIA has proposed relocation of the borehole site to a location without latrines to eliminate the possibility of fecal contamination from the 5 nearby latrines.
2	Develop Water Source Protection Plan and ensure that it is implemented during the commencement of the construction phase of the project through to implementation. The WSPP should consider 3% of the total development and implementation budget (include in the BOQ) as stipulated in the guidelines	SPP is being developed by the cnsultant
3	Ensure to develop sanitation/ solid waste management plans and clearly indicate the appropriate dumping for fecal waste	The contractor shall develop and implement proper sanitation and waste management plan
5	Were the boreholes test pumped? Abstraction rates, design basis. Identify the number of boreholes in the same locality to avoid conflicted abstraction	Yes, ground water assessments including testing and identification of other boreholes in the same location were assessed, and are included in the project feasibility report.
6	Water supply should indicate the positive and negative impacts anticipated from providing piped water to small towns such as increased semi-urban population and pressure on socio-economic infrastructure	Noted, these impacts have been assessed in the impact section of this report
8	Consider baseline water quality assessment and water quality monitoring after project establishment.	• Baseline water quality assessment was conducted at feasibility stage. • The ESIA conducted water quality assessments on surrounding water sources, mainly the lake in the vicinity of the project.

No.	Issues and concerns raised	Remarks
		• Water quality monitoring is a requirement under water supply and has been suggested under the water quality impact of this project.
9	Ground water sources – type of water treatment planned for boreholes	Disinfection of the water from the well will be effected by the installation of a DOSATRON online proportional chemical dozer at the reservoir.
10	Coordinates of wetlands that are likely to be used/ affected	The Borehole (DWD 60898) will be located outside the 200m protection zone of Lake Kyoga flood at coordinates (1°15'23.72"N, 33°16'30.71"E).

Figure 7-6: Meeting with DWRM and DWM

8. Grievance Redress Mechanism

OVERVIEW

Effective grievance redress mechanism gives an opportunity to the organization to implement a set of specific measures to ensure good governance, accountability and transparency in managing and mitigation of environmental and social issues of a particular project. The grievance redress mechanism shall consist of Grievance Redress Committees and shall be formed at the community level, construction site, Sub County/town council, District and MWE. A separate GRM for workers shall also be formed at the Construction site. The flow of grievance management is provided under **Annex G**. The GRM shall be disclosed as part of stakeholder engagement.

PURPOSE AND OBJECTIVES OF THE GRM

The purpose of GRM shall be to provide opportunity for 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 is such that the extra judicial systems will work smoothly and that number of disputes seeking interventions at the country judiciary will be minimized.

The objectives of the GRM include:

- 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.

LIKELY SOURCES OF GRIEVANCES

Considering the nature and extent of works, grievances are likely to arise from the the following:

- Land acquisition
- Restrictions on land use due to civil works, workers camps, material storage areas, material sources, etc.
- Clearance of right of way which may affect crops and trees
- Temporary displacement of road side activities in urban centers, including vendors
- Pollution due noise, dust
- Traffic accidents
- Workers Behavior or conduct including GBV, VAC, SEA/SH , alcoholism, smoking, drug abuse
- Disruption of social set up and security
- Compensation values and procedures
- Increased pressure on social services and infrastructure, including water supply

- Contractor's failure to pay workers and suppliers

MEMBERSHIP AND COMPOSITION OF GRIEVANCE MANAGEMENT COMMITTEES

GMCS AT VILLAGE OR PARISH LEVELS

Village and Parish GRM committees will be established as voluntary committees for each infrastructure to be constructed at village or parish levels depending on the community dynamics, area covered and nature of works. Community GRM Committees will have 10 members including

a) Chairperson,
b) Vice Chairperson,
c) Secretary,
d) Other Members (7) including a youth, Elderly Person, PWD and at least 3 members should be female. Quorum sitting shall be of at least five (5 members).

The LC I Chairpersons and Vice Chairpersons will be ex-officials to these committees.

NB: The committee shall be formed either at village or parish level given that linear projects traverse several communities. It is important that committees are accessible to communities at village or parish level.

GMCS AT CONSTRUCTION SITES

Each construction site shall have a Site GMC responsible for handling all community grievances related to construction including those grievances referred by the village/ Parish GMC. The Site GMC shall comprise of the following;

a) The Resident Engineer/ Supervising Consultant (Chairperson)
b) The Contractor's Contract Manager
c) Sociologist for the Consultant
d) Sociologist for Contractor (Secretary)
e) Environmentalist for the Consultant
f) Environmentalist for the Contractor
g) Health and Safety Officer for the Contractor
h) 2 Community Representatives (1 Female and 1 Male)

This committee shall consolidate and address all grievances from the community at the site and escalate any matters appropriately to the respective Local Government and MWE.

GMC AT SUB COUNTY/TOWN COUNCIL LEVEL

The committee will be formed at the sub-county level and its membership shall consist of;

a) Local Council III (chairperson);
b) The Sub County Chief,
c) Community Development Officer (Secretary)
d) Environment focal person

e) Representative of PAPs
f) Parish Chief of the respective area where the complaint originated from.

GMC AT DISTRICT LEVEL

At the District Level, the Grievances Management Committee shall consist of;

a) LC V Chairperson (Chairman)
b) Chief Administrative Officer or a his/ her Representative
c) District Community Development Officer (Secretary)
d) Head of Natural Resources
e) District Water Officer
f) Representative from the PAPs
g) District Lands officer

Note: Due to complex nature of grievances, the committees can be extended to include any other relevant officers suitable for addressing the prevailing grievances.

WORKERS GRIEVANCE COMMITTEE STRUCTURES

The common anticipated Grievances for Employee may include; Unsafe physical working conditions, Failure to issue formal contracts to workers, Illegal termination of contracts, Changes without prior notice, Poor employee relations, Poor/ failure/ delayed remuneration, Violation of workers' rights, Inadequate safety, health, and welfare amenities, Labor-management hostility, Incidences of workplace favouritism and nepotism, among others.

The grievance redress system for workers shall have three major committees set up and supported. These include the Workers' Council, Site Disciplinary Committee and overall Grievance Committee.

WORKERS' COUNCIL

The workers' council shall be constituted on the basis of directly elected representatives on the basis of different work sections. It will have representative workers including operators, drivers, mechanics, office/administration, technicians/lab, masons, flag ladies, foremen, clinic, casual laborers, surveyors etc. The different workers' categories shall mobilize and elect a representative to form a council of 5 members.

The 5 members shall select a Chairperson, Vice Chairperson, Secretary and members.

The council shall sit on a regular basis or monthly to discuss all complaints, welfare, working conditions among others. The Supervising Consultant's Sociologist shall be the patron of the Worker's Council and shall ensure that the members are provided with the support and protection to freely discuss and voice workers' issues.

Any issue that has not been addressed by the Workers' Council shall be escalated or referred to either disciplinary or Site Grievance Committee. The issues that disciplinary in nature shall

be referred to the Disciplinary Committee while other issues that are not disciplinary shall be referred to the Grievance Committee.

SITE DISCIPLINARY COMMITTEE

During the construction phase, a number of disciplinary related cases might emerge. Hence, each Site shall have to set up site disciplinary committee to ensure self- enforcement mechanism of discipline among workers.

The committee shall comprise of;

a) Consultant's Sociologist (Chairperson)
b) Contractor's Human Resource Officer (Secretary)
c) Workers' representatives (a Female and a Male).

The site disciplinary committee shall receive all disciplinary related complaints referred from the Workers' Council or from the Contractor's Management.

OVERALL SITE GRIEVANCE MANAGEMENT COMMITTEE (GMC)

Each construction site shall have a Site Grievance Management Committee comprising of the following;

a) The Resident Engineer/ Supervising Consultant (Chairperson)
b) The Contractor's Contract Manager
c) Sociologist for the Consultant
d) Sociologist for Contractor (Secretary)
e) Environmental Officers for the consultant
f) Environment Officer for the contractor

MANAGEMENT OF GBV, VAC AND OTHER OFFENSES

The management and referral of GBV, VAC, and other related criminal cases or allegations shall be inline with the Uganda Criminal Judicial requirement. The contractor and client shall ensure adequate sensitizations of stakeholders on the prevention measures and reporting of all criminal cases including GBV and VAC. In addition, MWE is recruiting dedicated consultant to among others ensure the implementation of mitigation measures, reporting and survivor centered management of GBV and VAC on the project. The reporting and referral pathways have been presented under annex G

CAPACITY BUILDING FOR THE GRIEVANCES MANAGEMENT COMMITTEES

It will be the responsibility of the MWE to coordinate and arrange for capacity building of the grievance committees. Local government administration shall have the responsibility of sensitizing and popularizing grievance redress arrangements to the local people and stakeholders. The ProjectSupport Team shall lead the rollout the capacity building framework and trainings to ensure the committees perform to the expectations of the stakeholders.

9. PROJECT IMPACTS

POSITIVE IMPACTS

INCREASED QUALITY WATER SUPPLY

Water supply is essential for human health and survival, for food security and the empowerment of women as well as the education of girls, for reduction in productivity losses due to morbidity and malnutrition, for the management and protection of natural resources. Although the crucial importance has been widely recognized, the right to safe water remains a promise unfulfilled for the world's poorest citizens. The lack of access to safe drinking water impedes economic development, thwarts progress towards gender equality and puts the health in danger. The project will ease the current water deficit in the project area and the environs consequently promoting the economic growth; the community will get access to quality clean water for drinking and domestic use. This will minimize cases of waterborne diseases resulting to a healthy community; reduce drudgery associated with water collection and result in gender balance.

According to Ministry of Water and Environment (MWE), feasibility report 2019 Kidera RGC large proportion of the population travels significantly long distances to the water sources. Within Kidera RGC, there are currently nine (9 No.) boreholes installed with hand pumps. The yields of these wells vary from 0.5 to 1.5 m^3/hr. The proposed groundwater water sources for the proposed piped water system are two boreholes. These boreholes (DWD 60870 and DWD 61681) were recently drilled by The Ministry of Water and Environment at coordinates 36N 503363.74 E, 147311.55 N and 503314.60E, 147243.53 in Nakibengo LCI, Kidera Parish. The proposed system will be sized basing on the maximum day water demand of **325.26**m^3/day by the year 2041. With the intention to serve about 2,999 residents in the four project villages of Kitete B, Nakibengo A, Nakibengo B and Kiwambya by 2041, therefore the construction of the water supply system will go a long way in improving water supply in this area.

Enhancement measure

- Ensure that the poor and other vulnerable groups can continue to safely satisfy their basic water needs. Take into account the population's capacity to pay when determining user fees.
- Ensure adequate water supply for addressing the basic needs of the beneficiary communities
- Develop alternative supply options to palliate for service breakdowns.
- Involve the population (men and women) in the management of new and improved services to ensure their sustainability.
- Implement water fees/tariffs to maintain a good quality and constant service level.
- Establish quality control for water supply and storage facilities.
- Provide information and education on monitoring and maintaining water supply systems, particularly for ensuring water quality preservation.

- Establish a formal consultation mechanism with local authorities to discuss issues disturbing inhabitants and to find solutions satisfying all parties.
- Plan wastewater management as part of the program

SHORT-TERM EMPLOYMENT OPPORTUNITIES FOR LOCAL COMMUNITIES

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 creates a great impact on the effectiveness and sustainability of water supply and sanitation programs. This can also help to minimize many of the potential negative environmental impacts associated with them. The project will therefore create direct and indirect employment to local people. The possible direct jobs include community workers (casual labour) such as trenchers, porters, cooks, security guards, etc. In terms of semi-skilled labour, there will be work for plumbers, masons, drivers, painters, carpenters, mechanics, electricians, mixer operators. There will be additional indirect employment opportunities such as supplier workers, petty business (e.g., food kiosks). This positive impact is classified as direct, short, highly significant, permanent and temporary. The income earned will enhance access to basic needs among the local communities. In order to maximize the above positive social impact, it will be necessary to consider the following enhancement measures. The likelihood of occurrence of the above positive impacts is Certain. The impact magnitude has been assessed as High, because without social acceptability the project can be adversely affected.

Enhancement measures

- Involve LC 1 village leaders in identifying casual and semi-skilled workers (Offer Identification / registration forms). However, the contractor should have jurisdictions over recruitment process and eligibility requirements.
- Contractor(s) will be required to employ to the extent possible local labour (specially to enhance benefits to the local youth) without compromising on the quality of their contractual outputs.
- Publicizing available project work opportunities in public areas such as administrative centres (such as sub-counties, town councils and trading centres) and such messages be aired in local the local dialect of the respective areas. However, should availed strictly to persons those above 18 years of age
- Conduct Labour Inspections on contractor's workplaces by District Labour Officer (DLO).
- Contractor should adhere to national Labour Laws, Policies and Regulations more so on renumeration and worker grievance management.

CONTRIBUTE TO LOCAL ECONOMY GROWTH IN THE AREA

During project implementation, the hired contractor will purchase local material supplies and services of required standard for local suppliers. There will be civil works thus necessitating materials such as sand, ballast, stones, cement, quarry chips, steel and timber. Construction equipment such as excavators, mixers, cranes are also often hired during construction. Formal and informal businesses will benefit from the works. Informally, those who provide services

to the workers on site for example catering businesses run by women will experience an upsurge in business. Similarly, businesses that provide services such as waste management will also greatly benefit from increased sales.

Enhancement measure

- Purchase construction material from the project locality if they meet the requisite standards
- The contractor should be conscious of the sources of these materials, as supplies from unlicensed operations indirectly promotes environmental degradation
- The contractor shall also ensure food vendors conform to hygiene standards related to food handling through health screening and should be licensed by the respective local government departments to supply food materials
- Publicizing available project work opportunities in public areas such as administrative centres (such as sub-counties and trading centres) and such messages be aired in local the local dialect of the respective areas. However, should be availed strictly to persons above 18 years of age.

IMPROVED/ INCREASED ACCESS TO CLEAN AND SAFE WATER AT COMMUNITY LEVEL

The proposed project will partially contribute to achieving the global SDG - Target 6.1 of universal and equitable access to safe and affordable drinking water for all by 2030. Additionally, the project will contribute to achieving the national targets of increased access to safe water in rural and semi-urban areas to 85 percent by 2025 and 100 percent by 2040 according to the third Uganda NDP and the Uganda Vision 2040, respectively (UNPA, 2020).

Data provided by Ministry of Water and Environment indicates that access to safe water in Buyende district was 38%, with rural access at 37% and urban access at 53% as of year 2021 (MWE/ Water Atlas, 2022). Access to clean water stands at 30% in Kidera Town council.

1) **Improved rural water access:** The baseline in Kidera TC is 30% (MWE, 2021), and this will increase after establishing the first Phase distribution network of 2Km and the start-up number of connections of 65No. household connections and 4No. public stand posts in 4 villages, some of them will be too remote and hard to reach.
2) **Improved physical access to safe water points / connections:** The project will construct new portable water access points in Kidera TC. It will improve the right to water and sanitation services that are physically accessible within, or in the immediate vicinity of, their households, workplaces, educational and health facilities. It will serve hitherto under-served areas that have been facing water stress and extreme water vulnerabilities in this rural area.
    - 65 start-up household service connections; and
    - 4 public stand points (PSPs) in 4 villages under phase 1 (Kitete B, Nakibengo A, Nakibengo B and Kiwambya)

The walking distance to safe water source will reduce as per the WHO standard of 100 meters to a water source. The project shall reduce critical walking distance for a hamlet to reach a

PSP to less than 1000m/ 1km between each PSP. Presently, 41.5% of households access water in distance of over 1km. This will be reduced.

Reduced time to collect water – At baseline, 0ver 40% households spend more than 1 hour to collect water from any available source. This will be reduced through availability of constant supply of clean water within a Km from households in target villages.

Figure 9-1: Situations at a borehole Kidera Trading Centre

Enhancement measures

- Conduct customer education and sensitize water users and communities about operations of new water system, especially on how to access new connections.
- Scale-up the intensification of lines, especially in areas where the trunk mains are too far away for the customers to be able to connect at reasonable cost.
- Ensure effective customer relations and customer care.

IMPROVED ACCESS TO SAFE AND CLEAN WATER AT PUBLIC INSTITUTIONS

Improved access to safe water will directly influence better public health conditions and health security. In this regard, the project will specifically impact on health facilities, schools, and markets in Kidera RGC. According to baseline information there is one health centre, twelve primary schools, several mushrooming landing sites including Meeru landing site and one weekly market in Kidera RGC. Baseline information further indicates that there are mainly boreholes and rainwater harvesting tanks at some public institutions used by both institutions and the neighbouring communities. The boreholes and rain water harvesting tanks tend to dry up during the dry seasons as such, this intervention will be an added source to address the water shortage issue.

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 daily often from sources distant from their houses. This reduction in burden would allow women and girls time for other activities including

involvement in economic ventures that could contribute to reducing poverty and furthering their education (thus increasing school enrolment). This impact will be enhanced through:

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

IMPROVED COMMUNITY SANITATION AND HYGIENE

The improved access to safe water will directly influence better human health conditions and health security. In this regard, the project will specifically impact as follows;

a) Contribute to reduction in incidence and prevalence of water related diseases and illnesses (e.g., Typhoid, diarrhea, dysentery, bilharzia, gastronomic disorders, malaria, etc) resulting from better access to safe drinking water, sanitation and hygiene. Insufficient water supply and sanitation as well as inappropriate hygiene practices are associated with number of different diseases such as dysentery, Cholera and other oral faecal diseases. Eliminating stagnant, standing water around the households and water points can contribute to reducing the incidence of malaria, in particular in dry areas with few natural mosquito breeding places. At the same time, reducing the incidence of water-borne, water-washed and water-based diseases through improved services and hygiene behaviours will have a positive impact on reducing the susceptibility to other illnesses.
b) According to WHO improves, Annually, safer water could prevent:
c) 1.4 million child deaths from diarrhoea;
d) 500 000 deaths from malaria;
e) 860 000 child deaths from malnutrition[18]
f) Improved on-site supply of water in health care facilities (WinHCF) – The project will improve / increase On-site supplies of clean water in many of health facilities (within all treatment wards and in waiting areas). Within Kidera RGC, there is no health facility with piped water. The project will provide piped water to Kidera HC IV which is a government aided facility. Therefore, in the end it will improve national, regional and global ranking of Uganda in terms of WinHCF. Nationally, the proportion of health facilities with basic water supply stands at 33% in Uganda (WHO Global Baseline Report, 2019). The UNICEF Joint Monitoring Programme (JMP) indicators on WinHCF show that Uganda ranks highest in terms of 'Limited" water at HCF at 65.15% in Sub Saharan Africa. It ranked 6th in terms of having 'Basic' water at 30.81% and 10th rank for having 'No Service".
g) Improve living conditions of medical staff at Health facilities – The improved access to on-site supply of water will contribute to better living conditions of medical staff

[18] https://www.who.int/news-room/questions-and-answers/item/how-does-safe-water-impact-global-health

that reside at health facilities. Baseline conditions show that majority fail to access water for their domestic use (e.g., bathing, washing) which in turn affects their work performance.

h) Improved community sanitation and hygiene – The project will construct 1 water borne toilet with following components - 2 No. stances for men; 2 No. stances for women; 2 No. stances for physically disabled (1 No. for each gender); Urinal for males, and 1 No. shower stall for each gender.

i) Improved menstrual health for women, adolescent girls and female youth - the public toilet will have incinerator for used sanitary pads installed in the female section of the toilet.

j) Contribute to national health security plan and targets – The piped water project will directly impact on Uganda National Action Plan for Health Security (NAPHS) 2019-2023. The aims at detecting, preventing, responding and mitigating public health hazards and emergencies (such as Cholera, Covid-19, HIV/AIDs, Ebola) that are recurrent health threats for Uganda (MoH/NAPHS[19], 2019). In this case, Kidera RGC has high-risk hotspot due to its high influx of Most At Risk Populations (MARPS) that include fishing communities without toilets, fish traders, migrant workers, youth, sexual workers, among others. More so, the project it will contribute to NAPHS Objective 4 (Target 12 - Improve infrastructure for water systems, isolation facilities and waste management) and Objective 3 (Objective 3: Strengthen the Healthcare-Associated Infection Prevention and Control program).

Enhancement measures

- Provide piped water connections to government health facilities (institutional connection) to all health units as part of the intensification lines.
- Adjust eligibility criteria for water connections by including appropriate conditionalities such as having a functional pit latrine, hand washing facility, rubbish pit / gunny bags for waste collection, community sanitation conditions (zero open defecation), among other. This will enable local leaders and potential water users to mobilize and prepare themselves before connection. It should be noted in many parts of Uganda, the water utility managing units such as WSDF/Umbrellas have often verified some of the above hygiene and sanitation conditions before establishing household connections. At the same time, given the rural nature of communities, verifying WASH conditions before any connection is done will enhance public health and safety.
- Provide water tanks to health facilities to enable them store enough water

CONTRIBUTE TO REDUCTION IN WATER BORNE DISEASES

The proposed water Supply and sanitation project will contribute towards reduction in the prevalence rates of waterborne diseases, especially typhoid, cholera, dysentery and diarrhoea.

[19] Uganda National Action Plan for Health Security (NAPHS) 2019-2023

This is anticipated since the communities will access clean water for drinking and domestic activities and with improved sanitation facilities. The awareness campaigns for public health, hygiene, and sanitation particularly targeted at women and girls will be widened to include measures for tackling HIV/AIDS and other diseases. The project will have significant strategic benefits in reducing the burden on the cost of health care services as diseases could be reduced. Improved water supply and sanitation will promote good health and reduce health care costs thus making overall national savings for investment in other developmental activities.

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

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

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

SKILLS AND TECHNOLOGY TRANSFER

Skills and technology transfer will take place in all phases of the project, though most importantly at the construction phase. It is anticipated that construction works will be contracted to a reputable Ugandan firm which will employ and train local labour. This will avail an opportunity for skills and knowledge transfer into Buyende communities. The operational phase will equally offer skills build-up, particularly for students from technical institutes with respect to the operation, management and maintenance of the various water supply and sanitation facilities.

The project proposes to a system manager, an accountant, a receptionist, a plumber, and a systems overseer. Two additional operators will be required to run the water treatment plant. The entire recruitment process for the workers will be managed by the EUWS in accordance with Uganda labour laws, the World Bank safeguard policies and EHS requirements/guidelines. Skilled local labour will be prioritised during recruitment.

IMPROVED ENROLMENT RATIO OF GIRL-CHILD AT PRIMARY SCHOOL LEVELS

The project is expected to translate into an increase in the enrolment ratio, especially for girls, and in the female literacy rate. Similarly, the ease of water fetching will contribute to the reduction in social conflicts related to water use such as those associated with the congestions at the existing boreholes. This impact will be enhanced through ensuring that most of the communities in the project foot-print are connected or have access to the piped water.

ENSURE ENVIRONMENTAL SUSTAINABILITY

The skill for managing water supply and sanitation 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. This impact will be enhanced through training of local communities on aspects of environmental and social management.

ADDITIONAL SOURCE OF REVENUE TO THE GOVERNMENT

The GoU will invest heavily in the construction phase of the proposed project which would involve use of locally available materials. The business community could take advantage of the proposed development to establish businesses that would otherwise be impossible without piped water. Furthermore, benefits to the Ugandan economy are foreseen to accrue during the construction and operational phases. Income will be generated through tax remittances such as Value Added Tax (VAT), With Holding Tax (WHT), Pay as You Earn (PAYE), Local Taxes, etc. The income generated will not only go the National Treasury, but equally to the District Treasury, thus directly benefiting Buyende District residents.

Enhancement measures

- During the construction phase, conditions should be put in place to ensure contractors prioritise use locally produced materials.
- The water distribution network connections should target SMEs.
- During the construction phase, all contractors and sub-contractors should be registered tax payers with the Uganda Revenue Authority (URA) and should pay applicable taxes and remittances in a timely manner.
- The project developer should ensure that engineering designs, architectural drawings and site layout plans for the various project facilities be submitted to the Physical Planning Committee of Buyende District Local Government for review and approval. EUWS, the foreseen operator of key project facilities, should obtain operational licenses from Buyende District Local Government once the facilities are ready for commissioning.
- The Central Government through URA should ensure that project facilities operator makes timely submissions and routinely update their tax bases.

NEGATIVE IMPACTS AND RISKS

CONSTRUCTION PHASE

IMPACTS OF LAND TAKE

The project components, namely; water sources and associated components such as the Pump house area, transmission, water reservoir and distribution, mostly traverses farmland under cultivation along settled and built-up areas. The reservoir site is located on land belonging to Kidera Town Council. The project will also be required to acquire land for access roads to the boreholes and the reservoir.

According to the project Resettlement Action Plan, the project will acquire land as follows:

Table 9-1: Land requirements on the project

Project Component	Land Requirement by Project (M^2)	Area in Acres
Water Source Site	900	0.22
Reservoir Site	900	0.22
Water Office	400	0.10
Public Toilet Site	100	0.03
Transmission and distribution	28,093.277	6.942

The project infrastructure is planned to mostly make use of road reserves of the existing public roads for its water transmission and distribution lines. However, the water source and the location of the sanitation facility shall be located on private land, whose owners will be engaged by MoWE in the process of land acquisition as per the laws governing land acquisition. The site for the reservoir and its associated access road belong to Kidera TC.

The clearing of corridor, movement of equipment and contractor staff and laying of pipes may lead to spot destruction of crops. Construction of the water intake, reservoir, water water office and sanitation facility will involve taking of land permanently from the original owners. In general, the loss of land will be direct, permanent, and irreversible resulting in a High impact sensitivity. The extent of land take/ project footprint is however low (**Error! Reference source not found.**), thus a low impact Intensity. Overall impact significance is rated as Minor.

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

Mitigation Measures

- LGs in the respective areas should be involved in mobilisation and sensitizing PAPs on the project land requirements;
- Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the water sources, water treatment plant, reservoir tanks and any other activity either by the developer shall be compensated for in accordance with applicable land acquisition legal instruments and GIIP relating to land acquisition;
- PAPs should be given financial literacy on how to use their compensation packages to avoid squandering and remaining in worse off conditions;

- In-kind compensation can be considered especially where the PAPs prefer so;
- Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses and manage their cropping calendars to avoid loss of crops.

Residual impact significance: Minor

LOSS OF VEGETATION COVER

Vegetation clearance will mainly take place at the water source site, distribution and transmission mains. According to the project baseline studies on vegetation, the entire project footprint has been modified by a combination anthropogenic factor such as cropping/farming grazing and seasonal fires amongst others, hence the areas do not have any pristine vegetation. In addition, baseline information indicates that the entire project site manifested low diversity of plant species with Asteraceae and Fabaceae families registering the highest number of individual species, each with eleven (11) species dominated by Bidens pilosa (69%) of the total percentage ground cover, followed by Ageratum conyzoides with (10%), Asteraceae and Indigofera hirsute with 16%, the rest registered 8 or less.

Out of the seventy-five (75) plant species encountered in all the study areas, only TWO species were listed under IUCN Red List of Uganda as of 2018. These are:

- Milicia excelsa (Mvule) in Moraceae, globally listed as Near threatened and nationally as (EN A2acd,); three large trees were recorded along the transmission to Kidela HC IV, and
- Tamarindus indica (Fabaceae), globally as NE, and nationally as (VU A2acd), only one tree along the transmission to Kidera, before Kapalasa ST. Kizito Primary School.

Although these species raise a great conservation concern in the country and in the region, all the observed species ranged between 10-25 meters from the road, therefore a linear project with small water pipelines may not have any major impact trees of conservation concern as the pipeline can be modified away from the trees to avoid damage to the identified tree species.

Apart from vegetation clearance at the intake, water office and the proposed locations of the public sanitation facilities, vegetation clearance is expected to be linear and minimal along the transmission and distribution lines with allowable instances of repositioning to avoid sensitive vegetation. The reservoir sites and pipeline routes are mainly covered by short grass that will rejuvenate on completion of construction works. However, several invasive/alien plant species, namely*; Amaranthus spinosus, Bidens pilosa, Chromolaena odorata, Conyza sumatrensis, all in Asteraceae), Commelina benghalensis (Commelinaceae), Hyptis sualoense, Leonotis neptifolia (Lamiaceae), Sida acuta (Malvaceae), Melia azedarach (Meliaceae), Imperata cylindrical, (Poaceae), Lantana camara, Stachytarpheta indica, (Verbenaceae)* were

registered in project area and if not appropriately handled could be spread further by construction activities.

However, given the smaller project land requirements compared and largely linear and based on limited land-take, this impact gauges as of low impact magnitude. In addition, only three tree species of conservation concern were identified within the project foot print and the study suggests that, the design leaves their locations outside the project. The overall impact significance is assessed as Minor.

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

Mitigation Measures

- The project design should avoid the locations of the two trees of conservation importance to ensure their protection;
- Vegetation clearance should be limited to only localities required for project development needs; and
- The contractor should restore sites where activities will be carried out at all the project sites. This site restoration and revegetation should involve planting of indigenous trees/vegetation types.

Residual impact significance: Negligible

LOSS OF FAUNA AND HABITATS

During project implementation, vegetation clearance, excavation and landscaping are expected to compromise some habitats. The clearance will lead to temporary loss of foraging habitat, basking, reproduction and hiding habitat for fauna. However, the baseline studies indicated:

a. Three (03) species of butterflies were recorded during the survey; African Queen *Danaus chrysippus*, African Leopard Fritillary *Phalanta eurytis* and African Migrant *Catopsilia florella.* ***All the butterfly species encountered are categorized as Least Concern by the 2020 IUCN Red List of threatened species.***

b. Nine (9) amphibian species (two toads and seven species frogs) were recorded in the project area. ***All the species encountered are categorized as least concern according to 2020 IUCN Red List of threatened species.***

c. Five species of reptiles two lizards, one crocodile, one snake and one skink were recorded during the survey of the Kidera water system project areas. ***None of the reptiles***

encountered and those reported by the community members are Red Listed. All the species are listed as least concern by IUCN 2020 Red List of threatened species.

d. Nineteen (19) species (Boreholes (11), reservoir (10) and distribution and supply pipeline were observed and recorded. The species represent fourteen (14) families and Eighteen (18) genera. ***The IUCN 2020 Red List of Threatened species categorizes all species as Least Concern (LC).***
e. Two species including Black Rat *Rattus rattus* and the Marsh mongoose *Atilax paludinosus*. Were reported by residents. The two represent the families Muridae (mice, rats, voles, gerbils, hamsters, etc.) and Herpestidae (Mongooses) and ***are listed by IUCN as being Least Concern (LC) according to the IUCN 2020 Red Data List.***

Based on these, project sensitivity is low and the impact intensity of the project on fauna is rated as low with its overall impact significance is ***Minor***

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

Mitigation measures

a. Clearance of fauna habitat (vegetation and soils) should be limited only to localities required for development;
b. The contractor should restore sites where activities will be carried out at all the project sites;
c. All project workers should be sensitized to observe instructions aimed at no hunting of any opportunistic wildlife in the sites;
d. Trenching, pipework laying as well as well as backfilling will be done concurrently. For pits like at the booster station, the contractor shall ensure that every evening, the pits are covered with timber while being secured with a warning tape to check accidental falls of wildlife and livestock in excavated pits;

The natural vegetation at the location of the intake and water treatment plant should not unnecessarily cut to avoid impacting possible habitats for invertebrates.

Residual impact significance***: Negligible***

DISTURBANCE AND DEGRADATION OF WETLAND ECOSYSTEMS

The project is likely to affect the wetland at the proposed location of the project borehole DWD 60870, transmission pipeline and the pump house. The main activities that will be undertaken in a wetland are excavation and establishment of the borehole and transmission pipeline from the abstraction point. The borehole DWD 60870 is located within the 200 m buffer zone prescribed in seventh schedule of the National Environment (Wetlands, River Banks, and Lake Shores Management) Regulations, N°. 3/2000.

Project works within the wetland will involve removal of wetland vegetation, excavation, installation of project infrastructure and redesigning of topography to suit the proposed project structures. The need for extensive earthworks to remove the vegetation and other loose subsoils to reach stable ground suitable for the foundation works for the pipeline may likely impact on the soils thereby erosion.

Construction of the project infrastructure will therefore result in loss of wetland vegetation, disturbance/loss of habitat for fauna and/or killing of wetland fauna, water pollution, siltation, turbidity, and sedimentation of water resources, which will comprise the wetland function in/near the project.

By and large, the impact magnitude is low since the construction works will:

- Occupy a smaller space as compared to the entire wetland,
- short-term duration (duration of construction works),
- be reversible at completion of works, and
- The proposed project location within the wetland is already disturbed by human activity

Therefore, the overall impact significance will be Moderate.

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

Mitigation Measures

- Obtain a wetland user permit from NEMA existing borehole DWD 60870 as well as the subsequent contruction works within the protection zone of the Lake Kyoga;
- The project implementation should then keenly follow the conditions in the Wetland User Permit to issued by NEMA;
- Construction works of the borehole, part of the transmission line within the wetland, should be limited to project footprint and allocated timeline;
- All project workers should be sensitized on minimization of damage to the wetland flora and fauna; and

- Close monitoring and supervision of the construction operations to ensure compliance to the NEMA permit conditions and avoid causing further damage to undesignated project areas.

RISK OF CONTAMINATION DUE TO FLOODING OF WATER SOURCE

borehole DWD 60870 is located in a flood prone lowland where infiltration of surface run-off may occur during heavy rains thus contaminating the water source. Given that at the time of the assessment, the area was flooded the potential contaminants may include pollutants carried by runoff.

The sensitivity of the receptors is considered to be 'high' while the impact intensity is considered to be low given that the project design will put into consideration construction techniques for water source protection to ensure minimal risk of contamination. The overall impact significance is moderate.

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

Mitigation measures

- The borehole should be constructed with a water tight casing above the water table
- The design and construction of the pump house at source should incorporate a raised apron slab above the ground by the required height for the predicted flood depth of the area.
- Aprons should be constructed with deep foundation edges to avoid erosion.
- Routine water quality tests should be carried out at borehole DWD 60870 and after events with potential to cause contamination, upon which appropriate water treatment should be carried out to remove the detected contaminants before its distributed to the users.
- A water source protection plan has been developed to ensure sustained water quality and quantity for the project.

SUSCEPTIBILITY TO SOIL EROSION

The site earthworks during construction of water sources, water transmission and distribution network and water storage reservoir will reduce soil stability and hence make the soils aggregated and more susceptible to erosion especially during the rainy season, resulting in sedimentation in water sources / wetlands in project areas downstream. This may affect

breeding habitats for the herpetofauna. Minor excavation works will take place at the water source, reservoir site, water office and the location of the proposed sanitation facility; soils excavated along transmission and distribution routes will be used for backfilling, thus reducing on top soil loss and dust pollution therein.

The impacts of soil erosion will occur, given the modified vegetation cover of the project area, leaving the soils prone to wind as an agent of erosion thus a Medium impact sensitivity. Since the scale of the construction activities is short term and limited in extent, the Intensity of impact is considered to be 'low'. The overall impact significance is assessed as moderate.

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

Mitigation measures

- Vegetation clearance should be limited to localities required for development.
- Construction sites should be hoarded off before excavations and soil barriers put in place to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water.
- Topsoil should be removed prior to carrying out excavations and kept separately so that it is used last in backfilling of the excavated areas. This is to ensure that the living soil (top soil) is available for plant growth in disturbed areas.
- The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation.
- Excess excavated soil material which will not be used for construction works shall be removed from the site in a timely manner and deposited at an approved site
- Areas adjacent to the construction site should not be disturbed and care taken to minimize the area of impairment caused by on-site storage of construction materials and equipment.
- MWE will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. Native vegetation must be used for re-vegetation of excavated sites.

GENERATION OF SOLID WASTES

The proposed project will generate waste of various types at the construction phase including food remains, polythene bags, plastic bottles, plastic offcuts from the HDPE and uPVC pipes

papers, wrappings for components to be installed, excavated soil and left overs of construction materials (timber, aggregates, sand, bricks/blocks, steel bar cuttings, glasses, cement, etc.), etc. Such waste needs to be handled reasonably and must not remain in the road reserves or along the water trenches. Inappropriate disposal of waste or spoil could have medium or long-term environmental and public health impact. Improper managing of these wastes could result in contamination of soil, air, surface water and thereby posing public health risks.

The sensitivity of project locations such as the water sources, reservoir sites and along the transmission and distribution networks, water office and sanitation facility location are also high since there is no regulated waste management in the RGC. The impact intensity is assigned Low due to the low volumes of waste expected on the project resulting in a **moderate** impact significance.

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

Mitigation measures

- The Contractor shall develop and implement a Waste Management Plan that will ensure that:
  - ✓ The wastes are properly segregated and separated to encourage recycling of some useful waste materials, that is, some excavated material can be used as backfills.
  - ✓ Solid waste storage bins and/or skips are provided at contractor's sites and at the construction sites and ensure they are collected or emptied in time. Depending on the rate of accumulation, waste collection is made at least once in 24 hours and done in such a way to minimize nuisance of smell and dust during collection.
  - ✓ Hazardous wastes such as paints, cement, adhesives are managed through a third-party contractor certified by NEMA. The wastes shall be transported in a NEMA approved box body trucks to the NEMA approved waste disposal facility in Kamuli.
- All sorts of waste generated during construction such as HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and delivered to recycling facilities. Other forms of waste which are inert must be collected by NEMA gazetted waste handlers and taken to a NEMA gazetted waste disposal facilities for disposal.
- All organic waste generated at eating places during construction such as food stuffs shall be collected and transported by the contractor to designated district landfills for disposal.

- All plastic waste generated during construction, such as mineral water bottles, polyethene bags, jerricans and cups shall be collected and taken for recycling in plastic collectors in designated areas within or around the district for onward transmission to plastic recyclers.
- The contractor will work with Buyende district Local government to facilitate sound waste handling and disposal. All wastes must be taken to the approved waste disposal facilities. Proof of delivery and safe disposal of waste will be provided and records maintained at all times.

RISK OF SOURCE CONTAMINATION FROM PIT LATRINES

Borehole DWD 61681 is located on raised land 200 meters outside the Kyoga buffer zone with limited potential for flooding. However, infiltration of surface run-off may occur during rise in the lake Kyoga water table and heavy rains thus contaminating the water source. Cumulatively, the location of the water source is close to a settlement and approximately within a 50m radius to six pit latrines owned by different households (Figure 9-2). There is potential that more households will spring up at the proposed location due to population growth within the project area by the ultimate year (2041). This may increase potential for cross contamination from the growing number of sanitation facilities and threaten the quality of the water from the borehole in the long run.

Figure 9-2: Latrine located near the Kidera borehole site

The sensitivity of the borehole water to contamination is High and given the vicinity of the borehole to pit latrines and the target user population for the water from the borehole. However, the impact Intensity is low since the project design will put into consideration

construction techniques for water source protection to ensure minimal risk of contamination. Additionally, the water will also be disinfected by the installation of a DOSATRON online proportional chemical dozer at the sump (see Section 0 above).

The overall impact significance is moderate.

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

Mitigation measures

- The production well should be constructed with a water tight casing above the water table
- A Resettlement Action Plan has been developed for land requirements of the site to deter cross contamination of the source by nearby latrines.
    - Under the RAP, the ESIA recommends that MWE should secure at least a 50m radius from the borehole site to eliminate potential for cross contamination from pit latrines
- A water source protection plan has been developed to ensure sustained water quality and quantity for the project. Among the recommendations from Kidera RGC Water Source Protection Plan is:
    - Household around borehole DWD 61681 should be supported with sanitation facility types that are not a threat to ground water contamination, such as ecosan, lined pit latrines. Sensitisation on usage should be conducted to ensure adoption of the technologies around the borehole.

AIR POLLUTION

Baseline Ambient air quality measurements indicate that the environment around the project area has pollution levels which are high based on-air quality measurements which averaged above the recommended limit prescribed in the World Health Organisation Air Quality Guidelines (WHO AQG), 2021 for Particulate Matter ($PM_{2.5}$, PM_{10}), CO, NO_2, and SO_2. The project location is generally rural with mainly motorcycles and a few salon vehicles as the main mechanism of transport on community roads.

The area sensitivity is low since it is generally rural with most households located far off the main road except in trading centres and near public institutions such as schools and health facilities. The impact intensity will be low due to the limited extent of earth works and few

vehicles that will be required on the project that are the potential sources of air pollutionThe overall impact significance is therefore Minor.

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

Mitigation measures

- Travel speeds of construction vehicles along the road especially at trading/ business centres will be controlled and should not exceed 50 km/h;
- Trucks will be covered during haulage of construction materials to reduce on spillage of materials and wherever dust suppression is necessary, water will be sprayed over dusty areas;
- Workers will be provided with PPE and the use of PPE shall be enforced;
- Accessed roads which of murram/gravel will be routinely sprinkled with water to suppress dust and frequency of which shall be included in the Contractor's Traffic Management Plan.
- Stockpiles of friable material will be grassed to prevent wind erosion; and
- A maintenance programme for equipment and vehicles will be implemented, to ensure air emissions like particulates, SO_2 and NO_2 are minimised.

The overall residual impact significance***: Negligible***

NOISE AND VIBRATIONS IMPACTS

Noise and vibration will occur both on and off site. This will emanate from movement of trucks, excavation works, usage of equipment (compactors and generators). Exposure of communities, workers and fauna to high noise and vibration levels can be a health concern. According to baseline noise level recorded in Kidera RGC, average noise levels ranged from 51.6dBA in Kidera Health Centre IV a hospital area near the location of reservoir, distribution and water transmission lines to 56.8dBA in Nakibengo trading centre, a mixed residential and semi-urban area, near the location for the Water abstraction, transmission and distribution lines. The baseline noise levels measured were slightly above the maximum permissible noise limits. The noise levels emanated mainly from anthropogenic economic activities (high volume music from bars, local cinema halls, and shops, speeding vehicular traffic) and people taking.

Table 9-2: The noise impact significance per project component site

Component	Expected equipment on site	Sensitive receptors	Sensitivity	Intensity	Significance
Intake, raw water transmission and Pump house	Movement of trucks, Excavation works, Usage of equipment (compactors and generators) Masonry works.	Workers, households	Low	Use of heavy construction equipment for a short term and limited in extent = Low	Minor (4)
Water transmission	Movement of trucks, Excavation by causal workers, Use of mobile compactors	Workers peri-urban population (businesses and settlements) incl. school	Medium	Use of manual labor, short term and limited in extent = Very Low	Minor (3)
Water reservoir and chemical house	Movement of trucks, Excavation works, Installation of reservoir parts Masonry works, usage of equipment (compactors and generators).	Semi-urban population (mix of businesses and settlements)	Medium	Use of diverse equipment for a short term and limited in extent = Low	Moderate (6)
Distribution network	Movement of trucks, Excavation by causal workers, Use of mobile compactors	Workers; Semi-urban population (mix of businesses and settlements), Schools	Medium	Use of manual labor, short term and limited in extent = Very Low	Minor (3)

Component	Expected equipment on site	Sensitive receptors	Sensitivity	Intensity	Significance
Construction of sanitation facilities and water office	Manual labor, Metal work, Compressors	Semi-urban,; population (mix of businesses and settlements)	Medium	Short term and limited in extent = Very Low	Minor (3)
Along access roads	Movement of trucks	Workers; peri-urban population (mix of businesses and settlements), School	Medium	Approximately 3 trucks for the entire construction phase = Low	Moderate (6)

Mitigation measures

- Workers should be provided with the necessary personal protective equipment (PPE) such as ear muffs;
- Periodic medical hearing checks should be performed on workers exposed to high noise levels;
- Construction sites must be hoarded to curb noise impacts to neighbouring communities;
- Works should be undertaken during day time that is, from 8am to 6pm;
- Works near schools or health centres should be done in periods like weekends for noise not to interfere with learning/health environment;
- Weekly monitoring of noise levels at active sites should be carried out by the contractor; and
- Avoid operating noisy equipment when not required, such as idling of cars, operating of generators when not required.

Vibrations: The effects of vibration vary and depend on the magnitude of the vibration source, the ground conditions between the source and receiver, presence of rocks or other large structures in the area. Due to absence of Uganda standards for vibrations, the ground vibrations standards are adopted from Ireland.

Typical vibration from transportation and construction sources falls in the range of 10-30 Hz and usually centres around 15 Hz. Therefore, the limit of 12.5 mm/s for construction equipment was adopted.

Baseline information on structures in Kidera RGC indicates that most of the houses are semi-permanent. The baseline vibration measurements in Kidera RGC averaged at 0.82mm/s in Nakibengo Trading Centre and 0.66mm/s in Kidera Health Centre IV.

Vibration monitoring may be necessary in case the contractor utilizes equipment with vibration frequency beyond 30 Hz to detect any structural damage risks. However, given the scale of works, use of equipment with such high levels of ground vibrations that can cause structural damage is not envisaged. Therefore, the sensitivity of the area to vibration is very low and even when it occurs the impact intensity is very low since vibration from construction equipment falls within the permissible limit of 12.5mm/s resulting in an overall Negligable impact.

TRAFFIC SAFETY

The proposed project will cut across several roads within the project area and the baseline information indicates that there are few road accidents in the project area. Those that occur mainly involve motorcycles. Children were also noted to ride bicycles to fetch water along community roads. Motorcycle and bicycle riders therefore need to be notified about works at possible road crossings and the presence of construction trucks within the project area.

Due to the rural nature and introduction of construction activities not common in the project location, the impact on traffic will be easily noticeable. The occurrence of the impact is therefore Low and moderate in nature.

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

Mitigation measures

- The Contractor shall develop and implement a Traffic Management Plan which is to guide aspect of traffic in the project;
- Likely disruptions to public access shall be identified in the Contractor's works schedule and responsive traffic management measures instituted to guide traffic through such areas;
- Vehicular access through areas of public institutions (markets, schools and health centres) shall be managed by traffic/flag persons who are work hand-in-hand with the traffic police in their areas;
- Road and site safety training should be conducted as part of tool-box talks in the project;

- Conspicuous signage shall be well placed on roads and the Contractor's Traffic guides on ground shall direct traffic in case of diversions or open trenches.
- All company vehicles used in the transportation of construction workers, material and equipment to and away from the site shall be in sound mechanical conditions. Evidence shall always be provided by recording the status of the vehicle in the Daily Vehicle Inspection Form before usage;
- All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits; and
- The vehicle speed shall be limited to a maximum of 30km/hr areas near sensitive facilities; and
- Works near sensitive facilities like schools and health centres shall only be limited to day time (7am to 6pm).

OCCUPATIONAL HEALTH AND SAFETY RISKS

Inadequate OHS risks management could result from insufficient medical capability at the construction site; or neglect of safety equipment, precautions, and procedures. Other causes of OHS problems in similar site could include amongst others, lifting of heavy and sharp objects, poor transportation of materials for maintenance, improper storage as well as handling and use of dangerous substances/chemicals, inadequate lighting and ventilation in workplaces, lack of adequate training (or neglect of safety precautions/ guidelines) in use of equipment and tools, misuse of equipment and materials for functions they are not designed, lack of safety signage in specific areas, electrical hazard, eye hazards such as splashes, lack of adequate PPE, and biological hazards (vermin, mosquitos, pathogens, etc.). Accidents could cause considerable ecological damage, financial loss and harm to human life. While largely reversible, some impacts such as loss of human life and body injury are irreversible.

The impact magnitude is high even if MoWE procures a qualified contractor who is aware of OHS measures but workers do not follow OHS requirements. Nevertheless, this gives rise to an impact of Moderate significance.

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

Mitigations measures

- The Contractor shall prepare and implement an occupational safety and health plan for all sites, approved by the MoWE;

- The Contractor shall provide safety guidelines to all operations prior to start of work;
- Strict adherence to safety measures and procedures are required to minimise (or eliminate) risks of accidents or hazardous developments occurring and ensure healthy and safe conditions for all persons working on the site;
- On-site training shall be conducted on how to prevent and manage incidences and such could involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences;
- Regular drills on site safety will be routinely conducted followed 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 case of incidences;
- Personnel on duty shall always wear appropriate PPEs, such as safety glasses with side shields, face shields, hard hats/helmets, and safety boots be required for all site staff;
- The Contractor shall establish emergency entrances, exits and amenities in the project facilities;
- The Contractor shall ensure that there are First Aid Kits on the site and such shall be modestly stocked with consumables that are key in delivery of first aid on the site;
- The Contractor shall secure site boundaries with fences or hoardings as appropriate to keep off intrusion in the project;
- The Contractor shall install caution signage around the site to discourage the public from being close to the site, for example, “falling debris”, “keep off the site” etc;
- The Client through the Construction Supervisor will continually monitor Contractors´ compliance with Health and Safety measures;
- An Accident Log will be maintained onsite to register all injuries and to investigate their causes during both the construction and operation phases of the project;
- The manufacturer's instructions and Material Safety Data Sheets (MSDS) shall be followed for the storage of all chemicals used in water treatment. Storage must conform to compatibility restrictions; and
- Work force shall be subjected only to standard work shifts/hours. Overtime allowances, if applicable/warranted shall be paid with ceiling limits. Working beyond such ceiling limits shall be discouraged, even if, so desired workforce or contractor.

RISK OF NON-PAYMENT OF WORKERS, SUPPLIERS AND SUB-CONTRACTORS

Delay in payment or the non-payment of suppliers and subcontractors of a contractor is a usual occurrence in projects, and poses a grave risk to project which negatively impacts on the effectiveness of the contractor and as such affect project delivery schedule and it creates mistrust between the parties impacted. It is therefore essential, that contractors ensure they are paid on time so that they do not unnecessarily ‘renege’ on their contractual obligations with suppliers of good and services to the project. Delays and failure to pay them for supplies to the project can affect their financial status and even survival in business. Lastly, non-payment would trigger grievances and also cause reputational damage to the project. This impact is ranked ***Moderate.***

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

Mitigation Measures

- All workers must sign contracts as part of engagement in the project;
- Include clauses for equal pay for equal work;
- Institute Contractor Grievance Committees to handle grievances including those related to labour issues;
- Involve the District Labour Officers in project supervision to offer guidance on management of labour issues;
- The provision of 'pay when paid clause' should be introduced in the contractor and supplier/sub-contractor contract;
- Understanding the terms or clauses of payment in the project;
- The effect of delayed payments on the project progress must be understood by all parties and personnel involved; and
- Right for contractors to suspend work in the event of late or non-payments by the client to avoid unnecessary stand offs with suppliers.

Residual impact significance: **Negligible.**

LIABILITY FOR LOSS OF LIFE, INJURY, OR DAMAGE TO PRIVATE PROPERTY

Some of the Construction activities may lead to accidents that may be mild or fatal depending on various factors. During the implementation of the proposed project, accidents could be due to negligence on part of the workers, machine failure or breakdown or accidental falls into the pipeline trenches. These incidents can be reduced through proper work safety procedures. In addition, during construction, there may be damage to private property that may not be foreseen by the RAP. This impact is ranked ***Moderate.***

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

		Sensitivity			
		1 Very low	**2 Low**	**3 Medium**	**4 High**
	4 High	4 Minor	8 Moderate	12 Major	16 Major

Mitigation measures

- Provision of PPE to all worker;
- The contactor will ensure that the Project is implemented by total adherence to the Employment Act 2006;
- The workers should receive requisite training especially on the operation of the machinery and equipment;
- There should be adequate warning and directional signs;
- Ensuring that the prepared code of conduct for staff is followed to prevent accidents;
- Develop a site safety action plan detailing safety equipment to be used, emergency procedures, restriction on site, frequency and personnel responsible for safety inspections and controls;
- Cordon off unsafe areas and provide safe crossing points across trenches;
- Provide an onsite clinic to provide first aid services to the staff;
- Recording of all injuries that occur on site in the incident register, corrective actions for their prevention are instigated as appropriate;
- Contractor to ensure compliance with the Workmen's Compensation Act, ordinance regulations and union agreements; and
- The Contractor to repair any damage done to private property.

Residual impact significance: **Minor.**

RISK OF SEXUAL EXPLOITATION AND ABUSE (SEA) OF COMMUNITY MEMBERS BY PROJECT WORKERS

This impact refers to sexual exploitation and abuse committed by Project staff against communities, and represents a risk at all stages of the Project, especially when employees and community members are not clear about prohibitions against SEA in the Project. Commercial sexual exploitation is reportedly practiced in bars in the Town council which provides a fertile ground for this practice to be propagated by the workers. Other places are clubs, streets, pimps' homes, brothels and nearby trucks. The magnitude of the impact is expected to be moderate because 35-40 workers on average per site are expected to be involved in the works, most of which are casual workers to be recruited locally. The magnitude is however likely as abused persons face challenges of unwanted pregnancies, as well as associated psychological torture. The impact significance is **moderate**.

		Sensitivity			
		1 Very low	**2 Low**	**3 Medium**	**4 High**
Intensity	**1 Very low**	1 Negligible	2 Minor	3 Minor	4 Minor

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

Mitigation measures:

- Develop and implement and SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018) and the Ministry of Gender, Labour and Social Development (Social, Safety and Health Safeguards Implementation Guidelines for Local Governments, 2020)
- The SEA action plan will include how the project will ensure necessary steps are in place for:
- **Prevention of SEA**: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance;
- **Response to SEA:** including survivor-centred multi-sectoral referral and assistance to complainants; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level
- **Engagement with the community**: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights;
- **Management and Coordination:** including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle-blower protection; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points and trained community liaison officers.

RISK OF VIOLATION OF CHILDREN' RIGHTS BY CONTRACTOR & LABOUR FORCE

According to the World Health Organization (2020), Violence against Children (VAW) is defined as physical, sexual, emotional and/or psychological harm, neglect or negligent treatment of minor children (i.e. under the age of 18), including exposure to such harm, that results in actual or potential harm to the child's health, survival, development or dignity in

the context of a relationship of responsibility, trust or power[20].This includes using children for profit, labour, sexual gratification, or some other personal or financial advantage. This also includes other activities such as using computers, mobile phones, video and digital cameras or any other medium to exploit or harass children or to access child pornography. The Children Act of Uganda 2016 prohibits contractors from "employing children in a manner that is economically exploitative, hazardous, and detrimental to the child's education, harmful to the child's health or physical, mental, spiritual, moral, or social development. According to the Uganda Bureau of Statistics (UBOS), 45% of children (with ages of 5 – 17 years) in Busoga from households living below the poverty line are forced out of school to work and supplement their parents' income[21]. Given the trend, it is possible for the contractor to abuse children through hiring them to supply labour, also labour force on site might abuse children within the Project area through sexual advance that could lead to early pregnancies and school dropout including exposure to communicable diseases such as HIV. The impact is likely to occur since children are already engaged in community work, especially in collecting water. However, the impact magnitude is low since few jobs for a short period of time will be available on the project. The impact significance is **Moderate**.

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

Mitigation Measures

The contractor should among other things clearly stipulate Code of conduct that includes:

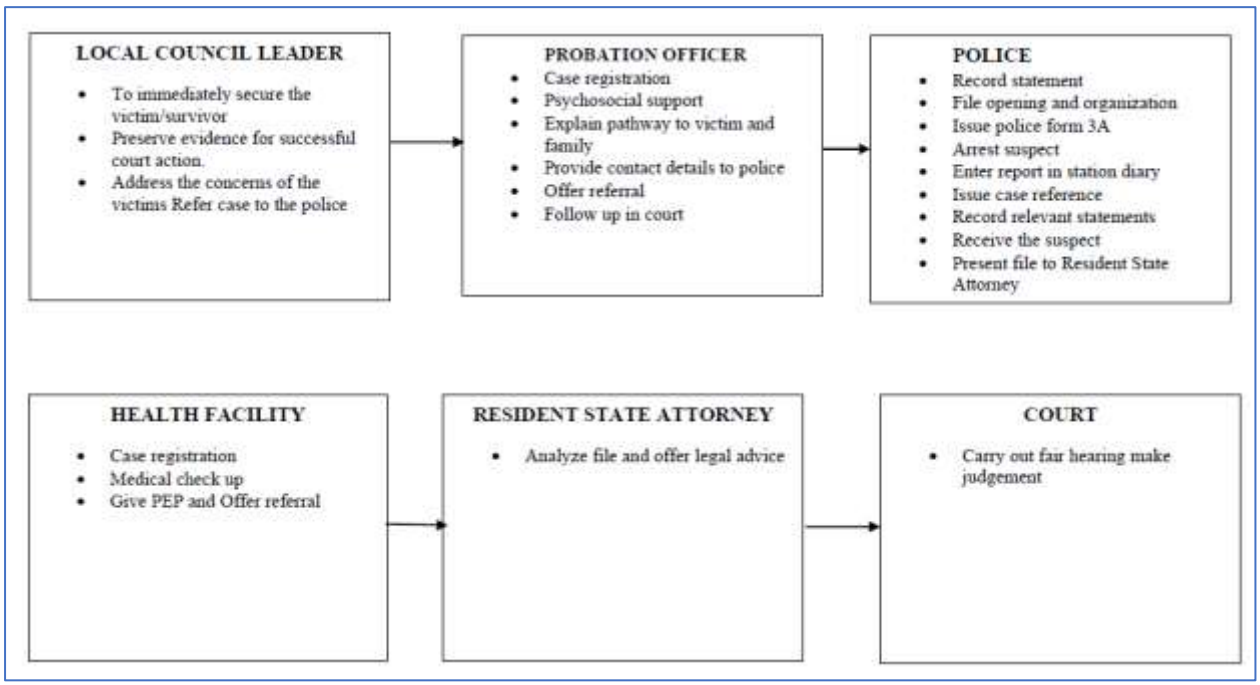
a) Strict adherence to rules prohibiting Child Labour as in national laws and ILO on matters out-lawing child labor in the project establishment,

b) Develop and implement a Children Protection Plan that will ensures minors are protected against negative impacts associated by the Project.

[20] https://www.who.int/news-room/fact-sheets/detail/violence-against-children

[21] https://nilepost.co.ug/2021/10/29/busoga-rise-in-cases-of-child-labour-attributed-to-poverty-culture/

CHILD SEXUAL VIOLENCE REFERRAL PATH



Recommended MoLSGD -Child abuse referral pathway

a. Continuous monitoring of VAC by CDOs, LCs, Police to ensure no child labor cases.
b. Involving local CSOs in the prevention, reporting and management of VAC cases.

Residual impact significance: **Minor.**

RISK OF GENDER BASED VIOLENCE AND FAMILY/ MARRIAGE BREAKDOWN

GBV constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. This impact refers to gender-based violence at the community level that women and girls may experience as a result of Project implementation. This includes, for example, an increase in intimate partner violence (IPV) when compensation schemes that share funds equally among husband and wife at the household level do not provide adequate sensitization and safety measures to reduce potential for increased tensions due to females receiving funds. This also refers to other GBV-related risks incurred as a result of 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. The information collected from the project area for the period of 2020 by the Uganda Police crime indicates that there 217 reported cases of sexual assault ,20 cases related to child abuse and 102 cases of common assault Field consultation with Kidera police also indicated that there are several forms of GBV shown in the **Figure** 9-3 below.

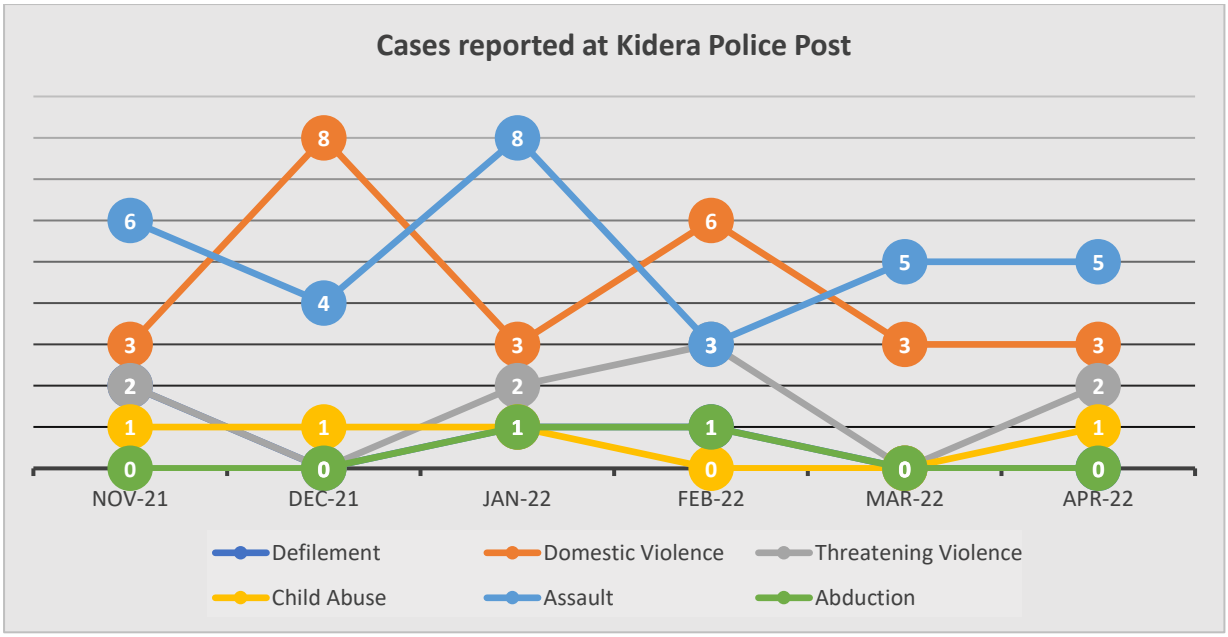


Figure 9-3: GBV in Kidera RGC

Source: Kidera Police

Therefore, since these communities already experience gender-based violence the sensitivity is very high. However, the impact magnitude is ranked as medium 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.***

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

Mitigations Measures

a. Develop and implement provisions that ensure that gender-based violence at the community level is not triggered by the Project such as effective and on-going community engagement and consultation, review of specific project components that are known to heighten GBV risk at the community level, for instance; compensation schemes; employment schemes for women; delivery of water supplies; etc;
b. Amongst project staff, the project PCU shall have a GBV Specialist to oversee GBV issues in the project;
c. Specific plan for mitigating such risks, for instance; sensitization around gender equitable approaches to compensation and employment; water services; etc

d. Ensure adequate referral mechanisms are in place if a case of GBV conflicts on project staff level is reported to police due to their criminal nature;
e. 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;
f. 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; and
g. Include gender affirmative actions and workplace conditions such as engendered washrooms, changing rooms, female condoms, breastfeeding room for breast feeding mothers, observing working time of 8:00AM to 5:30 PM so that parents especially women can attend to their domestic duties.

Residual impact significance***: Minor***

RISK OF SPREAD OF HIV/AIDS AND OTHER STDS AND STIS

According to the UGANDA POPULATION-BASED HIV IMPACT ASSESSMENT UPHIA 2016–2017 the HIV/AIDS prevail of Buyende is 4.7% since it lies within the East Central region. This is attributed to factors that include the districts' strategic location at near water bodies such as Lake Kyoga HIV prevalence of 14.8%. Additionally, Prevalence was highest among the 40–49-year age groups which may be attributed to people living longer with the virus on treatment[22]. widow inheritance, polygamy, poverty and prostitution which is rampant in Buyende and the fishing villages which is deeply rooted in their culture. Residents of fishing communities are one of the most-at-risk groups for HIV in Sub-Saharan Africa owing to frequent mobility, transactional and commercial sex, multiple sexual partners, high consumption of alcohol, poor health infrastructure, and limited access to health services are reported among the main factors shaping the HIV epidemic in finishing communities[23].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 magnitude is however high as these poor communities would struggle to cope with the challenges of being HIV positive. The impact significance ***is Moderate.***

[22]https://chs.mak.ac.ug/content/lake-kyoga-fishing-communities-have-lower-hiv-prevalence-lake-victoria-communities

[23] Hiv Epidemic In Fishing Communities In Uganda: A Scoping Review,2021

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

Mitigation Measures

- Sensitize workers and the surrounding communities on awareness, prevention, and management of HIV/AIDS through staff training, awareness campaigns, multimedia, and workshops or during community barazas;
- Provide VCT services and Anti-Retro-Viral Treatment to both the workers who test HIV positive and those from the community who come test at the project site;
- Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs, as well as sexual health and rights; and
- Ensure supply of condoms for the workers and the community members who access the project through points where such items are deposited in the project sites.

DESTRUCTION OF PHYSICAL CULTURAL RESOURCES

During the project implementation phase, certainly, PCRs like graveyards and older-trees may be damaged during site clearance, laying of the transmission mains. However, there are currently no known archaeological sites within the immediate vicinity of the proposed project area.

Given the excavation works involved in the laying of the transmission and distribution system, the possibility that some cultural features being encountered along the alignment cannot be ruled out. However, there are currently no known archaeological sites within the immediate vicinity of the proposed project area in Kidera. Owing to the importance of and sentiments attached to burial sites, the impact is likely to occur. The impact Magnitude is low given that the grave yard at the proposed reservoir site is most likely not to be affected since it is located outside the project foot print. The overall impact significance is **moderate**.

		Sensitivity			
		1 Very low	**2 Low**	**3 Medium**	**4 High**
Intensity of Impact	**1 Very low**	1 Negligible	2 Minor	3 Minor	4 Minor
	2 Low	2 Minor	4 Minor	6 Moderate	8 Moderate

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

Mitigation measures

- At the local level, additional consultations will be carried out prior to commencement of works by the contractor at the project sites.
- A '***chance find***' procedure will guide actions to be taken in the event that suspected archaeological artefacts or paleontological items are encountered and they should be handed over to Ministry of trade and industry- Department of Museums and Monuments.
- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artifacts before commencement of work. Such training should be administered in liaison with the Department of Museums and Monuments (DMM)
- Construction works will be designed to ensure no damage to any cultural sites or medicinal plants that may be encountered including older-trees that are culturally significant. Where such sites cannot be avoided, culturally appropriate measures will be agreed and implemented prior to the construction activities.
- Compensation of the affected sites will be undertaken before construction activities commence in accordance with World Bank requirements.

OPERATION AND MAINTENANCE PHASE

POTENTIAL WATER AND SOIL POLLUTION IN THE PROJECT SMALL TOWNS

Baseline information indicates there are no wastewater management facilities such as septic tanks, wastewater stabilization ponds or lagoons in Kidera RGC. The most common sanitation facilities are pit latrine both at homestead and institutional level while wastewater from washing and other tasks are poured on open ground. The closest wastewater stabilization ponds are yet to be established in Kamuli town, 49km from Kidera RGC. The wastewater management challenge may also be an avenue for individual innovation and adoption of new wastewater technologies, however at RGC level, it will remain a challenge.

Improved water supply comes with an increase in the amount of wastewater generated by households and industrial or commercial facilities. Poor disposal or management of the wastewater generated will lead to land and/ or water pollution, formation of foul wastewater channels and ponds in small towns, which will become eye sores and breading grounds for water related illnesses and other related sanitation problems if proper treatment systems such as septic tanks are not utilized. In cases where household are connected to water and

not to sewerage system, they may use septic tanks whose cesspool or soak pit overflow may lead to contamination of soil and/or groundwater.

The impact sensitivity is High because Kidera Town Council does not have a development and structural plan. Additionally, the impact is long term and will be spread across all the semi-urban locations/ small towns of Kidera RGC. The impact intensity is high, resulting in an overall impact significance is Major.

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

Mitigation measures

a. The project (EUWS) should support Kidera Town Council should develop and implement a development and structural plan that incorporates waste and/or wastewater management;
b. EUWS/MWE should create awareness on wastewater management and promote through community/youth skills development affordable technologies such as construction of soak pits, septic tanks at household and institutional levels.

INCREASED COSTS PER UNIT HENCE REDUCED AFFORDABILITY AND ACCESS

The cost per unit is likely to be higher than the prevailing level of water affordability per unit of water. Currently, 42.5 percent pay more than UGX 600 for a 20l jerrycan, 31.5 percent more than UGX 600, 11 percent UGX 200, while 8.2 percent less than UGX 100 to get access to water. Additionally, 42.3% of the respondents are willing to pay UGX 100, 31% - UGX 50, 8.5% - UGX 200 and 5.6% for UGX300 and UGX30 for a 20l jerrycan respectively. In comparison, the project feasibility study (MWE, 2019) proposed a Ugx.83/20 litres water tariff, a computation based on ability of the consumers to pay (ATP) 5 percent of the household monthly income on an improved water service. This will hinder affordability and utilization, especially for the 36.6% not willing to pay more than Ugx.50 to access 20l jerrycan of clean safe water, hence increased substitutability.

The impact Intensity may be Medium since over 44.5% already pay for water 93.2 of whom pay more than Ugx. 100 for a 20l jerrycan of water, however only 56.4% indicated a willingness more than Ugx. 90 to access 20l jerrycan of water. The overall impact significance is Moderate.

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

Mitigation measures

- Alternative water sources such as the boreholes should continue to be maintained by the local government and water user committees.
- EUWS under the guidance of MWE should put into consideration the project area's economic profile and vulnerability when setting affordable water prices.

INCREASED VULNERABILITY TO WATER SHORTAGES IN CASE OF BREAKDOWN & URBANIZATION

According to water demand assessment, its notable that the drilled borehole source has a safe water yield of 13.14 m^3/hr with ultimate maximum day demand of **325.26** m^3/day (and this can only satisfy 12.4% of the 2041 maximum day demand within the entire Project Area). Therefore, it is anticipated that the water demand will overwhelm the water supply infrastructure in medium and long run, due to rapid urbanization. In case of water system breakdowns and leakages, the communities will be negatively affected, which will in turn increase exposure to vulnerabilities such as risks of searching for water by children, women throughout the day and night. This will also affect the maintenance of water-borne toilets assigning the sensitivity of the impact as medium since the project will cover four core villages and shortages will be short-term giving a medium impact intensity of the project.

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

Mitigation measures

Sensitize water users about system shut down in time.

IMPACT OF SOLID WASTE NUISANCE AS A RESULT OF THE PROJECT

During the operation of the project, solid waste will be generated from the activities of the water office, Pump house and activities of maintaining the water transmission and distribution lines. The wastes that will be generated include food remains, polythene bags, plastic bottles, papers, wrappings for spare parts, and offcuts from plastic pipes among others. Waste expected from the Pump and dosing houses include used oils and grease from operations and maintenances activities, containers for treatment chemicals such as chlorine and sludge. Wrappings/cylinders for treatment chemicals can be hazardous to humans and the environment if not safely disposed. Sludge and chemical wrappings/cylinders should either be re-used or disposed of as hazardous waste.

Baseline information indicate that there is no designated hazardous and non-hazardous waste disposal site within Kidera RGC. The closest waste management hazardous and non-hazardous disposal/management site are in Kamuli Town, 49km away from the RGC.

The sensitivity of the impact is medium since waste generation will be long term and continuous and there are no hazardous and non-hazardous waste disposal sites. However, the impact intensity is low due to the low volumes of waste expected from operations. The overall impact significance is Moderate.

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

Mitigation measures:

- A Waste management plan for the operation phase of the project should be developed and implemented;
- Waste collection bins should be provided at strategic positions at the water offices, Pump house and reservoirs sites for temporary waste storage. The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes;
- The water supply system operator should hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA; and
- Project workers (both sub-contracted and EUWS) should be trained on appropriate waste handling by category for appropriate management.

RISK OF POLLUTION FROM POOR MISMANAGEMENT OF SANITATION FACILITIES

The project will support construction of 1N^{o}. 6 stance waterborne toilet at a public place to serve the residents of Kidera RGC especially during market days. Baseline information indicates that the area has no sewerage system. Therefore, the waterborne public toilets will have septic tank systems. The septic tanks shall be emptied and treated at a site (waste treatment plant) gazetted by NEMA such as the waste stabilization ponds at Iganga town, 115.2km from the project area or a yet to be established stabilization pond in Kamuli 49 Km from the project area. Therefore, the collection, transportation and disposal of sewage must be done correctly to minimize or and avoid health risks to communities. Any mismanagement of sanitary waste generated during the operation may lead to pollution of the area which may end up polluting the water sources. This may cause risk to public health.

The sensitivity of the impact is high since there are no sewerage system in the project area. The impact is long term and continuous although low volumes of waste are expected from sanitation facilities per time interval (emptying may take 6 months) resulting in medium impact Intensity. The overall impact significance is **Major**.

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

Mitigation measures

a. A Periodic maintenance regime including emptying and desludging should be put in place and implemented to prevent sewage over flows.
b. Use of manifest system to ensure that the wastes are disposed of at a site (waste treatment plant) gazetted by NEMA.

A robust management system for the sanitation facilities involving the communities, their leaders and the health workers should be put in place to monitor, detect, and alert the responsible authorities to call for emptying of any septic tank that pauses a danger to the community.

RISK OF SEXUAL EXPLOITATION AND ABUSE OF COMMUNITY MEMBERS BY PROJECT WORKERS

This impact refers to sexual exploitation and abuse committed by Project staff against communities, and represents a risk at all stages of the Project, especially when employees and community members are not clear about prohibitions against SEA in the Project. Commercial sexual exploitation is reportedly practiced in bars in the Town council which

provides a fertile ground for this practice to be propagated by the workers. Other places are clubs, streets, pimps' homes, brothels, and nearby trucks. The intensity of the impact is expected to be low because 5-7 workers on average per site are expected to be involved in the operation of the system, some of whom may be recruited locally. The sensitivity of the population in the RGC is high as abused persons face challenges of unwanted pregnancies, as well as associated psychological torture. The impact significance is **Moderate**.

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

Mitigation measures:

- Develop and implement and SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018) and the Ministry of Gender, Labour and Social Development (Social, Safety and Health Safeguards Implementation Guidelines for Local Governments,2020)
- The SEA action plan will include how the project will ensure necessary steps are in place for:
    - **Prevention of SEA**: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance;
    - **Response to SEA:** including survivor-centred multi-sectoral referral and assistance to complainants; staff reporting mechanisms; written procedures related to case oversight, investigation, and disciplinary procedures at the project level
    - **Engagement with the community**: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights;

      Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle-blower protection; training for all project management; management of coordination mechanism for case oversight, investigations, and disciplinary procedures;

supervision of dedicated PSEA focal points and trained community liaison officers.

CUMMULATIVE IMPACTS

VALUED ENVIRONMENT AND SOCIAL COMPONENTS

Multiple projects currently under implementation and those planned within the spatial and temporal framework impact a set of environment resources and social systems. Although the scope of this report only covers the proposed development of the solar powered piped WSSS in Kidera RGC, there are other projects in the project area. The identified VECs may include;

a) Material Source Areas

Projects implementing infrastructure development especially water pumping station, water reservoirs, booster stations, water office blocks and sanitation facilities shall require gravel, murram, sand, rocks and among other products hence impacting on source areas.

b) Shared Land Corridors

Linear projects like roads, power lines and telecom cables normally share corridors. Relocation of such services is an impact and acquisition and compensation of such corridors may raise social and economic concerns.

c) Water Resources

Project implementation in Kidera may impact water sources especially during the dry season. The relatively high population in Kidera trading centre and increase in patients at Kidera HC IV may heighten the challenge. Additionally, the proposed Kidera boreholes are near L. Kyoga, therefore, the surface and underground water interactions may occur leading to contamination.

d) Land and Wetlands

The project area has a major mushrooming trading centre, namely; Kidera trading centre, which continue to expand due to the population growth as a result of services within and near the centres such as schools and Kidera HC IV being the biggest town from surrounding landing sites hence putting pressure on land and wetlands (cultivation, settlements and sanitation facilities). Kidera boreholes are located within the flood plain of L. Kyoga, which renders it prone to floods during the rainy seasons from increased surface runoff in case of continuous and uncontrolled land use activities e.g. clearing landcover and wetland degradation.

e) Social Services

The most critical service affected by multiple construction projects is health infrastructure. Increased inflow of workers may place a burden on health units. Security services may experience increased demand due to the inflow of workers.

f) Gender and Sexual Harassment

Increased inflow of migrant labour working on different projects may increase the anonymity of workers and possible offenders. Because there are many contract workers it becomes

difficult to isolate those engaged in illicit sexual behaviour and further individual involved to harassment of women. There are several on-going projects and activities by Government of Uganda and private sector that target fishing within Kidera RGC. Possible concurrent implementation of all these projects and interventions within the same project area or in proximity of the RGC project has the potential to generate cumulative impacts.

IDENTIFIED CUMULATIVE IMPACTS

The key cumulative impacts and risks associated with the project are summarized below:

- The ease of water fetching as a result of the project is expected to translate into an increase in the enrolment ratio, especially for girls, and in the female literacy rate and contribute to the reduction in social conflicts related to water use such as those associated with the congestions at the existing boreholes. This impact will be enhanced through ensuring that most of the communities in the project foot-print are connected or have access to the piped water.
- However, as noted under negative impacts, the project will supply water to more than 1 small and unplanned town and other 4 villages in Kidera RGC. Improved water supply comes with an increase in the amount of wastewater generated by households and industrial or commercial facilities. Poor disposal or management of the wastewater generated will lead to land and/ or water pollution, formation of foul wastewater channels and ponds in small towns, which will become eye sores and breeding grounds for water related illnesses, lead to contamination of soil and/or groundwater and other related sanitation problems if proper treatment systems such as septic tanks are not utilized. There is therefore need to improve physical planning and conduct behaviour change campaigns to maximise benefits from the projects and deter cumulative negative impacts of the same.
- The hydrological connection between surface water (L. Kyoga) and groundwater (proposed boreholes) may be altered. The impact of surface water on groundwater table will depend on the soil permeability (due to the proximity of about 200m) as well as the agricultural practices, and settlements in Kidera catchment. The infiltration of surface water into the borehole may lead to groundwater contamination which may deteriorate the water quality hence triggering the treatment costs.
- Pollution of water from pit latrines around borehole 61681 and high flood risk at borehole 60870 are likely to result in long term water pollution. If measures are not put in place to manage these impacts, it may result into high water treatment costs and/or supply of contaminated water to the target population.

10. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

OVERVIEW

The general approach to effective monitoring is to compare the pre- and post- project situations, measuring relevant environmental impacts against baseline conditions. Baseline data establish a reference basis for managing environmental impacts throughout the life of the project. A monitoring process will therefore be introduced to check progress and the resultant effects on the environment as the implementation of the proposed Kidera Water Supply and Sanitation project proceeds.

The Developer will institute the necessary monitoring measures for both short-and long-term monitoring programme respectively. However, during monitoring close links shall be maintained with other relevant lead agencies. The key lead agencies that shall be kept in the loop will include Buyende and Kidera Local Governments, NEMA and DWRM. It is the role of the Developer to ensure that the Contractor implements the proposed mitigation measures presented in this ESIA report. The planned mitigation measures indicated in this ESIA ESMP (Table 10-1) shall be planned and checked against their effectiveness in reducing the negative impacts/or enhancing the benefits identified in this report.

The process shall also include regular reviews of the impacts that cannot be contemplated at the time of doing this Environment Impact Assessment. Action shall be taken in response to the unforeseen changes and subsequently scale up the mitigation and monitoring measures. Monitoring shall undertake appropriate new actions to mitigate any negative effects. The issues to monitor may include the following:

a. The clearing of the water transmission and distribution corridors including all forms of compensations and or resettlements made in respect of the displaced families or persons,
b. Supervision of the excavations for the water pipes and subsequent laying and burying of pipes,
c. Occupational health and safety of workers and the community among others,
d. the fate of solid waste/debris disposal and other wastes after it has reached and has left the site,
e. Behavioural changes among the community and Contractors staff,
f. Water Quality,
g. Noise and dust pollution, and
h. Biodiversity changes.

Table 10-1: Environmental and Social Mitigation/Enhancement Plan

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
POSITIVE IMPACTS – CONSTRUCTION PHASE			
Provision of direct jobs (casual workers) for locals - youth, women and men	• Recruit locals for construction jobs according to their skills.	• Contractor	Embedded in contractor's fees
	• Promote labor-intensive construction methods to create more jobs.	• Contractor	
	• Adhere to the local labour laws of 30% women in employment and remuneration of workers above the minimum wage.	• Contractor	
	• Ringfence some jobs such as cleaning and cooking specifically for local women.	• Contractor	
	• Encourage qualified females to apply for jobs.	• Contractor	
	• Gender sensitive facilities such as bathrooms, toilets and breastfeeding spaces to be provided to create a conducive working environment.	• Contractor	5,000,000

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
NEGATIVE IMPACTS – CONSTRUCTION PHASE			
Impacts of land take for project components	LGs in the respective areas should be involved in mobilization and sensitizing PAPs on the project land requirements	RWSS	RAP Budget
	Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the water sources, water treatment plant, reservoir tanks and any other activity either by the developer shall be compensated for in accordance with applicable land acquisition legal instruments and GIIP relating to land acquisition	RWSS	

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	PAPs should be given financial literacy on how to use their compensation packages to avoid squandering and remaining in worse off conditions	RWSS	
	In-kind compensation can be considered especially where the PAPs prefer so	RWSS	
	Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses and manage their cropping calendars to avoid loss of crops.	RWSS	
Susceptibility to Soil Erosion	Vegetation clearance should be limited to localities required for development.	Contractor	
	Construction sites should be hoarded off before excavations and soil barriers put in place to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water.	Contractor	Within contractor's bid budget
	Topsoil should be removed prior to carrying out excavations and kept separately so that it is used last in backfilling of the excavated areas. This is to ensure that the living soil (top soil) is available for plant growth in disturbed areas.	Contractor	
	The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation.	Contractor	
	Excess excavated soil material which will not be used for construction works shall be removed from the site in a timely manner and deposited at an approved site	Contractor	

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	Areas adjacent to the construction site should not be disturbed and care taken to minimize the area of impairment caused by on-site storage of construction materials and equipment.	Contractor	
	Ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. Native vegetation must be used for re-vegetation of excavated sites.	MWE	
Loss of Vegetation Cover	The project design should avoid the locations of the two trees of conservation importance to ensure their protection	Contractor	No cost addition
	Vegetation clearance should be limited to only localities required for project development needs		
	Restore sites where activities will be carried out at all the project sites. This site restoration and revegetation should involve planting of indigenous trees/vegetation types		
Loss of fauna and habitats	Clearance of fauna habitat (vegetation and soils) should be limited only to localities required for development	Contractor	No cost addition
	Restore sites where activities will be carried out at all the project sites		
	All project workers should be sensitized to observe instructions aimed at no hunting of any opportunistic wildlife in the sites		
	Trenching, pipework laying as well as well as backfilling will be done concurrently. For pits like at the booster station, ensure that every evening, the pits are covered with timber while being secured with a warning tape to check accidental falls of wildlife and livestock in excavated pits		

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	The natural vegetation at the location of the intake and water treatment plant should not unnecessarily cut to avoid impacting possible habitats for invertebrates		
Disturbance and degradation of wetland ecosystems	Obtain a wetland user permit from NEMA before constructing the intake and raw water transmission line within the protection zone of the Lake Kyoga, a satellite of Lake Kyoga	Contractor	No cost addition
	The project implementation should then keenly follow the conditions in the Wetland User Permit to be issued by NEMA		
	Construction works of the intake, raw water transmission line within the wetland, and the WTP near the wetland should be limited to project footprint and allocated timeline		
	All project workers should be sensitized on minimization of damage to the wetland flora and fauna		
	Close monitoring and supervision of the construction operations to ensure compliance to the NEMA permit conditions and avoid causing further damage to undesignated project areas		
Generation of Solid waste	The Contractor shall develop and implement a Waste Management Plan	Contractor	15,000,000
	All sorts of waste generated during construction such as HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and delivered to recycling facilities. Other forms of waste which are inert must be collected by NEMA gazetted waste handlers and taken to a NEMA gazetted waste disposal facilities for disposal.	Contractor	10,000,000

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	All organic waste generated at eating places during construction such as food stuffs shall be collected and transported by the contractor to designated district landfills for disposal.	Contractor	
	All plastic waste generated during construction, such as mineral water bottles, polyethene bags, jerricans and cups shall be collected and taken for recycling in plastic collectors in Buyende for onward transmission to plastic recyclers.	Contractor	
	The contractor will work with Buyende district Local government to facilitate sound waste handling and disposal. All wastes must be taken to the approved waste disposal facilities. Proof of delivery and safe disposal of waste will be provided and records maintained at all times.	Contractor	Within contractor's bid budget
Risk of contamination due to Flooding of Water Source (DWD 60870)	The production well should be constructed with a water tight casing above the water table	MWE	Part of the Design Consultant's work
	The design and construction of the pump house at source DWD 60870 should incorporate a raised apron slab above the ground by the required height for the predicted flood depth of the area.	MWE	Part of the Design Consultant's work
	Aprons should be constructed with deep foundation edges to avoid erosion	MWE	Part of the Design Consultant's work

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	A water source protection plan has been developed to ensure sustained water quality and quantity for the project.	MWE	Part of the Design Consultant's work
Risk of contamination from pit latrines	Under the RAP, the ESIA recommends that MWE should secure and fence off at least a 50m radius from the borehole site as a buffer to eliminate potential for cross contamination from pit latrines	Contractor	Part of ESIA, RAP & SPP Consultant's work
	Household around borehole DWD 61681 should be supported with sanitation facility types that are not a threat to ground water contamination, such as ecosan, lined pit latrines. Sensitisation on usage should be conducted to ensure adoption of the technologies around the borehole.	MWE	Part of the Design Consultant's work
Noise and Vibrations	Workers should be provided with the necessary personal protective equipment (PPE) such as ear muffs	Contractor	5,000,000
	Periodic medical hearing checks should be performed on workers exposed to high noise levels	Contractor	Within contractor's bid budget
	Construction sites must be hoarded to curb noise impacts to neighbouring communities	Contractor	
	Works should be undertaken during day time that is, from 8am to 6pm	Contractor	

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	Works near schools or health centres should be done in periods like weekends for noise not to interfere with learning/health environment	Contractor	-
	Weekly monitoring of noise levels at active sites should be carried out by the contractor	Contractor	-
	Avoid operating noisy equipment when not required, such as idling of cars, operating of generators when not required	Contractor	Within contractor's bid budget
Air Pollution	Travel speeds of construction vehicles along the road especially at trading/ business centres will be controlled and should not exceed 50 km/h on the highway and 40 km/h off the highway.	Contractor	-
	Trucks will be covered during haulage of construction materials to reduce on spillage of materials and wherever dust suppression is necessary, water will be sprayed over dusty areas.	Contractor	No additional cost
	Workers will be provided with PPE and the use of PPE shall be enforced.	Contractor	
	All surfaced roads shall be subject to road cleaning and un-surfaced roads to dust suppression, the methodology and frequency of which shall be included in the Contractor's Traffic Management Plan.	Contractor	
	Stockpiles of friable material will be grassed in order to prevent wind erosion.	Contractor	-
	A maintenance programme for equipment and vehicles will be implemented, to ensure air emissions like particulates, SO2 and NO2 are minimised.	Contractor	No cost addition

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
Traffic Safety	The Contractor shall develop and implement a Traffic Management Plan which is to guide aspect of traffic in the project	Contractor	No cost addition
	Likely disruptions to public access shall be identified in the Contractor's works schedule and responsive traffic management measures instituted to guide traffic through such areas	Contractor/ Subcounty Council	No cost addition
	Vehicular access through areas of public institutions (markets, schools, and health centres) shall be managed by traffic/flag persons who are work hand-in-hand with the traffic police in their areas	Contractor	No cost addition
	Road and site safety training should be conducted as part of tool-box talks in the project	Contractor	No cost addition
	Conspicuous signage shall be well placed on roads and the Contractor’s Traffic guides on ground shall direct traffic in case of diversions or open trenches.	Contractor/ Police/ LC	No cost addition
	All company vehicles used in the transportation of construction workers, material, and equipment to and away from the site shall be in sound mechanical conditions. Evidence shall always be provided by recording the status of the vehicle in the Daily Vehicle Inspection Form before usage	Contractor/ Police/LC	No cost addition
	All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits	Contractor	No cost addition

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	The vehicle speed shall be limited to a maximum of 30km/hr areas near sensitive facilities	Contractor	No cost addition
	Works near sensitive facilities like schools and health centres shall only be limited to day time (7am to 6pm).	Contractor	No cost addition
Occupational Health and Safety risks	Prepare and implement an occupational safety and health plan for all sites, approved by the MWE.	Contractor	No cost addition
	Provide safety guidelines to all operations prior to start of work.	Contractor	No cost addition
	Strict adherence to safety measures and procedures are required to minimise (or eliminate) risks of accidents or hazardous developments occurring and ensure healthy and safe conditions for all persons working on the site	Contractor	No cost addition
	On-site training shall be conducted on how to prevent and manage incidences and such could involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences	Contractor	10,000,000
	Regular drills on site safety will be routinely conducted followed 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 case of incidences	Contractor	No cost addition
	Personnel on duty shall always wear appropriate PPEs, such as safety glasses with side shields, face shields, hard hats/helmets, and safety boots be required for all site staff	Contractor	No cost addition

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	The Contractor shall establish emergency entrances, exits and amenities in the project facilities	Contractor	No cost addition
	The Contractor shall ensure that there are First Aid Kits on the site and such shall be modestly stocked with consumables that are key in delivery of first aid on the site	Contractor	5,000,000
	The Contractor shall secure site boundaries with fences or hoardings as appropriate to keep off intrusion in the project	Contractor	5,000,000
	The Contractor shall install caution signage around the site to discourage the public from being close to the site, for example, “falling debris”, “keep off the site	Contractor	2,000,000
	The Client through the Construction Supervisor will continually monitor Contractors´ compliance with Health and Safety measures	Contractor	5,000,000
	An Accident Log will be maintained onsite to register all injuries and to investigate their causes during both the construction and operation phases of the project	Contractor	No cost addition
	The manufacturer's instructions and Material Safety Data Sheets (MSDS) shall be followed for the storage of all chemicals used in water treatment. Storage must conform to compatibility restrictions	Contractor	No cost addition
	Work force shall be subjected only to standard work shifts/hours. Overtime allowances, if applicable/warranted shall be paid with ceiling limits. Working beyond such ceiling limits shall be discouraged, even if, so desired workforce or contractor	Contractor	No cost addition

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
Risk of non-payment of workers, suppliers and sub-contractors	All workers must sign contracts as part of engagement in the project	Contractor	No cost addition
	Include clauses for equal pay for equal work	Contractor	No cost addition
	Institute Contractor Grievance Committees to handle grievances including those related to labour issues	Contractor	5,000,000
	Involve the District Labour Officers in project supervision to offer guidance on management of labour issues	Contractor	5,000,000
	The provision of 'pay when paid clause' should be introduced in the contractor and supplier/sub-contractor contract	Contractor	No cost addition
	Understanding the terms or clauses of payment in the project	Contractor	No cost addition
	The effect of delayed payments on the project progress must be understood by all parties and personnel involved	Contractor	No cost addition
	Right for contractors to suspend work in the event of late or non-payments by the client to avoid unnecessary stand offs with suppliers	Contractor	No cost addition
Liability for loss of life,	Provision of PPE to all worker	Contractor	No cost addition

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
injury or damage to private property	The contactor will ensure that the Project is implemented by total adherence to the Employment Act 2006	Contractor	No cost addition
	The workers should receive requisite training especially on the operation of the machinery and equipment	Contractor	5,000,000
	There should be adequate warning and directional signs	Contractor	2,000,000
	Ensuring that the prepared code of conduct for staff is followed to prevent accidents	Contractor	No cost addition
	Develop a site safety action plan detailing safety equipment to be used, emergency procedures, restriction on site, frequency and personnel responsible for safety inspections and controls	Contractor	No cost addition
	Cordon off unsafe areas and provide safe crossing points across trenches	Contractor	No cost addition
	Provide an onsite clinic to provide first aid services to the staff	Contractor	30,000,000
	Contractor to ensure compliance with the Workmen's Compensation Act, ordinance regulations and union agreements	Contractor	No cost addition
	The Contractor to repair any damage done to private property	Contractor	Project contingency

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
			(10% pf total contract value)
Risk of violation of children' rights by contractor & labour force	Strict adherence to rules prohibiting Child Labour as in national laws and ILO on matters out-lawing child labor in the project establishment	Contractor	No cost addition
	Continuous monitoring of VAC by CDOs, LCs, Police to ensure no child labor cases	Contractor	5,000,000
	Involving local CSOs in the prevention, reporting and management of VAC cases	Contractor	5,000,000
Risk of SEA of community members by workers	The Contractor should have a zero tolerance on sexual harassment policy and mainstream it to ensure strict adherence to established mechanisms to avoid the emergence of these challenges;	Contractor	-
	MWE should ensure that social safeguards personnel are recruited as part of the project implementation personnel to supervise contractors and to continuously engage communities;	MWE	-
	Put SGBV reporting mechanisms in place;	Contractor	-
	Community sensitization among men and women.	Contractor	-
Risk of Gender Based	Develop and implement provisions that ensure that gender-based violence at the community level is not triggered by the Project such as effective and on-going community engagement and consultation, review of specific project components that are known to heighten GBV risk at the	Contractor	12,000,000

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
Violence and Family/marriage breakdown	community level, for instance; compensation schemes; employment schemes for women; delivery of water supplies		
	Amongst project staff, the project PCU shall have a GBV Specialist to oversee GBV issues in the project	Contractor	12,000,000
	Specific plan for mitigating such risks, for instance; sensitization around gender equitable approaches to compensation and employment; water services	Contractor	5,000,000
	Ensure adequate referral mechanisms are in place if a case of GBV conflicts on project staff level is reported to police due to their criminal nature	Contractor	No cost addition
	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	Contractor	No cost addition
	Include gender affirmative actions and workplace conditions such as engendered washrooms, changing rooms, female condoms, breastfeeding room for breast feeding mothers, observing working time of 8:00AM to 5:30 PM so that parents especially women can attend to their domestic duties	Contractor	No cost addition
Risk of spread of HIV/AIDS risks and STDS/STIS Infections	Sensitize workers and the surrounding communities on awareness, prevention, and management of HIV/AIDS through staff training, awareness campaigns, multimedia, and workshops or during community barazas	Contractor	5,000,000
	Provide VCT services and Anti-Retro-Viral Treatment to both the workers who test HIV positive and those from the community who come test at the project site	Contractor	5,000,000

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs, as well as sexual health and rights	Contractor	No cost addition
	Ensure supply of condoms for the workers and the community members who access the project through points where such items are deposited in the project sites	Contractor	2,000,000
Risk of Contracting and Spreading COVID-19	Sensitize all project employees about the signs and symptoms of COVID-19 as well as the ways to control its spread.	Contractor	-
	Screen local employees/contractors for COVID-19 during recruitment.	Contractor	-
	Screen all visitors to construction sites using a temperature gun and enforce washing of hands before entry and wearing of approved masks.	Contractor	-
	Management of potential COVID-19 cases – in case, any workers develop the above symptoms, isolate them and immediately contact the respective District Health Officers (DHOs) to pick and transport the patients for treatment.	Contractor	-
	Reduce site traffic – prohibit entry for any non-essential visitors. In addition, utilize staggered start and finish times for workers to limit site congestion and physical contact. Further, restrict the number of people in attendance at any site inductions, and consider holding them outdoors whenever feasible.	Contractor	-

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	Practice social distancing – Consistently monitor points of worker interactions such as dining areas to ensure social distancing guidelines (2-4 meters apart) are being met.	Contractor	-
	Prioritize sanitation – Enforce workers to wash their hands with soap and water for at least 20 seconds or to use sanitizers before entering and after leaving the worksite, as well as before and after handling all goods, materials and equipment. Routinely clean any common contact surfaces on-site (e.g. scanners, turnstiles, screens, telephones and desks). Lastly, be sure to temporarily remove or disable any site entry systems that require skin contact (e.g. fingerprint scanners).	Contractor	-
	Limit physical contact – Make sure that the contractor stagger break times to reduce congestion and physical contact in eating areas. Require workers to keep at least 2-3 metres of distance between one another while eating.	Contractor	-
	Enhance whole-of-society coordination mechanisms to support preparedness and response, including the health, transport, travel, trade, finance, security and other sectors. Involve public health Emergency Operations Centres and other emergency response systems early.	Contractor	-
	Continuously sensitize the workers and pass on any new guidelines by Government and the WHO.	Contractor	-
Destruction of physical	At the local level, additional consultations will be carried out prior to commencement of works by the contractor at the project sites.	Contractor	Within contractor's budget

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
cultural resources	A '*chance find*' procedure will guide actions to be taken in the event that suspected archaeological artefacts or paleontological items are encountered and they should be handed over to Ministry of trade and industry- Department of Museums and Monuments.	Contractor	No cost addition
	Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artifacts before commencement of work. Such training should be administered in liaison with the Department of Museums and Monuments (DMM)	Contractor/ DMM	No cost addition
	Construction works will be designed to ensure no damage to any cultural sites or medicinal plants that may be encountered including older-trees that are culturally significant. Where such sites cannot be avoided, culturally appropriate measures will be agreed and implemented prior to the construction activities.	DLG / Contractor	No cost addition
	Compensation of the affected sites will be undertaken before construction activities commence in accordance with World Bank requirements.	MWE	Within RAP implementation budget
NEGATIVE IMPACTS AND RISKS – OPERATION PHASE			
Increased cost per unit hence reduced affordability and access	Alternative water sources such as the boreholes should continue to be maintained by the local government and water user committees.	BDLG	5,000,000
	EUWS under the guidance of MWE should put into consideration the project area's economic profile and vulnerability when setting affordable water prices.	EUWS	5,000,000

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
Increased vulnerability to water shortages in case of breakdown and urbanization	Sensitize water users about system shut down in time.	EUWS	Per EUWS' operation budget
Potential water and soil pollution in the small project towns	The project (EUWS) should support Kidera Town Council should develop and implement a development and structural plan that incorporates waste and/or wastewater management	MWE	RWSS, EUWS
	EUWS/MWE should create awareness on wastewater management and promote through community/youth skills development affordable technologies such as construction of soak pits, septic tanks at household and institutional levels.	MWE	RWSS, EUWS
Solid waste nuisance from project	A Waste management plan for the operation phase of the project should be developed and implemented	RWSS, EUWS	5,000,000
	Waste collection bins should be provided at strategic positions at the water offices, Pump house and reservoirs sites for temporary waste storage. The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes		5,000,000
	The water supply system operator should hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA	EUWS	6,000,000

Impact/Risk	Mitigation /Enhancement commitments	Responsible entity	Estimated Annual & Remarks
	Project workers (both sub-contracted and EUWS) should be trained on appropriate waste handling by category for appropriate management.	EUWS	No cost addition
Pollution from poor management of sanitation facilities	A Periodic maintenance regime including emptying and desludging should be put in place and implemented to prevent sewage over flows.	Kidera Town Council	4,000,000
	Use of manifest system to ensure that the wastes are disposed of at a site (waste treatment plant) gazetted by NEMA.	Sub-Contractor – Waste management	
	A robust management system for the sanitation facilities involving the communities, their leaders and the health workers should be put in place to monitor, detect, and alert the responsible authorities to call for emptying of any septic tank that pauses a danger to the community.	Kidera Town Council	300,000
Total			181,000,000

11. ENVIRONMENTAL AND SOCIAL MONITORING PROGRAMME

PURPOSE OF MONITORING

A monitoring program aims to ensure that proposed mitigation and enhancement measures are implemented to generate intended results, otherwise the measures need to be modified, ceased or replaced when inappropriate. Moreover, monitoring allows assessing compliance with national standards as well as with the World Bank policies and guidelines.

SCOPE OF ENVIRONMENTAL AND SOCIAL MONITORING

Environmental monitoring will be undertaken at different levels as described below

- **Surveillance:** Undertaken by the Supervision Engineer on behalf of MWE.
- **Quarterly Monitoring:** Joint by all relevant stakeholders at various levels.
- **Audit activities:** To be done by a NEMA registered Environmental Auditor.
- **Spot checks:** By Supervising Engineer, MWE, Contractor, District Leadership, NEMA.

MONITORING ACTIVITIES AND PROCESSES

WEATHER FORECASTS

Weather monitoring and forecast is important to ensure that the Contractor plans for activities and provides mitigation where weather especially rainfall may pose challenges. This will be critical during excavation works.

SITE INSPECTION

Routine inspections will be carried out to cover all aspects of environmental and social management on the site. Daily inspection aims to identify any environmental issues and rectify them without delay whereas weekly, monthly and quarterly inspections will verify that the daily inspections are identifying any maintenance requirements and that these requirements are being completed in an appropriate time frame. Site inspections will be carried out by the Contractor with instructions from the Supervision Consultant.

MEETINGS

Monthly site meetings are to be held to discuss project progress and, in such meetings, safeguards issues shall be sufficiently discussed and minuted. That shall include a review of the effectiveness of the mitigation measures, successes, and non-compliances. This will be a platform for the Engineer, the client (MWE) and World Bank to raise any environmental issues arising from the joint inspection and as a reaction to the contractor's presentation.

RECORDKEEPING

MWE shall ensure that all relevant monitoring and compliance records are readily available. Section 122 (6) of NEA (2019) states, "A developer shall maintain proper records of the monitoring undertaken under subsection (2), which shall be made available to the Authority or lead agency upon request" while subsection (7) states, "A lead agency or the Authority may require the developer to submit monitoring reports in a prescribed form".

MONTHLY AND QUARTERLY ENVIRONMENTAL AND SOCIAL REPORT

Either a standalone Monthly Environment and Social shall be prepared, or safeguards shall be sufficiently covered in the Contractor's Monthly Progress Report in fulfilment of the Contractor's contractual reporting obligations. The report will highlight different activities undertaken to manage environmental and social aspects of the project in line with contract specifications, laws, standards, policies, and plans of Uganda and World Bank Safeguard policies. This report will also have to be verified and approved by the supervising consultant Planning for management of environmental aspects is typically done on a continuous basis. In that regard, every monthly progress report should include a schedule for environmental and social activities for the next month.

This Contractor's Monthly Report is expected to summarize the following:

a) Progress in implementing the CESMP and the standalone management plans;
b) Status of key approvals and documentation for the project;
c) Compliance with legal obligations and specifications;
d) Compliance to the commitment to child labur and GBV (SEA & SH) prevetion and management
e) Findings of the monitoring programmes, with emphasis on any breaches of the control standards, action levels or standards of general site management;
f) Summary of any complaints by the community and actions taken/to be taken; and
g) Key environmental activities for the next month.

On a quarterly basis, the supervising consultant will prepare an Environment and Social Report covering similar thematic areas as listed above (for the quarter) that will be submitted to the developer (MWE). This report will inform the MWE quarterly report that will be shared with the World Bank and other stakeholders.

MWE should stipulate reporting requirements in the bidding documents for sourcing the project contractor and supervising consultant, and binding clauses should also be included in the subsequent contracts to ensure compliance.

ACCIDENT AND INCIDENT REPORTING

The supervising consultant and contractor shall ensure reporting of any serious and severe incidents to MWE within 24 hours of their occurrence while MWE will ensure similar reporting to the World Bank within 48 hours of their occurrence.

REPORTING CHANNELS ON SGBV/SEA-SH ON SEVERE INCIDENTS & BREACHES DURING IMPLEMENTATION

During implementation, the contractor shall follow guidelines on where and how to report SGVB/SEA-SH incidents and breaches. The ESS team will track, record, report and manage all GBV/SEA related incidents (breaches). All reports on GBV/SEA-SH shall indicate BY WHO, TO WHOM, WHAT, WHEN and TARGET / ACHIEVEMENTS. It is essential that the confidentiality and safety of victims and/or survivors will (must) be protected.

FORMANT / ISSUES TO REPORT	BY WHO	TO WHOM	WHEN

The project will track and report severe GBV/SEA-SH incidents, breaches and allegations, by clearly establishing the following: • Keep record of all incidents (GBV/SEA-SH Register) • Nature of the case; • Location; age, sex of victims and/or survivors; • Perpetrators sex, relationship to victim / survivor; origin • Project-related (Yes / No) • Whether the victims and/or survivor were referred to services. • Any other resolution of matter done	Social Safeguards officer / GRM	MWE (who can then report to bank)	As soon as becomes known (Tracking is done continuously / daily)
The GBV Service Provider (contracted to project) shall ensure continuous monthly reporting is done on following: • Total number of GBV/SEA-SH cases received / referred, disaggregated by age and by sex; location, date of occurrence, referral status • The number of cases open, closed cases, and average time they have been open / closed • Summary data on perpetrators (location, relation to victims and/or survivors), date of occurrences	GBV Service provider (e.g. CBO, NGO)	Contractor & MWE	Monthly
The contractor (through a designated officer e.g. Supervising Engineer) shall prepare a Status Report on GBV/SEA-SH. Specifically, the report shall highlight the following issues: • Progress on Key Indicators on GBV/SEA-SH showing Planned and Achieved Target) • GBV /SEA-SH Incident Register (Excel file) • Training done (total number of participants – workers, local leaders, community actors) • Community awareness meetings done on GBV/SEA-SH prevention and response / reporting and community feedback (minutes of the community meetings can also be shared)	Contractor	MWE	Monthly / Quarterly

• Performance of GRM- how correctly for receiving and resolving complaints; GRM indictors • Status on appropriate mechanism to resolve GBV/SEA-SH complaints			
The MWE as an implementing Agency (IA) shall prepare status reports on GBV/SEA-SH and report to World Bank.	MWE	World Bank	Monthly / Quarterly

If the aggrieved party is satisfied, the matter shall be closed and signed off with them in the complaints log book (Annex 10). The grievances on GBV, VAC, sexual harassment, among others that result into body injuries, shall be referred to nearby health centre facilities. However, in case of criminal cases, grievances on GBV, VAC, sexual harassment, among others, shall be immediately referred to Police (in respective cells) for statutory investigations and management in accordance with Uganda's legal system.

Therefore, in a formal reporting, the following procedure will be undertaken using the report form;

- Getting the details of the Victim of GBV by GBV focal person
- Documenting the details of the Case
- Preparing witnesses to engage other Legal Actors like the Police
- Establishing the appropriate procedure including the need to for medical examination of the victim and the perpetuator
- Producing a comprehensive report to enable duty bearers assess and take appropriate actions
- Submitting the report to Duty Bearers like Uganda Police, State Attorneys and Courts
- Follow up of GBV Cases and victims to ensure appropriate services are accessed by the Victim

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN REVIEWS

The ESMP is a living/dynamic document subject to similar influences and changes from variations to the provisions of the project specifications. It will be reviewed at an interval of 6 months in order to identify any required amendments.

ENVIRONMENTAL COMPLIANCE AUDIT

MWE will take the responsibility to fulfil the requirements for an environmental and social audit, not less than 12 nor more than 36 months after project completion or commencement of operations respectively in line with the National Environment Act 2019 and the Audit Regulations of 2020.

APPROVAL OF THE ESMP ACTIVITIES

Implementation of ESMP activities will be approved by MWE and safeguards compliance will be one of the bases for payment. Final payment for the contractor shall be tagged to successful restoration of all disturbed areas and clean-up of all construction sites.

ENFORCEMENT OF COMPLIANCE

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

OPERATION PHASE MONITORING

WATER SUPPLY PLAN

MWE should develop, implement, and maintain a water safety plan taking into consideration the potential risks to the safety of the water from the supply catchment area to the consumer. A water safety plan should consist of three key components:

a) System assessment to determine whether the drinking-water supply chain (up to the point of consumption) as a whole can deliver water of a quality that meets health-based targets;
b) Identifying control measures in a drinking water system that will collectively control identified risks and ensure that the health-based targets are met; and
c) Management plans describing actions to be taken during normal operation or incident conditions and documenting the system assessment (including upgrade and improvement), monitoring and communication plans and supporting programmes.

A water safety plan should include:

a) Measures to protect the source of drinking water from risks of pollution;
b) Measures to ensure all installations intended for the production of drinking water exclude any possibility of contamination. For this purpose and in particular:
    - The installation for collection, the pipes and the reservoirs should be made from materials suited to the water and in such a way as to prevent the introduction of foreign substances in water;
    - the equipment and its use for production should meet hygienic requirements;
c) Measures to ensure an appropriate treatment such as pre-treatment processes, coagulation, flocculation, sedimentation, filtration and disinfection are undertaken to assure the safety of water for the consumers;
d) Appropriate operational monitoring system including monitoring parameters that can be measured and for which limits have been set to define the operational effectiveness of the activity; frequency of monitoring and procedures for corrective action that can be implemented in response to deviation from limits. If, during

production it is found that the water is polluted, the producer shall stop all operations until the cause of pollution is eliminated; and

e) A verification plan to ensure that individual components of a drinking-water system, and system as a whole is operating safely.

Public health surveillance (that is, surveillance of health status and trends) contributes to verifying drinking-water safety. Adequate infrastructure, proper monitoring and effective planning and management; and a system of independent surveillance are basic and essential requirements to ensure the safety of drinking-water. Surveillance should cover the total supply network from the source of untreated water to the consumer delivery points.

WATER QUALITY MONITORING PLAN

MWE will undertake water quality tests before use of the water by the communities to determine if water is safe to drink and to establish a baseline so that any future degradation can be detected. The Uganda Drinking Water Standards (**Table** 11-1) are as follows:

Table 11-1: Uganda Drinking Water Quality Standards and WHO Drinking Water Standards

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 $CaCO_3$)	mg/l	500	No Guideline
Calcium (as Ca)	mg/l	75	No Guideline
Sodium (as Na)	mg/l	200	200
Magnesium	mg/l	50	No Guideline
Arsenic (as As)	mg/l	0.05	0.01
Copper (as Cu)	mg/l	1.0	2.0
Chloride (as Cl)	mg/l	250	250
Chromium (as Cr 6+)	mg/l	0.05	0.05

Characteristic	Unit	US-201: 2008 Requirement	WHO 2011 Requirement
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 NO_3)	mg/l	5	50 (Total Nitrogen)
Barium	mg/l	1.0	0.7
Aluminium (as Al)	mg/l	0.1	0.2
Sulphates	mg/l	200	250
Zinc (as Zn)	mg/l	5.0	3.0
Lead (as Pb)	mg/l	0.05	0.01
Selenium (as Se)	mg/l	0.01	0.01
Cadmium (as Cd)	mg/l	0.01	0.003
Phenolic substances (C_6H_5OH)	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			

The minimum parameters to be tested are as detailed below:

Physicochemical:

- Conductivity, or dissolved solids
- Colour
- Turbidity
- Taste
- Odour

Microbiological:

- Faecal coliform bacteria or E. coli;
- Shigella spp
- Salmonella spp

Chemical:

- Fluoride as F-

- Nitrate
- Nitrite
- pH value
- Aluminium
- Iron(total)
- Ammonia
- Residual chlorine

The frequency of sampling and surveillance will be as detailed in **Table** 11-2 below:

Table 11-2: Minimum frequency of sampling of water for surveillance

Population served (P)	Frequency (minimum) of sampling
P > 100,000	10 samples every month per 100,000 of population served
25,001 – 100,000	10 samples every month
10,001 – 25,000	3 samples every month
2500 – 10,000	2 samples every month
P < 2500	1 sample every month

A sampling programme that takes into consideration appropriate international recommendations should be established and implemented. The sampling should be regular, and its frequency should mainly depend on the following factors:

a) Quality of water harnessed including effects on the water from climatic, human and industrial activities;
b) Type of treatment for drinking worthiness;
c) Volume of water processed;
d) Risks of contamination;
e) Background of public water supply network;
f) Population served; and
g) Capabilities of the analytical facility (both in terms of capacity and in terms of analytical performance).

OPERATION PHASE ANNUAL COMPLIANCE AUDIT

During the operation period, MWE will take the responsibility to fulfil the requirements for an environmental and social audit in line with the National Environment Act 2019 and the Audit Regulations of 2020. MWE shall submit the environmental compliance audit report to NEMA and undertake mitigation measures to address and rectify any non-compliance detected.

STAKEHOLDERS TO BE INVOLVED IN THE ESMP IMPLEMENTATION, THEIR ROLES AND RESPONSIBILITIES

The management and supervision of the ESMP is strictly the responsibility of the Ministry of Water and Environment as the Developer. During construction, the Contractor will be responsible for the day-to-day implementation of the ESMP. During the operation phase, the Eastern Umbrella for Water and Sanitation (EUWS), who will take over management of the project, will be responsible for the implementation of the ESMP. The Developer, the Contractor and the Operator should employ an Environmentalist with relevant academic qualification and work experience. At the local level Buyende will be responsible for the day-to-day monitoring of the ESMP in their areas of jurisdiction.

At the National level, two institutions i.e., the National Environment Management Authority (NEMA) and the Department of Occupational Safety and Health (DOSH) of the Ministry of Gender, Labour and Social Development will be involved. The role of NEMA is to monitor the project as per the Environment Act Nº.5 of 2019 and to approve external environmental compliance audits as per the Environmental Audit Regulations (1999). The role of DOSH is to issue permits and periodically inspect the project site. DOSH will issue workplace Certificates every year if the project meets working conditions as set out in the Occupational Safety and Health Act 2006. The district and town councils will approve construction permits in their area of jurisdiction.

As a means of impartiality, local NGO's or CBOs will be involved in the implementation of ESMP. Their role is to be neutral observers. They should have experience in environmental management and skills in conflict resolution.

INSTITUTIONS INVOLVED IN SAFEGUARDS MANAGEMENT

The Project will be implemented by MoWE in close collaboration with BuyendeDistrict local government and their partners (e.g., private sector operators). To facilitate integration within the sector,MoUs outlining joint responsibilities will be signed between the MWE,Buyende district local governments and entities responsible for specific activities (e.g., districts).

Table 11-3: Institutional Mandates

Ministries, and Departments &Statutory Agencies	Mandates/Responsibilities
The World Bank	The World Bank will be financing the project and is therefore expected to offer implementation support supervision to the project's environmental and social performance through missions. The World Bank will designate a safeguards team that can participate in safeguards missions.

Ministries, and Departments &Statutory Agencies	Mandates/Responsibilities
Ministry of Water and Environment-MoWE	The Ministry of Water and Environment (MoWE) has the overall mission: to promote and ensure the rational and sustainable utilization, development and effective management of water and environment resources for socio-economic development of the country. The ministry has three directorates: Directorate of Water Resources Management (DWRM), Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA). *MoWE shall take lead on implementation of the project and shall ensure all recommendations contained in the mitigation plan are implemented.*
Ministry of Local Government-MoLG	The Ministry is mandated to carry out a number of responsibilities in the Local Government Act as follows: to inspect, monitor, and where necessary offer technical advice/assistance, support supervision and training to all Local Governments; to coordinate and advise Local Governments for purposes of harmonization and advocacy; to act a Liaison/Linkage Ministry with respect to other Central Government Ministries and Departments, Parastatals, Private Sector, Regional and International Organizations; and to research, analyse, develop and formulate national policies on all taxes, fees, levies, rates for Local Governments. Buyende DLG fall under this Ministry and will be supervised and supported by MoLG.
Directorate of Environmental Affairs-DEA	The DEA is responsible for environmental policy, regulation, coordination, inspection, supervision and monitoring of the environment and natural resources as well as the restoration of degraded ecosystems and mitigating and adapting to climate change.
Directorate of Water Development (DWD)	The DWD is responsible for providing overall technical oversight for the planning, implementation, and supervision of the delivery of urban and rural water and sanitation services across the country, including water for production. DWD is responsible for regulation of provision of water supply and sanitation and the provision of capacity development and other support services to Local Governments, Private Operators, and other service providers.

Ministries, and Departments &Statutory Agencies	Mandates/Responsibilities
Directorate of Water Resources Management-(DWRM)	The DWRM is responsible for developing and maintaining national water laws, policies, and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction, and wastewater discharge permits; Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of transboundary waters resources and peaceful cooperation with Nile Basin riparian countries.
Supervising Consultant	The Contractor will prepare Method Statements for specific activities such as excavation works and submit for the Supervision Engineer's review and comments before commencement of works. If the Engineer notifies the Contractor that a specific method statement has failed to provide adequate mitigations, such a statement should be revised and resubmitted until when approved
Statutory Agencies	
National Environment Management Authority- NEMA	NEMA retains its mandatory role of coordination, supervision and monitoring environmental issues. As for the implementation of the ESIA process, NEMA's role will involve coordinating the review of the ESIAs of the planned interventions with relevant line agencies. Other lead agencies that would participate in the review are the Ministry of Local Government and local governments. Specifically, the Environmental Monitoring and Compliance Department of NEMA is responsible for the review and approval of ESIAs, post-implementation audits and monitoring of approved projects. Although project sponsors have a responsibility for monitoring their own activities, NEMA carries out its own monitoring largely through District Environmental Officers and environmental inspectors at NEMA's head office/ Lead Agencies.
District Environment Officer (DEO)	The functions of the District Environment Officer are amongst others, advice the district Environment committee on all matters relating to the environment amongst others.
District Environmental Committees	The functions of the District Environment Committees include: to act as a forum for community members to discuss and recommend environmental policies and bye laws to the District Council and advice the District Technical Planning Committee, the District

Ministries, and Departments &Statutory Agencies	Mandates/Responsibilities
	Council and NEMA on environmental management issues in the district.
NGOs	The NGOs working in the sector are coordinated at the national level through UWASNET, Uganda Water and Sanitation NGO Network an umbrella organization, which has been largely funded by sector development partners through MoWE.
Water Management at District Level	They receive funding from the center in the form of a conditional grant and can also mobilize additional local resources for water and sanitation programs. Local Governments, in consultation with MoWE appoint and manage private operators for urban piped water schemes that are outside the jurisdiction of NWSC.
COMMUNITY	
Beneficiary Communities	The Communities are responsible for demanding, planning, contributing a cash contribution to capital cost, and operating and maintaining rural water supply and sanitation facilities. A water user committee (WUC), which is sometimes referred to as a Water and Sanitation Committee (WSC) should ideally be established at each water point. Being the primary beneficiaries of the project, the community will be made to participate fully in all aspects of the program including project identification preparation, implementation, operation and maintenance.

The goal of the IWMDP is to the maximum extent possible utilize existing institutional structures and capacity within the MWE and the local government to implement the Project. In order to successfully implement the ESMP, it is important to ensure that target groups and stakeholders who play a role in implementing it are provided with the appropriate and continuous Environmental and Social Safeguards capacity development.

The key institutions/group of people whose capacity needs to be enhanced to effectively implement and monitor the ESMP of this project are:

- Beneficiary Communities: There is a need to carry our training and awareness trainings for the key community members on the safeguard's aspects of the project. Further, they need to be facilitated to enable them effectively monitor the ESMP implementation process.
- Staff of the respective District Local Governments: The staff at the district level needs to be trained on key aspects of the project. They also need to be facilitated to enable them effectively monitor the ESMP implementation process.

There is a need for the project to foster inter institutional monitoring of the implementation of the project's ESMP. An interinstitutional monitoring committee should be formed, trained and their activities facilitated. A capacity building plan should be developed after instituting an inter institutional monitoring committee.

ROLES OF CONTRACTOR DURING PROJECT IMPLEMENTATION

During the construction phase and operation and maintenance phase, MWE will engage contractors to undertake the civil works and O&M tasks for the project respectively. Contractors will be responsible for complying with all relevant legislation and adhere to all mitigation measures specified in the ESMMP including the NEMA conditions of approval. MWE will therefore have to ensure enforcement of mitigation measures which will be enshrined under contractual obligations. The contractors will be obliged to commit resources to ensure implementation of obligations in the contract through hiring qualified Safeguards Officers to operationalize the environmental and social requirements in the ESMP and supporting documentation. The construction contractor has not yet been procured, while the NUWS has been identified as the most suitable O&M phase contractor in the project feasibility study. However, based on experience for similar projects, the following safeguards team is recommended:

a) Health & Safety Officer
b) Environmentalist
c) Sociologist
d) Site Nurse
e) Community Liaison Officer/Grievance Officer

MWE through the supervising consultant must approve the contractors' safeguards team. It may be useful to include the minimum requirements in the contracts for the civil works/ O&M phase. The Contractors are encouraged to sign MoUs with different service providers for safeguards related matters (waste management, HIV/AIDS, etc).

ROLE OF SUPERVISING CONSULTANT

The Supervising Consultant should have in their teams at least an Environment Specialist and a Social Specialist who will have overall responsibility of issuing guidance and instructions to the contractor including review and approval of the contractor's management plans. The Environmental Specialist and Social Safeguards Specialist will work closely with MWE Safeguards Team in supervising the contractor. In addition, the Supervising Consultant will conduct scheduled site supervisions to monitor state of safeguards compliance as documented or executed by the Contractors. The Supervising Consultant will have obligation to also oversee compliance and observation of environment, safety, health and social requirements alongside other cross-cutting issues in the project.

STAFFING REQUIREMENTS

The following personnel are proposed for each ESMP implementing stakeholder: -

Table 11-4: Personnel required to implement and monitor the ESMP

Stakeholder	Personnel required
Ministry of Water and Environment (Project Coordination Unit)	Water Engineer Sociologist Environmental Health Officer Health and Safety Officer
Construction Contractor	Site Engineer Site Supervisor Site Foreman Environmental Officer Sociologist Health & Safety Officer Site Nurse
O&M Contractor	Environmental Officer Sociologist Grievance Management Officer
Kiryandongo District Local Government	District Environmental Officer District Water Officer District Engineer District Community Development Officer
Bweyale Town Council and Kiryandongo sub county	Community Development Officer Councilors Secretary for Health
NEMA	Monitoring Officer
OSH Department	Health and Safety Inspector supported by District Labour Officer
NGO/ CBO	Representative with skills in environmental management and conflict resolution
Department of Museums and Monuments	Archaeologist

The ESMP is based on a collaborative approach where the responsibility for the implementation and monitoring of the environmental and social management measures is shared among relevant stakeholders, to varying degrees. Successful ESMP implementation and more particularly its institutional arrangements and its environmental and social monitoring programs, will be based on a program of institutional support and capacity-building. Contractors must also be aware of the need to integrate best practices in their work.

It is the onus of each ESMP implementing stakeholder to ensure that all its personnel required in implementation of this ESMP are adequately qualified and were appointed based on their qualification and suitability for their respective roles. The ESIA Consultant recommends a training program (safeguards clinic) be implemented through the ESMP to enhance the environmental and social awareness of the project's key personnel. Monitoring may require the services of environmental specialists or a company with laboratory and analytical facilities (for complex environmental problems) or inspection by the local government environmental officers.

THE ENVIRONMENTAL AND SOCIAL MONITORING TEAM

While the Developer will do his own internal monitoring; a monitoring team headed by the District Environment Officer of Buyende Districts and composed of the local environmental authorities, representatives from the District and NEMA and any other lead agencies may also carry out monitoring. The Contractor shall undertake monitoring of key environmental parameters like water quality, noise, and air pollution etc. and make monthly reports to the Developer.

Table 11-5: Environmental and Social Monitoring Plan

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
NEGATIVE IMPACT								
CONSTRUCTION PHASE								
Land acquisition/ displacement of land uses	PAPs	Before commencement & continuous throughout implementation	BH areas & along TL	No. of PAPs Compensated Land consent agreements	RAP Implementation Report/ Grievance Log	100% compensation	MWE/ RAP Consultant	Proj. Sup. RAP Budget
Land use/ cover change	Area cleared; Species type	Monthly After construction/ material extraction	Quarry site, Sand mines, Intake/ WTP/ Reservoir site	Ha No. species	Progress Reports Restoration/ completion certificates	Restricted to TL & DL Restored	Supervising Engineer MWE/NEMA	Contract

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
			Along the TL and DL					
Wetland management	Area cleared; Species type Wetland integrity	Monthly After construction/ material extraction	Intake site	Ha No. species	Progress Reports Restoration/ completion certificates	Compliance with Wetland permit	Supervising Engineer MWE/NEMA	Contract
Waste management	Amount of Solid waste	Once a week	Project site	Kg for Solid waste, Litres for Liquid waste	Observations and Measurements	0 Legal disposal	MWE DLG Contractor	5,000,000 MWE Budget Contract
Noise pollution	Noise level Workers	Once a week Before and after project	Project site	dBA Hearing medical check	Noise Level Meter Health report	Ntl Stds Hearing standard	MWE	5,000,000 10,000,000

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
Air Quality	Dust (PM_{10})	Once per months (daily inspection to be made to detect and remedy excessive dust generation).	Project site	ppm	Micro-dust Pro	Ntl Stds	Contractor MWE / Sup. Consultant	Contract 10,000,000
Safety and health risks	Signage No. of training First aid kits No. and type of PPE. Fence in place Monitoring	Daily by contractor, weekly by Consultant and Quarterly by MWE.	Project site	Number of safety measures provided	Incidents/Acc. Log, injuries and inspection No of near misses, incidences/accidents recorded.	0	MWE Contractor	5,000,000 10,000,000 5,000,000 2,000,000 Contract

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
	Health and sanitation facilities in site.				No. of toolbox talks conducted			Contract
HIV/AIDS	No. of sensitization training VCT services and Anti-Retro-Viral Treatment Supply of condoms	Monthly Sub contracted	Project site Community	Number of HIV/AIDS mainstreaming strategies provided	Monthly report		MWE Contractor	5,000,000 5,000,000 2,000,000
GBV, VAC Cases	Nature of GBV Case GBV specialist Monitoring of VAC Reporting and management of VAC cases	Daily by contractor, weekly by Consultant and Quarterly by MWE.	Project site	No. Reported Cases No. of cases resolved	Grievance Log Police Case Files	0	MWE Consultant Contractor	12,000,000 12,000,000 5,000,000 5,000,000

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
GRM for workers and communities	Grievance Committees	Monthly	Project site	No. Reported Cases and resolved	Grievance Log	0	MWE Consultant Contractor	5,000,000 10,000,000
Liability for loss	Training on the operation of the machinery & equipment Signage Onsite clinic	Daily by contractor, weekly by Consultant and Quarterly by MWE.	Project site	No. of losses recorded	Grievance Log	0	MWE Insurance Company Contractor	5,000,000 2,000,000 30,000,000
Physical cultural resources	Consultation Training Compensation/preservation	During project construction phase	Project sites	No. of resources identified	Consultation Chance finds	0	Contractor MWE MMU	7,000,000 RAP budget
Operation phase								
Water Quality & Quantity	All	Monthly	BHs	All	Lab. Analysis Hydrogeological analysis	Ntl Stds	MWE	40,000,000

Environmental and Social Aspect	Parameters	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
Waste Management	Amount of Solid waste	Once a week	Project site	Kg for Solid waste, Litres for Liquid waste	Observations and Measurements	0 Legal disposal	MWE DLG	6,000,000 MWE Budget

12. CONTRACTOR'S E&S MANAGEMENT PLANS CONSTRUCTION PHASE

CONTRACTOR MANAGEMENT PLANS

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

LABOUR FORCE MANAGEMENT PLAN

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

QUALITY MANAGEMENT PLAN

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

EROSION AND POLLUTION CONTROL PLAN

Soil erosion is a very important aspect given the location of the construction site for the water sources and reservoir. In addition, the transmission and distribution lines will go through some wetlands. Erosion risks are expected to be mainly associated with vegetation clearance, construction of access roads and storage of excavated materials. In some cases, the project area may receive high amounts of rainfall that will be associated with several soil erosion and drainage impacts, such as, siltation and water stagnation that could be experienced in the direct project area. There is need to lay special strategies for managing the soil erosion.

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

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

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

Erosion prevention practices like stabilization are generally less costly and more effective than sediment control measures, which involve settling or filtering mobilized soil particles before they are transported by runoff to surface waters. Various practices can be used for sediment removal from dewatering discharge. Sedimentation is primarily effective at removing larger sized particles, while filtration and chemical treatment can also remove the fine particles. These approaches are less effective for dissolved nutrients and metals that are non-adsorbed. Effectiveness of chemical treatment depends greatly on the pH and temperature of the water being treated. The Contractor should ideally include a comprehensive Erosion, Sedimentation and Pollution Control Plan Checklist.

WASTE MANAGEMENT PLAN

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

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

OCCUPATIONAL HEALTH AND SAFETY PLAN

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

HANDLING OF CHEMICALS AND OTHER POTENTIALLY HARMFUL MATERIALS

Chlorine, a harmful and toxic chemical, will be employed at the storage reservoirs during project operation. Thus, it must be safely handled to prevent any accidents, including health and safety issues. This section analyses the handling aspects of this chemical.

DESIGN AND MANAGEMENT OF CHLORINATION STORAGE AND DOSING AREAS

The following special storage and handling features should be utilized and maintained during the water supply project operation.

a) Storage and equipment rooms be equipped with doors, opening outward to the outdoors complete with panic hardware;
b) Viewing window into chlorine storage and equipment rooms for operator security;
c) Visual and audible emergency alarms at the chlorine room entrance;
d) Exhaust fans with a typical rating to air changeover every minute;
e) A chlorine gas leak detector to generate alarms and attendant ammonia bottle to help locate a leak;
f) A drench shower located where it is easily accessible in case of emergency, with single turn (butterfly valve) water tap;
g) An emergency kit to repair leaking containers.

For systems that use gas chlorination:

a) Install alarm and safety systems, including automatic shutoff valves, that are automatically activated when a chlorine release is detected;
b) Install containment and scrubber systems to capture and neutralize chlorine should a leak occur;
c) Use corrosion-resistant piping, valves, metering equipment, and any other equipment coming in contact with gaseous or liquid chlorine, and keep this equipment free from contaminants, including oil and grease;
d) Store chlorine away from all sources of organic chemicals, and protect from sunlight, moisture, and high temperatures.

HANDLING OF CHLORINE DURING OPERATION

Chlorine reacts violently with hydrogen, acetylene gases and solvents creating heat (EPA, 2011b). The reaction of chlorine with ammonia can create explosive compounds and gases that are toxic to breathe. Chlorine also reacts with metals. In the presence of water, chlorine can create a highly corrosive and dangerous acid mist. Therefore:

a) Prepare and approve standard operating procedures for its storage and handling;
b) Never store chlorine gas and ammonia in the same building or area;
c) Keep chlorine isolated and in different rooms from the chemicals that it reacts with;
d) Chlorine storage areas, storage containers and process equipment and lines should be properly labelled and appropriate hazard warning should be posted in accordance with site specific operating procedures;
e) Gas containers should be stored in separate or divided rooms separately from flammable materials and other chemicals such as ammonia and sulphur dioxide, if used elsewhere in the installation;
f) Containers should be stored and used above ground level and always in a vertical position;
g) Chlorine gas containers should be stored in marked areas shielded from external heat sources;
h) The protective hood should be kept secure on all unused containers and should only be taken off only when the container is being used. All containers in use should be secured in position by chains or other methods as appropriate. Gas containers should only be lifted with suitably rated and tested equipment and never by their protective hoods;
i) Empty cylinders should be clearly marked and segregated from unused cylinders.

EMERGENCY RESPONSE PLAN

The main purpose of an Emergency Response Plan (ERP) is to provide a systematic approach to the protection of employees, assets and the environment from impact of serious incidents. The plan encompasses organizing, coordinating and implementing a range of procedures to prevent, mitigate, respond to and recover from the consequences of an emergency event. The ERP covers the required actions for all situations that could generate emergency situations during the project's construction phase. It will be developed to establish general guidelines and response procedures for the management of emergency events on the Project. It will also establish an emergency management command structure and mechanisms for review, oversight and accountability. The contractor shall establish procedures to ensure that all personnel have the skills to report environment incidents. The contractor shall keep records of all incidents, investigation, and analysis and counter measures taken.

The ERP will also set out the means by which these measures will be communicated to affected communities in a culturally appropriate manner. The ERP should have Best Practices, which include working with local and national agencies like the fire brigade, police, hospitals, counter terrorism units etc. The following are key emergencies, which the project should be prepared to handle:

- Fire
- Electricity shocks and electrocution
- Bomb threat
- Civil disturbance
- Hostage
- Terrorist incident
- Death of a worker on the project site

- Suicide
- Shooting or stabbing
- Disasters e.g. earthquake, lightening, collapse of excavation walls
- Large-scale hazardous material spill
- Mass casualties
- Health epidemics
- Rapture or leak of equipment
- Flooding

SECURITY MANAGEMENT PLAN

The purpose of the Security Management Plan is to assure a safe and secure project environment for staff, visitors and its service providers alike and to mitigate any risk of loss/damage to project property, equipment or its infrastructure. It identifies potential security risks present in the construction phase, methods and policies to mitigate these risks, and the requirements to ensure the highest levels of safety and security in the implementation of the Project. It will therefore, set out commitment of the Project to security. The Plan will specifically deal with:

1. Security issues in the project i.e. being safe from attacks from thugs and ill motived persons;
2. Being prepared for insecurity incidents; and
3. Decisively responding to and managing the insecurity circumstances and incidents.

COMMUNITY HEALTH AND SAFETY PLAN

The Plan applies to Project construction activities and the associated risks and potential impacts that these activities may have on community health and safety. The risks and potential project impacts to community health and safety can emerge from both within and outside the so-called project area of influence. Therefore, the scope of this plan focuses on the management of aspects associated with the interaction of construction activities, the workforce, and the community as well as mitigation of contagious diseases (e.g. COVID-19; Ebola etc). The Plan should include control measures designed to avoid, minimize or mitigate the adverse effects of project activities on the health and safety of the community, while at the same time, enhancing the beneficial effects and capitalize on opportunities that may contribute to improving overall community well-being.

STAKEHOLDER COMMUNICATIONS AND ENGAGEMENT PLAN (SEP)

In pursuit of timely, meaningful and appropriate stakeholder engagement, the contractor is expected to have a clear strategy for stakeholder engagement to assist in managing and facilitating future engagement through the various stages of the Project's life cycle from mobilization up to handover. This stakeholder engagement plan shall detail the key stakeholders to be engaged and the schedule of engagements throughout the various stages of construction, decommissioning and the defects liability period.

HIV/AIDS AND GENDER MANAGEMENT PLAN

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

CHILD PROTECTION AND MANAGEMENT PLAN

Contractors should be cognizant of the importance of child protection issues and their responsibility to uphold the rights of children at all times. A child protection plan should spell out measures to prevent any form of abuse of children such sexual violence, exploitative labour and sexual exploitation which include children. Additionally, the plan should have stringent punitive measures properly defined for potential perpetrators of child related abuse. This should also be signed by contractor workers as part of their contractual obligations to guard against child abuse.

The Child protection Plan shall include the following:

1. Brief Overview of Child Concerns
2. Policy, Legal and Regulatory framework governing child protection issues
3. Child Protection Risks at each site
4. Contractor's Policy on Children and Codes of Conduct
5. Child Protection Services by contractor (Prevention & Mitigation)
6. Arrangements for Referral & Linkage to Other Child protection services in area
7. Support Offered to Children to access justice
8. Mentorship & Training
9. Monitoring & Reporting
10. Schedule of Engagements such as Community Meetings and Joint Stakeholder Meetings.

CHANCE FINDS PROCEDURE

During excavations, chance finds may be encountered. Therefore, the contractor should have a chance finds management plan that defines the measures necessary for the overall management of any cultural heritage encountered during construction.

In order to avoid potential damage to cultural property discovered during construction, the following will apply:

- Workers must be vigilant to any relics found during excavation;
- In case of a discovery during the excavation, workers must immediately report the findings to the Foreman;
- The Foreman must stop the work immediately and communicate the findings to the Supervisor;

- The Supervisor then communicates the findings to the Contractor Manager;
- The Contractor Manager then notifies MWE Safeguards Team;
- The Department of Museums and Monument of Uganda will then be notified either via communicating with the MWE Safeguards Team via telephone or email or based on a site visit within 14 days from the time of discovery;
- Any further excavations or continuation of the infrastructure development at the Site of the discovered heritage will be undertaken only with the approval of the Department of Museums and Monuments;
- Should the Conservator of Antiquities from the Department of Museums and Monuments confirm that the discovered resource falls within the heritage resource description, he/she will report the resource to the Minister of Tourism, Heritage and Antiquities for preservation and protection;
- Rescue excavation or *in-situ* conservation will be proposed based on the disturbance likely to be caused by the project or in relation to cost vis-à-vis value of the heritage resource;
- MWE will then apply for either an excavation or preservation in-situ license of the discovered resource. The feasible proposal will then be executed. In case of in-situ conservation, the site will be managed and open to the communities and tourists that access the project area; and
- All chance finds will be recorded in the chance find form.

The project activities will then continue after the following have taken place:

1. In the case of archaeological artefacts discovery, MWE will inform the Uganda Museum and grant a period where specialists from the Department of Museums and Monuments excavate and curate the artefacts professionally;
2. In the case of discovered human remains the police will have to be notified and either the remains are taken for forensic investigation or the LC1 authorities sanction the reburial of the remains at another location. The Contractor then meets the relocation and reburial expenses which shall be claimed from MWE; and
3. In the case of an encounter with an unknown sacred site, relocation ceremonies will be undertaken by the custodians of the site and the contractor then meets the relocation expenses which shall be claimed from MWE.

Overall, the following precautions ought to be undertaken:

A. ***Site avoidance****:* If the boundaries of the site have been delineated, attempt must be made to redesign the proposed development to avoid the site;
B. ***Mitigation****:* If it is not feasible to avoid the site through re-design, it will be necessary to sample it using data collection program prior to its loss. This could include surface collection and/or excavation; and
C. ***Site Protection****:* It may be possible to protect the site through the installation of barriers during the time of the development and/or possibly for a longer term. This could include erection of high visibility fencing around the site or covering the site area with a geo-textile and then capping it with fill. The exact prescription would be site- specific.

During the implementation of the project and in the event that, a PCR is encountered, the following can be contacted:

Ministry of Tourism, Wildlife and Antiquities Rwenzori Towers 2nd Floor, Plot 6 Nakasero Road. KAMPALA, UGANDA. P. O. Box 4241 Kampala Phone: +256 414 561 700 Email: info@tourism.go.ug	The Uganda Museum Plot 5-7 Kira Road, P. O Box 365, KAMPALA-UGANDA (+256) 414 232707. www.ugandamuseums.or.ug

DECOMMISSIONING PLAN

The Kidera RGC Water Supply and Sanitation Project has been planned to operate up to 2041 after which, a system upgrade may be required. Therefore, for the next 20 years, full scale decommissioning of the project is not anticipated to take place except a site construction decommissioning approach which can be considered at the moment in this study. Therefore, the practical decommissioning will for now involve the following:

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

Although limited adverse impacts may occur, the contractor and the Developer shall prevent any condition from developing on site during construction, operation and decommissioning that would prevent restoring the site to a useful condition upon removal of the water transmission lines. Within 12 months before facility removal, the operator shall develop a decommissioning plan, detailing the following;

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

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

13. CONCLUSIONS AND KEY RECOMMENDATIONS

RECOMMENDATIONS

Generally, the purpose of this project is to increase sustainable access to safe water and basic sanitation in Kidera RGC along the distribution route. From the assessment, the positive impacts outweigh the negative impacts. Further, the negative impacts of the project are identifiable and mitigatable. The report presents specific mitigation measures for each impact identified. The mitigation measures are aimed at either eliminating the impact or reducing its magnitude and or severity or both. Therefore, study recommends that the project should proceed but with the following recommendations;

a. Construct the proposed water project along the road reserves of the existing public roads as proposed by the Developer to avoid delays, impacts and negotiations associated with land acquisitions with private landlords.

b. The project design should incorporate aspects and techniques that protect the borehole structures from risk of flooding at borehole DWD 60870 and contamination from pit latrines at borehole DWD 61681 as included in the project ESMP.

c. Detailed design for the water transmission and distribution lines shall be undertaken in close consultation with the authority in charge of access roads in Kidera RGC so as to take care of the new road designs which UNRA may be planning to implement in the project area.

d. Conduct and implement pre and post construction phase mitigation measures by coordinating with local authorities and involving the district and sub-county officials.

e. Implement the project Resettlement Action Plan recommendations in relation to land acquisition, easement and protection of physical cultural resources,

f. Implement actions proposed in the project water source protection plan for sustainability of the project water resources in the Kidera RGC

g. Ensure adequate and qualified staffing for Environmental and social safeguards management at MWE, Supervising Engineer, and Contractor during implementation to enhance oversight and compliance roles with environmental and social safeguards requirements.

The following general mitigation measures shall be undertaken and will include but not limited to the following:

h. Ensure employment opportunities for the local people.

i. Ensure health and safety for both workers and the public.

j. Institute a programme where all communities affected by the water and sanitation project have access to adequate and clean water.

k. Control negative impact on biodiversity and wetlands.
l. Ensure all livelihoods lost are restored through a transparent and adequate compensation procedure and livelihood restoration plan.
m. Mainstream HIV/AIDS prevention in contractors SEAP.
n. The Contractor should develop a Construction specific ESMP after developing the final designs. This should constitute the monitoring checklist to be used by the Supervising Consult and MoWE.

The environmental management and monitoring plan shall be attached as a condition for the project construction contract so as to make the contractor aware of his environmental obligation before securing the contract and enhance the implementation of the ESMP.

Overall; this will enhance environmental standards in the whole project. In case of any archaeological finds during excavation, these shall be reported and handed over to the Department of Museums and Monuments in the Ministry of Tourism, Wildlife and Antiquities for further follow up in accordance with the Chance Find procedure developed for this project.

CONCLUSIONS

In this study, the need for the project was examined, its compatibility with the surroundings and economic benefits evaluated and environmental impacts assessed and analyzed.

Adverse impacts were identified, mitigation measures to avoid, reduce and minimize these impacts have been suggested, either as part of the design, or as measures to be implemented. Good practice measures were also identified in order to minimize the impact of the proposed development further. The proponent has agreed to these mitigation measures and they are, therefore, expressed as commitments.

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

Based on the above, it is recommended that NEMA approves this project because its planned activities do not pose a threat to environment and natural resources if the mitigation measures and monitoring plan are implemented effectively.

REFERENCES

https://washdata.org/data/household#!/dashboard/new (Accessed online on 15th April 2022); http://wsdb.mwe.go.ug/index.php/reports/district/54 ((Accessed online on 15th April 2022);

Buyende District Sanitation Report, July 2020

Beentje, H., Adamson, J., and Bhanderi, D. 1994. Kenya Trees, Shrubs, and Lianas. National Museums of Kenya, Nairobi, Kenya.

BirdLife International. 2021. IUCN Red List for birds. http://www.birdlife.org on 12/09/2021.

Branch B. 2005. A Photographic Guide to Snakes, other reptiles and amphibians of East Africa. – Struik Publishers: Cape Town.

CITES Appendix II of the IUCN Red Category, 2019.

Cronk, Q.Cs. and Fuller, J.L. 1995. Plant Invaders: The Threat to Natural Ecosystems. Chapman and Hall, London.

Daubenmire, Rexford. 1959. A Canopy-coverage method of vegetational analysis. Northwest Science 33:43-64.

Davenport, T.R.B. 1993. The Butterflies of Uganda - An Annotated Checklist. Uganda Forest Department, Kampala, Uganda.

Delany, M.J. 1975. The Rodents of Uganda. British Natural History Museum, London.

EPA, 1999. Wastewater Technology Fact Sheet: Ultraviolet Disinfection (EPA 832-F- 99064), Office of Water Municipal Technology Branch, Washington, DC. DCN DW00677.

EPA. 2011. Drinking Water Treatment Plant Residuals Management. Technical Report: Summary of Residuals Generation, Treatment, and Disposal At large Community Water Systems. EPA 820-R-11-003. Environmental Protection Agency. Washington, DC, USA.

Fellers, G. M., Freel, K. L. 1995. A standardized protocol for surveying aquatic amphibians. U.S. National Park Service Tech. Rept. NPS / WRUC / NRTR-95-01 (UC CPS TR # 58). Washington, D.C.

Glasson, J. 1994. 'Life after the Decision: The Importance of Monitoring in EIA', Built environment, 20 (4): 309-320.

Gender relations, livelihood security and reproductive health among women refugees in Uganda- The case of Sudanese women in Rhino Camp and Kiryandongo Refugee Settlements; https://edepot.wur.nl/42396

Grieg Smith, P. 1983. Quantitative Plant Ecology. Blackwell Scientific Publications, Oxford. 359 pp.

Halliday, T. R. 1996. Amphibians. In: Sutherland W.J, ed. Ecological Census Techniques: A Handbook. Cambridge UK: Cambridge University Press, pp. 205-217.

Heyer, W.R; Donnely, M.A.; McDiarmid, R.W.; Hayek Lee-Ann, C. AND Foster M.S. (eds) 1994: Measuring and monitoring Biological Diversity: Standard methods for Reptiles and Amphibians. Smithsonian Institution Press, PA.

Hilton-Taylor, C. (compiler). 2000. IUCN Red List of Threatened Species. IUCN, Gland, Switzerland and Cambridge, UK. www.iucnredlist.org.

https://www.iucn.org/news/species/202103/african-elephant-species-now-endangered-and-critically-endangered-iucn-red-list

IUCN Red List of Threatened Species, 2020.

Jay P. Graham and Matthew L. Polizzotto, 2013; Pit Latrines and Their Impacts on Groundwater Quality: A Systematic Review, 2013; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3673197/

Jennings S. B. Brown, N. D. & Sheila, D .1999. Assessing forest canopy and understorey Illumination.

Kingdon, J. (1971-74). East African Mammals: An Atlas of Evolution, Vols. I, IIA and IIIB. Academic Press, London.

MWE. 2013. Water Supply Design Manual Second Edition. Ministry of Water and Environment, Government of Uganda. Kampala, Uganda.

MWE. 2021. Water Atlas for Kiryandongo District. Ministry of Water and Environment, Government of Uganda. Kampala Uganda. http://wsdb.mwe.go.ug/index.php/reports/district/116.

Ndawula J, Tweheyo M, Tumusiime D N & Eilu G 2011. Understanding sitatunga (*Tragelaphus spekii*) habitats through diet analysis in Rushebeya-Kanyabaha wetland, *Uganda, African journal of Ecology* 49 (4): 481–489.

Olson D.H, Leonard WP, Bury B. R, eds. 1997. Sampling Amphibians in Lentic Habitats. Olympia, WA: Soc Northwest Vert Biol.

Spawl, S., Howels, K., Drewes, C. & Ashe, J. 2002. *A field guide to the reptiles of East Africa.* A & C Black Publishers, London and San Diego.

UBOS. 2014. Poverty Maps of Uganda Mapping the Spatial Distribution of Poor Households and Child Poverty Based on Data from the 2016/17 Uganda National Household Survey and the 2014 National Housing and Population Census Technical Report October 2019; https://www.ubos.org/wp-content/uploads/publications/02_2020Poverty_Map_report__Oct_2019.pdf

UBOS. 2014. Uganda National Household survey 2012/13. Uganda Bureau of Statistics. Kampala, Uganda.

UBOS. 2018. Water and Sanitation Sector Gender Statistics Profile. Uganda Bureau of Statistics. Kampala, Uganda.

UGANDA: Child poverty by population size and region https://covid19.gou.go.ug/uploads/document_repository/authors/unicef/document/Multi-dimensional_Poverty_and_monetary_poverty_U18_-_with_Kampala.pdf

Uganda Participatory Poverty Assessment Process; Second Participatory Poverty Assessment Report; Deepening The Understanding Of Poverty; https://www.participatorymethods.org/sites/participatorymethods.org/files/deepning%20the%20understanding%20of%20poverty.pdf

Uganda Poverty Maps https://www.unicef.org/uganda/media/961/file/Uganda%20Poverty%20Maps.pdf%20.pdf

UNHCR, 2021; Refugee Statistics and Verification – Uganda; https://data2.unhcr.org/en/working-group/168?sv=0&geo=220&secret=unhcrrestricted

UNICEF. 2020. Going Beyond Monetary Poverty Uganda's Multidimensional Poverty Profile; https://www.unicef.org/esa/media/6146/file/UNICEF-Uganda-Multi-dimensional-child-poverty-2020.pdf

WHO. 1999. Carbon monoxide: Environmental health criteria; 213. World Health Organisation. Geneva, Switzerland.

WHO. 2006. WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide, Global updates 2005. World Health Organisation. Geneva, Switzerland. http://whqlibdoc.who.int/hq/2006/WHO_SDE_PHE_OEH_06.02_eng.pdf

World Bank Group (IFC). 2007. Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality. http://www.ifc.org/ehsguidelines

World Bank. 2016. The Uganda Poverty Assessment Report 2016 Farms, cities and good fortune: assessing poverty reduction in Uganda from 2006 to 2013; https://thedocs.worldbank.org/en/doc/381951474255092375-0010022016/original/UgandaPovertyAssessmentReport2016.pdf

https://sdg6data.org/country-or-area/Uganda#anchor_6.1.1

Uganda Bureau of Statistics (UBOS), 2018. Uganda National Household Survey 2016/2017. Kampala, Uganda; UBOS

Kes, A. and Swaminathan, H. 2006. Gender and time poverty in sub-Saharan Africa. In Blackden, C.M. and Wodon, Q. (Eds), Gender, time use and poverty in sub-Saharan Africa, pp. 13-38. World Bank Working Paper No. 73. Washington, DC: World Bank

Gender Issues in Uganda, an analysis of gender-based violence, asset ownership and employment,2014

https://www.ubos.org/wp-content/uploads/publications/03_20182016_UNHS_FINAL_REPORT.pdf

Uganda rural population for 2020 was 34,326,791, a 2.51% increase from 2019. Uganda rural population for 2019 was 33,485,073, a 2.81% increase from 2018. Uganda rural population

for 2018 was 32,570,632, a 3.01% increase from 2017 (Source:https://www.macrotrends.net/countries/UGA/uganda/rural-population#:~:text=Uganda%20rural%20population%20for%202020,a%203.01%25%20increase%20from%202017 .

https://www.unicef.org/media/97281/file/WASH%20affordability%20case%20study-Uganda.pdf (Accessed online on 25th March 2022

https://water.org/our-impact/where-we-work/uganda. (Accessed online on 25th May 2022)

Third National Development Plan (NDPIII) 2020/21–2024/25, National Planning Authority-KAMPALA

ANNEXES

ANNEX A: NEMA APPROVAL OF TOR

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 / 232650
Email: info@nema.go.ug
Website: www.nema.go.ug

NEMA/4.5

7th June, 2022

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

Tel: +256 417889400
Email: mwe@mwe.go.ug

RE: SCOPING REPORT AND TERMS OF REFERENCE FOR UNDERTAKING AN ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR FIVE LARGE SOLAR POWERED PIPED WATER SUPPLY SYSTEMS AND SANITATION FACILITIES IN, IGWAYA AND KIDERA IN BUYENDE DISTRICT, KITENGA IN KALIRO DISTRICT, BUKIZIBU-BUMWENA IN MAYUGE DISTRICT AND LUGALA IN NAMAYINGO DISTRICT (EIATOR 8454)

Reference is made to the Scoping Report and Terms of Reference (TOR) for carrying out an Environmental and Social Impact Assessment (ESIA) for the above-mentioned Project, which was submitted to this Authority on 6th April, 2022, for review and consideration for approval.

This Authority has finalized the review and grants formal **approval** of the said TOR. Please note that the approval of the TORs **does not grant permission** to start implementing any of the proposed project activities, as this is not a Certificate of approval.

Please undertake separate Environmental and Social Impact Assessments (ESIAs) in respect to piped water supply systems and sanitation facilities in:

(a) Igwaya and Kidera, Buyende District;
(b) Kitenga, Kaliro District;
(c) Bukizibu-Bumwena, Mayuge District; and,
(d) Lugala, Namayingo District.

In addition to the scope of work presented in the TOR, you are advised to make due consideration of the aspects below during the conduct of the ESIA studies, and the preparation of ESIA reports:

i. Provide a comprehensive description of the project components and activities covering the construction and operational phases, associated infrastructure, details of the design and capacity of water supply systems, the methods and

Page **1** of **3**

7/6/2022

chemicals to be used for water treatment, and size of the workforce; and the implications of these on the environment.

ii. Undertake geotechnical investigations of the proposed project sites so as to inform the design and construction of the Water Supply Systems and Sanitation Facilities.

iii. Include in the ESIA reports hydrological investigative reports in regards to the potential impacts of the project on underground water resources within the proposed project areas, and mitigation actions to address such impacts.

iv. Provide a detailed description of the waste streams that will be generated from the activities of the piped water supply systems and sanitation facilities, and the measures and equipment that will be put in place to handle such waste.

v. Include in the ESIA reports other relevant baseline information that is project site specific, on the soils, water, air quality and noise levels; as well as, clear-coloured photographs depicting the current status of the project areas and the neighbouring environs.

vi. Provide clear coloured and well-labelled location maps/images (*preferably each covering A-3 size paper*) and accurate sets of GPS coordinates clearly indicating the site boundaries and locations of the various project components. Ensure that all GPS coordinates are provided in UTM format.

vii. Append to the ESIA report well-labelled copies of the proposed site layout plan (*preferably covering A3 or larger paper size*) that shows the layout and placement of the different project components.

viii. Carry out comprehensive consultations with all the relevant key stakeholders including, Buyende, Kaliro, Mayuge and Namayingo District Local Government Authorities, Department of Occupational Safety and Health (Ministry of Gender, Labour and Social Development), local communities in the neighbourhood and the Directorate of Water Resources Management (DWRM) particularly in regards to 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 reports.

ix. Include in the ESIA report, comprehensive analysis of analysis of alternatives/ options to the selected project location, design and technology among other aspects.

x. Carry out a comprehensive evaluation of the negative environmental impacts associated with the proposed project activities and the relevant mitigation measures to minimize the identified environmental impacts of the proposed project.

nbk
7/6/2022

xi. Make reference to all the relevant provisions of the applicable policies, laws, regulations, guidelines and standards, in particular, the National Environment Act, No. 5 of 2019.

xii. Append to the ESIA reports, authentic copies of land ownership and acquisition documents.

xiii. Consider any other critical environmental aspects/concerns which, may have not been initially foreseen during preparation of the scoping report and TOR, and include an evaluation of such environmental and social concerns in the ESIA reports.

xiv. Indicate the estimated cost of the project evidenced by a certificate of valuation of the capital investment of the project, issued by a qualified and registered valuer in accordance with Regulation 18(1) of The National Environment (Environmental and Social Assessment) Regulations, S.I No. 143/2020.

xv. Provide evidence of payment of a non-refundable administration fee of 30% (thirty percent) of the total fees on submission of the Environmental and Social Impact Statements, in accordance with Regulation 49(2) of The National Environment (Environmental and Social Assessment) Regulations, S.I No. 143/2020.

Note that only registered environmental practitioners including the team leader should be contracted to conduct the ESIA for the proposed project.

This is therefore, to recommend that you proceed with carrying out the ESIA studies for the proposed solar powered piped water supply systems and sanitation facilities. We look forward to the receipt of comprehensive copies of the ESIA reports, for our further action.

Monica Angom
FOR: EXECUTIVE DIRECTOR

Republic of Uganda

Ministry of Water and Environment

Book of Drawings:

Feasibility study, Detailed Engineering Design, Environmental and Social Impacts Assessment for Piped Water Supply Schemes in Selected Rural Growth Centers (RGCs) in the County

Contact No: MWE/CONS/17-18/00014/1

Prepared for:

MINISTRY OF WATER AND ENVIRONMENT,
RURALWATER & SANITATION DEPARTMENT
- RWSD
Plot 21/28 Port Bell Road, Luzira
P. O. Box 20026, Kampala, Uganda.

By:

AIR WATER EARTH (AWE) LTD
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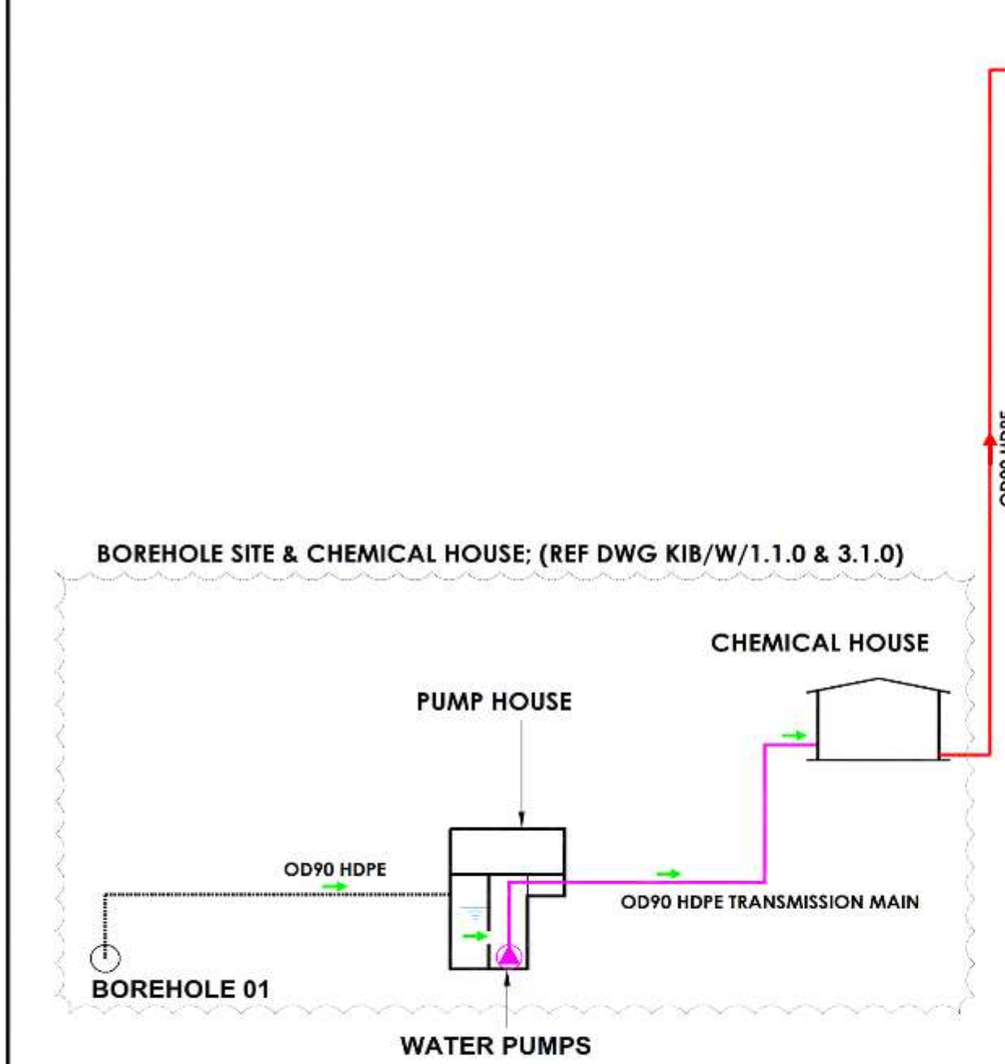

AMENDMENTS

No	Date	Revision

NOTES

1. All dimensions are in metres unless stated otherwise.
2. All levels are in metres above sea level.
3. For Site location see Dwg. KID/W/0.0.0
4. All valves, hydrants and washout locations are identified by marker post in positions.
5. Structural details are not included

LEGEND

Client:

THE REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT
Rural Water Supply and Sanitation Department (RWSSD)

Project:

Feasibility study, Detailed Engineering Design, Environmental and Social Impacts Assessment of piped water supply and sanitation systems in selected Rural Growth Centres across the country

CONSTRUCTION OF KIDERA WATER SUPPLY AND SANITATION SYSTEM

Consultant:

AIR WATER EARTH (AWE) LTD
Civil, Environmental Engineers & Project Management
Consultants,
Mt. 27 Kimera Road, Bugoloba
P.O. Box 22428, Kampala, UGANDA.
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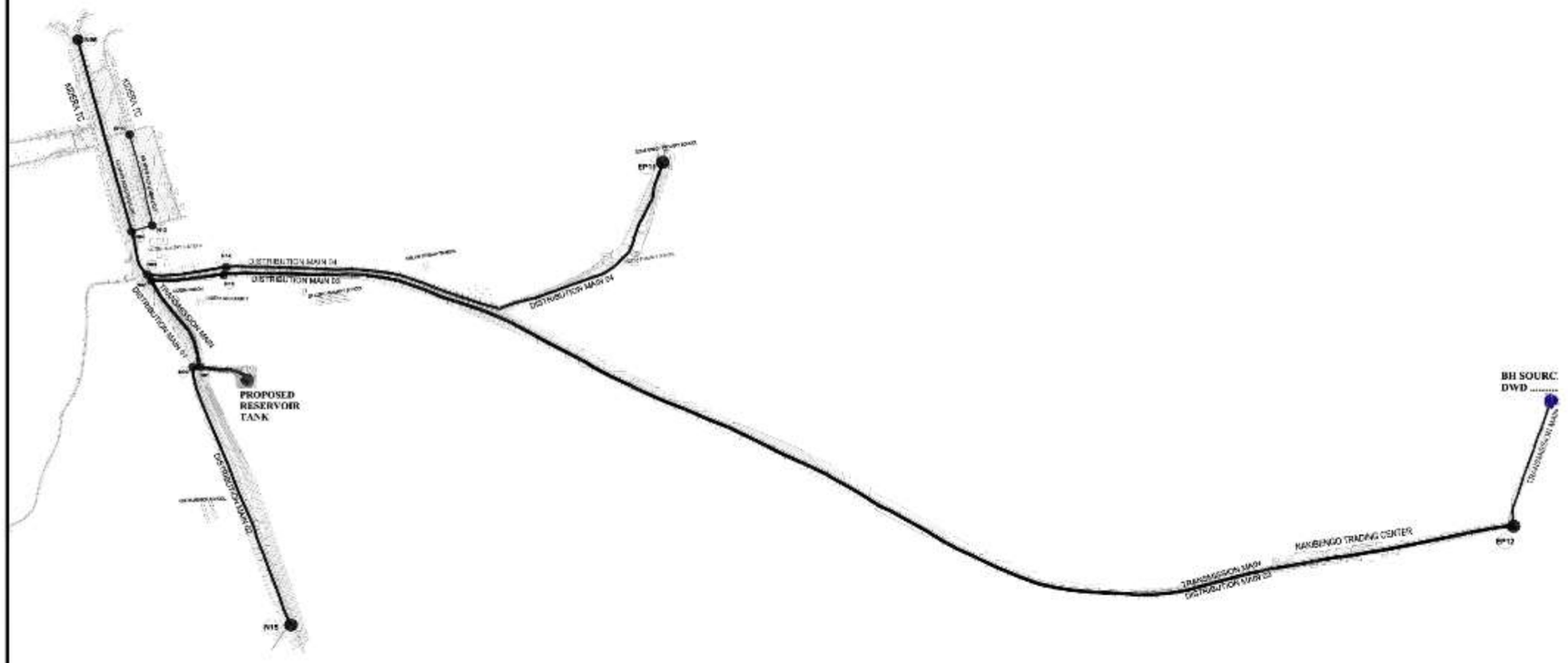
Drawing Title:

SCHEMATIC LAYOUT

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Drg No: KID/W/1.0 | Cad file No: 013.



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2. All levels are in metres above sea level.
3. For Site location see Dwg. KIDAW/0.0.0
4. For Node details, see Dwg. KIDAW/6.0.0
5. All valves, hydrants and washout locations are identified by marker post in positions.

LEGEND

- Pipe Line
- Contours
- Road
- DAV — Double Orifice Air Valve
- WO 2 — Type 2 Washout
- N01 — Node detail No. 01

Client:

THE REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT
Rural Water Supply and Sanitation Department (RWSSD)

Project:

Feasibility study, Detailed Engineering Design, Environmental and Social Impacts Assessment of piped water supply and sanitation systems in selected Rural Growth Centres across the country

CONSTRUCTION OF KIDERA WATER SUPPLY AND SANITATION SYSTEM

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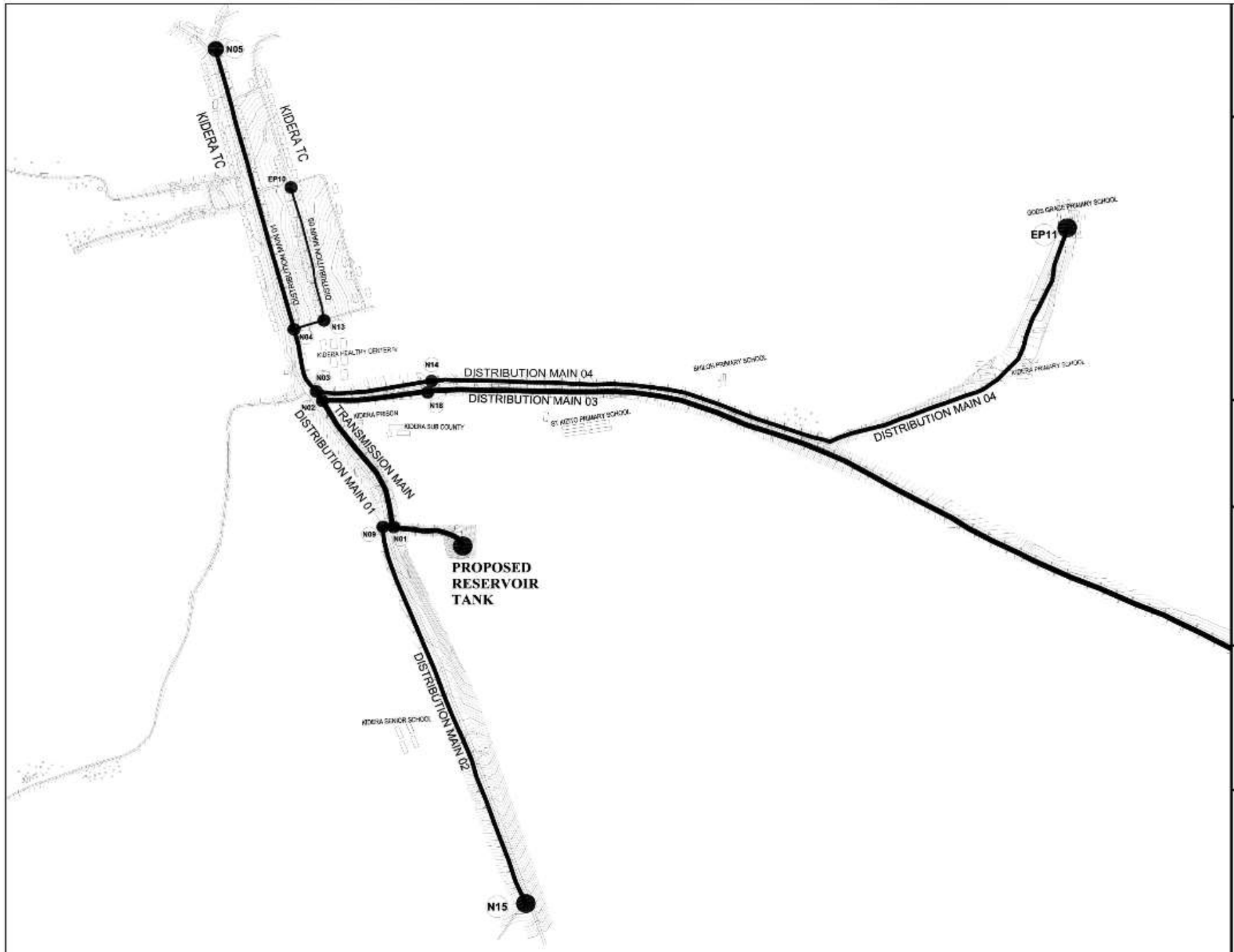
Drawing Title

GENERAL LAYOUT
TRANSMISSION & DISTRIBUTION MAINS

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500		**Designed:**	GB,AM,ODM,IN,JO
		Drawn:	A.E
Date:	OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
		Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Dra No: KIDAW/0.0.0 Card file No 013



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4. For Node details, see Dwg. KIDAW/6.0.0
5. All valves, hydrants and washout locations are identified by marker post in positions.

LEGEND

	Pipe Line
	Contours
	Road
DAV	Double Orifice Air Valve
WO_2	Type 2 Washout
N01	Node detail No. 01

Client:

THE REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT
Rural Water Supply and Sanitation Department (RWSSD)

Project:

Feasibility study, Detailed Engineering Design, Environmental and Social Impacts Assessment of piped water supply and sanitation systems in selected Rural Growth Centres across the country

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Drawing Title

GENERAL LAYOUT
TRANSMISSION & DISTRIBUTION MAINS

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
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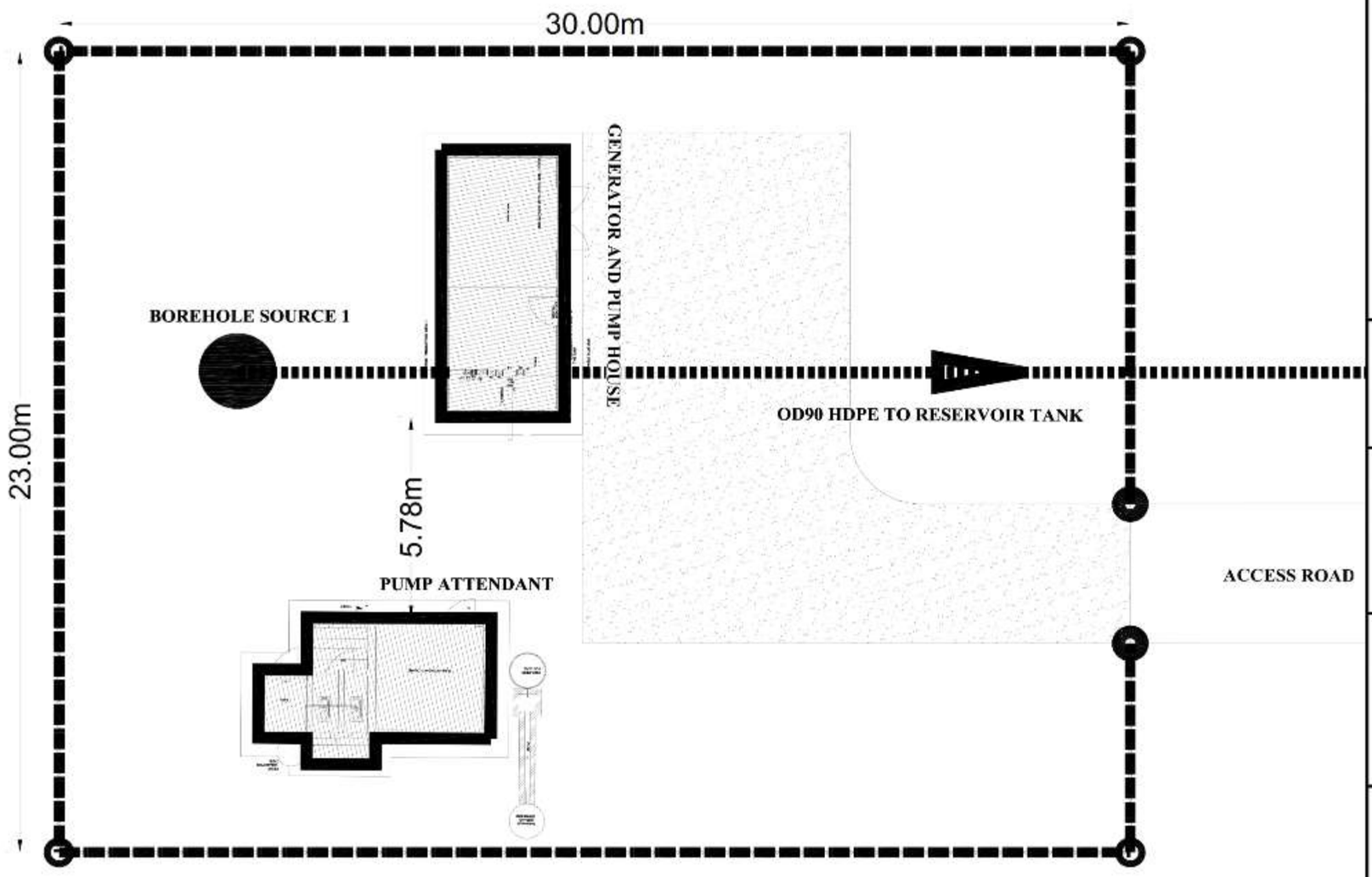
DETAILED ENGINEERING DRAWING



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Drawing Title

BOREHOLE PUMP HOUSE
TYPICAL SITE LAYOUT

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

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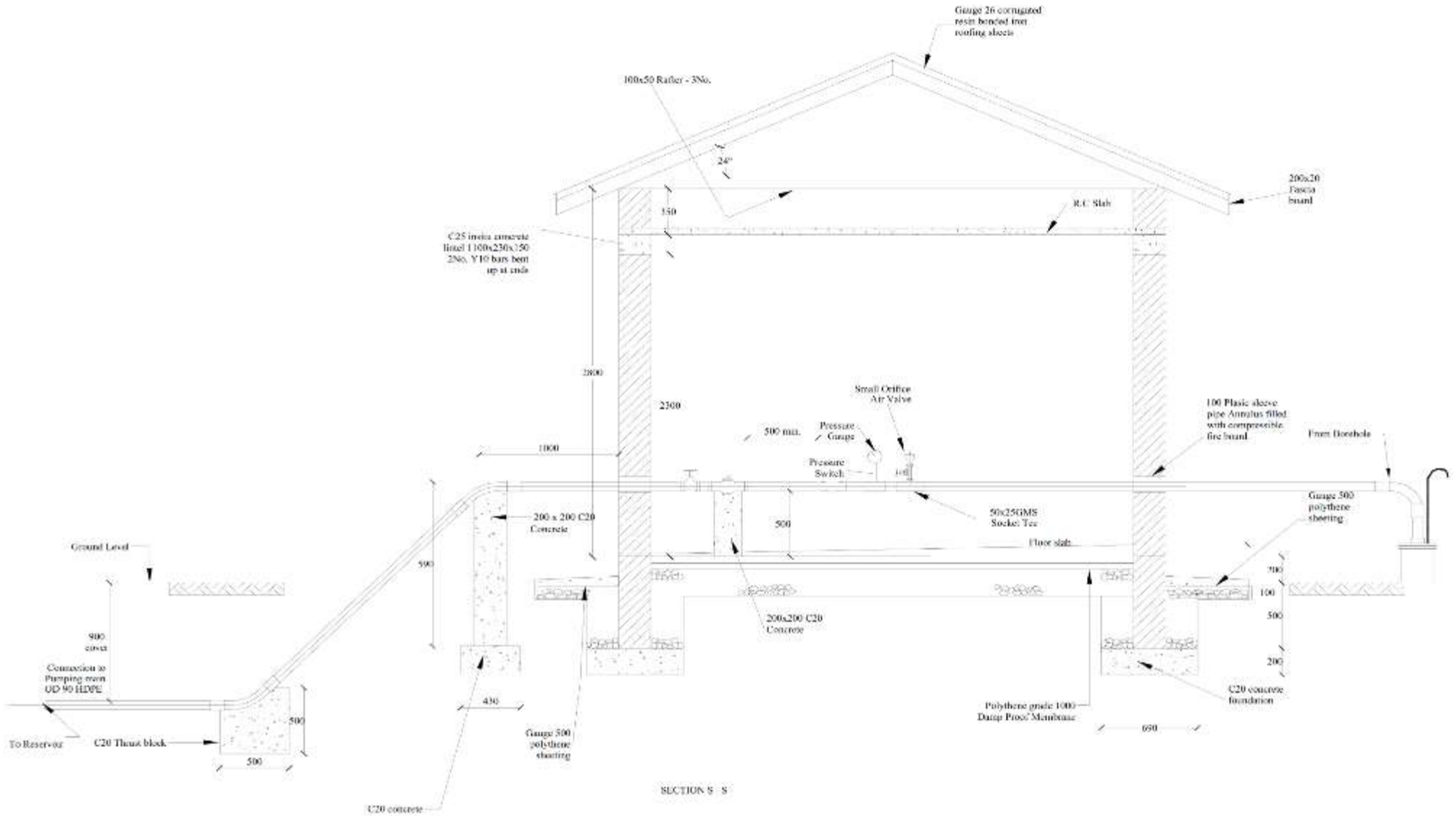

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THE REPUBLIC OF UGANDA
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Project:

Feasibility study, Detailed Engineering Design, Environmental and Social Impacts Assessment of piped water supply and sanitation systems in selected Rural Growth Centres across the country

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Drawing Title

BOREHOLE PUMP HOUSES
TYPICAL SECTIONS

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

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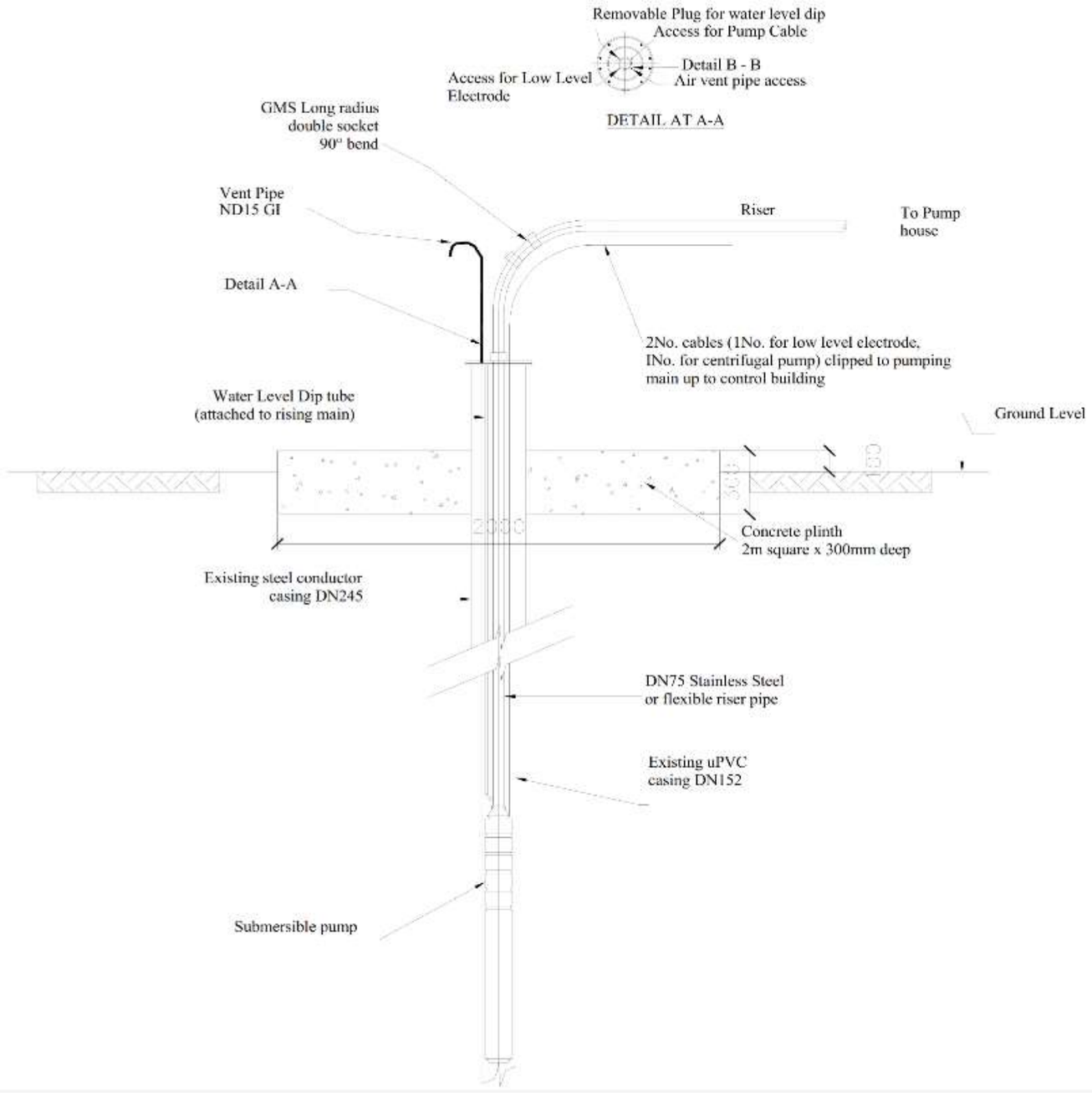

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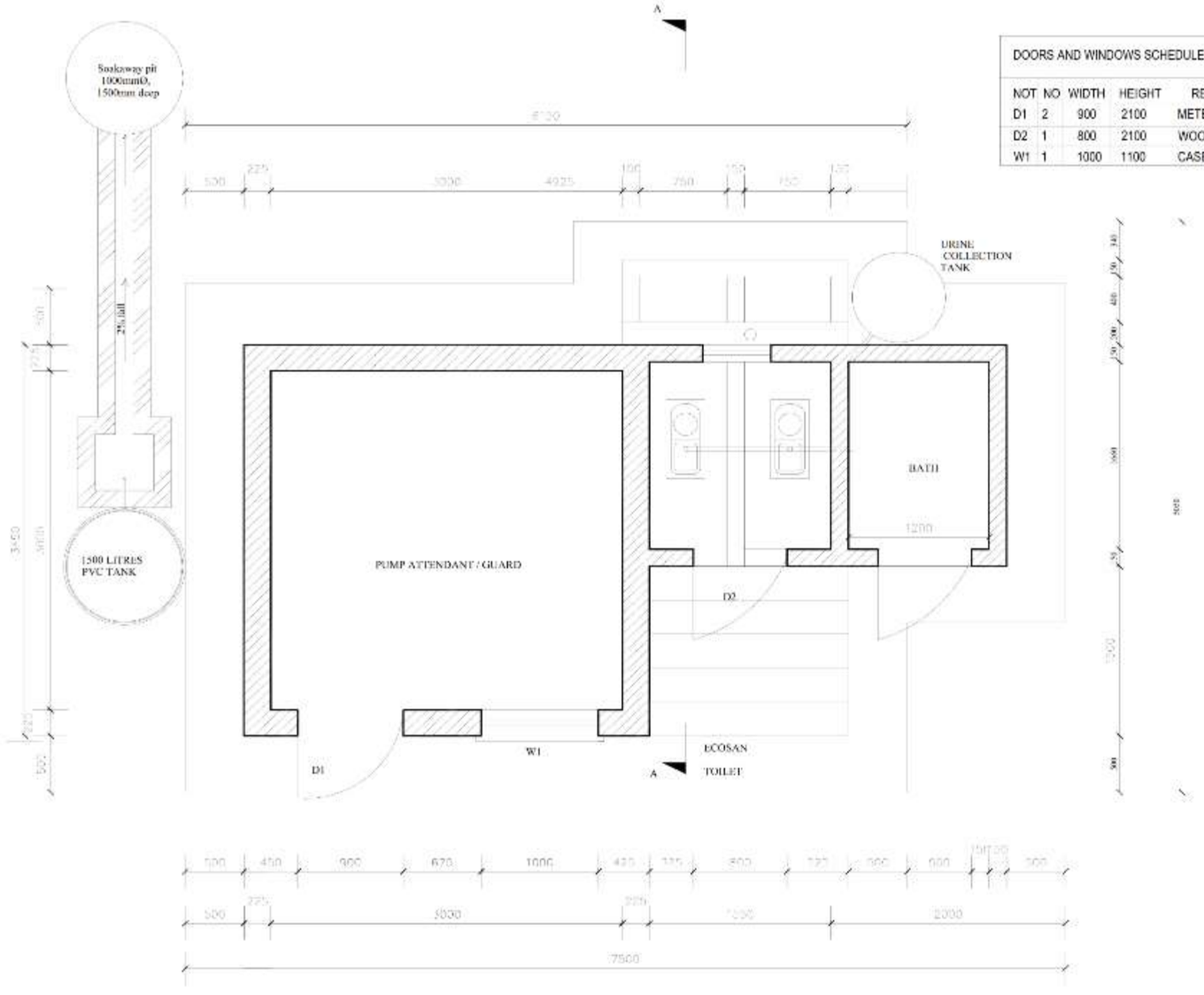
Drawing Title

BOREHOLE PUMP HOUSE
TYPICAL SECTION THROUGH BOREHOLES

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Drg No: KID/W/1.1.3 **Cad file No** 013.



GROUND PLAN

DOORS AND WINDOWS SCHEDULE				
NOT	NO	WIDTH	HEIGHT	REMARK
D1	2	900	2100	METEL
D2	1	800	2100	WOODEN
W1	1	1000	1100	CASEMENT

AMENDMENTS

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W: www.awe-engineers.com

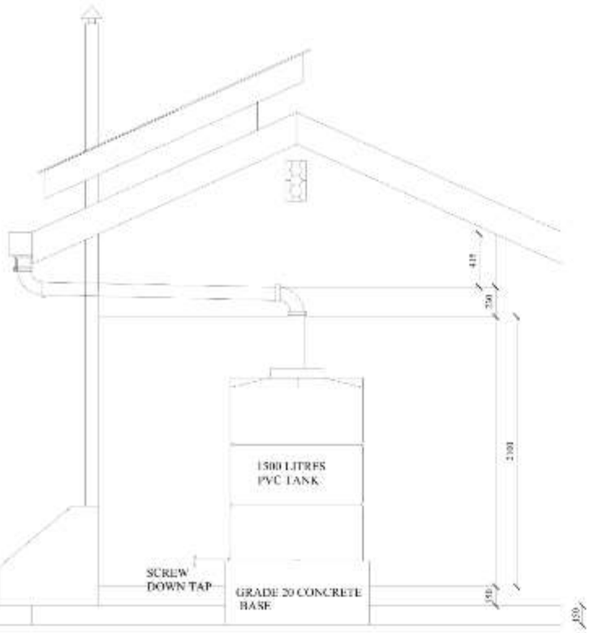
Drawing Title

PUMP ATTENDANT / GUARD + ECOSAN
GROUND FLOOR PLAN

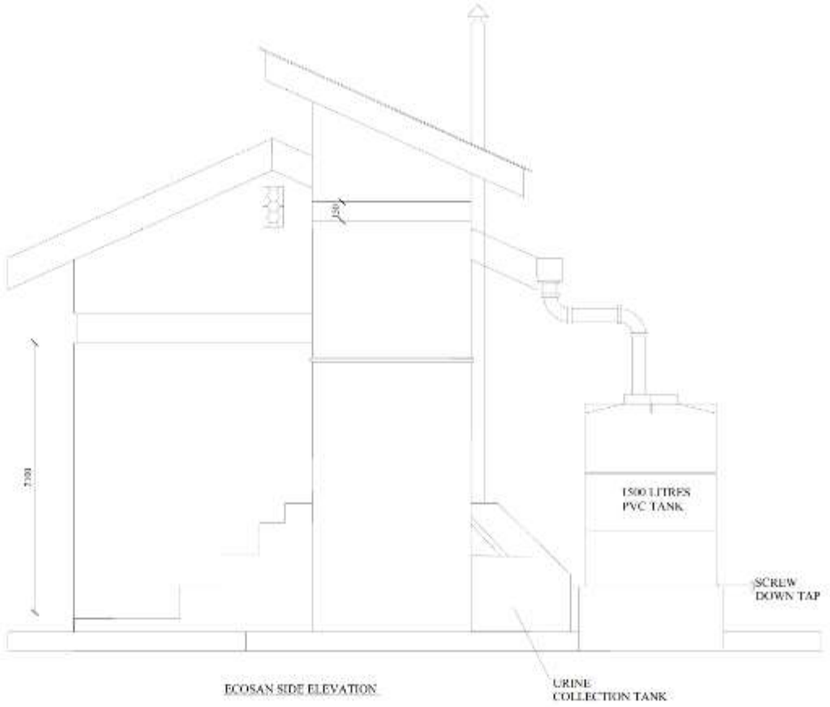
Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A,E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Dra No: KID/W/1.2.0 Cad file No 013



TANK SIDE ELEVATION



ECOSAN SIDE ELEVATION

AMENDMENTS

No	Date	Revision

NOTES

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2. All levels are in metres above sea level.
3. For Site location see Dwg. KIDWW.0.0.0
4. All valves, hydrants and washout locations are identified by marker post in positions.
5. Structural details are not included

LEGEND

Client:

THE REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT
Rural Water Supply and Sanitation Department (RWSSD)

Project:

Feasibility study, Detailed Engineering Design, Environmental and Social Impacts Assessment of piped water supply and sanitation systems in selected Rural Growth Centres across the country

CONSTRUCTION OF KIDERA WATER SUPPLY AND SANITATION SYSTEM

Consultant:

AIR WATER EARTH (AWE) LTD
Civil, Environmental Engineers & Project Management Consultants
M1, 27 Binayomba Road, Bugolobi
P.O. Box 22428, Kampala, UGANDA.
T: 041-4268488, Mob: 078-2680490
E: mail@awe-engineers.com
W: www.awe-engineers.com

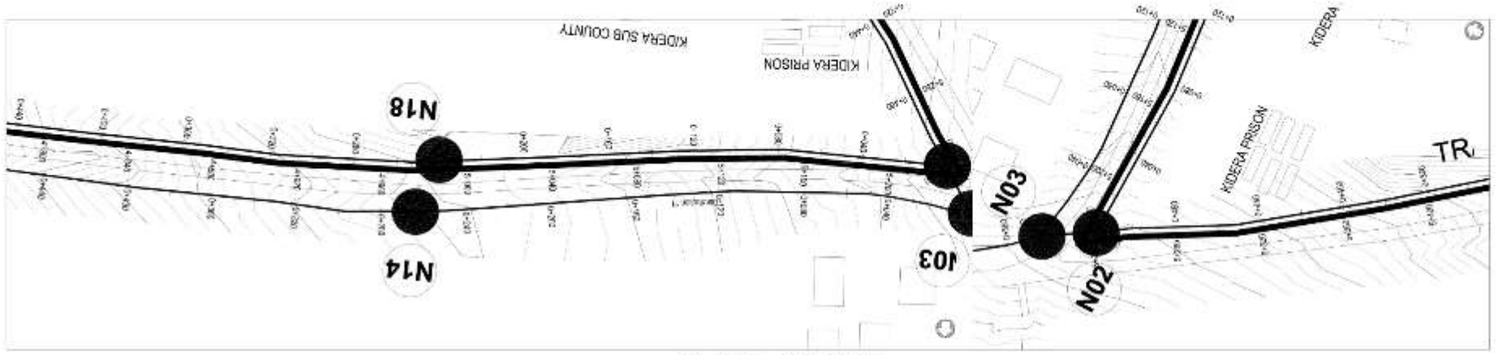
Drawing Title

PUMP ATTENDANT / GUARD + ECOSAN
SIDE ELEVATIONS

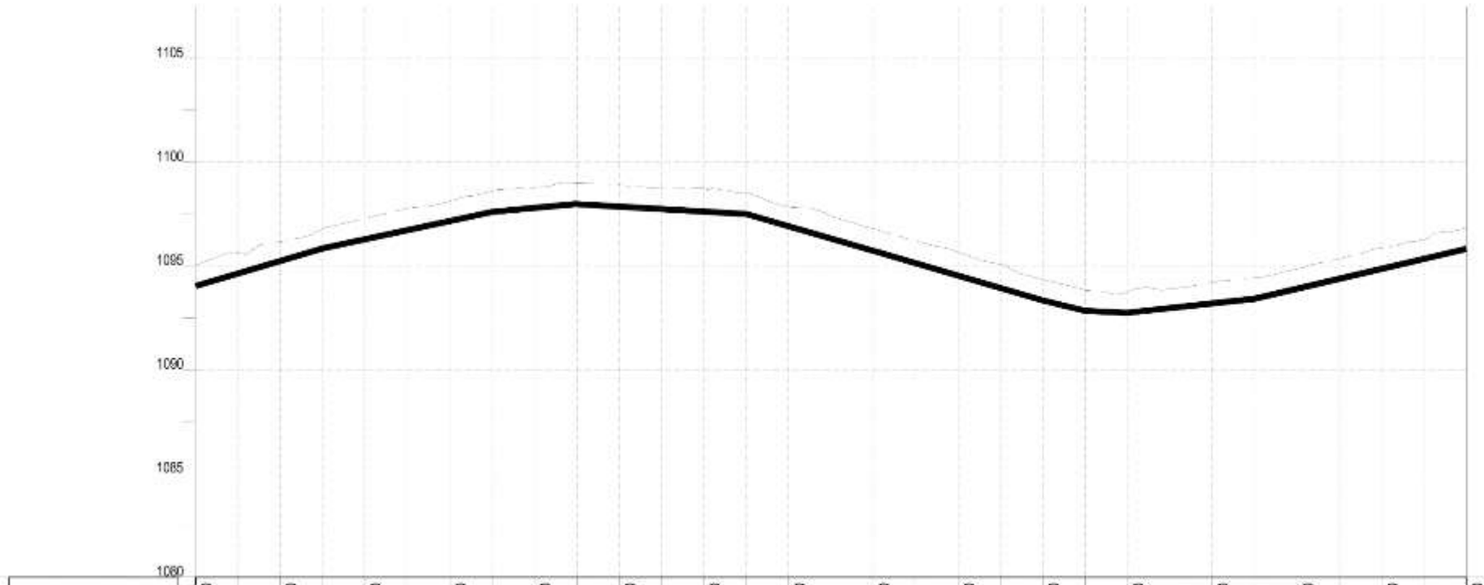
Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2000	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Dra No: KIDWW1.0.0 Cad file No 013.



PLAN LAYOUT



LONGITUDINAL PROFILE

AMENDMENTS

No	Date	Revision

NOTES

1. All dimensions are in metres unless stated otherwise.
2. All levels are in metres above sea level.
3. For Site location see Dwg. KID/W/0.0.0
4. For Node details, see Dwg. KID/W/5.0.0
5. All valves, hydrants and washout locations are identified by marker post in positions.

LEGEND

- Pipe Line
- Contours
- Road
- DAV — Double Orifice Air Valve
- WO_2 — Type 2 Washout
- N01 — Node detail No. 01

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T: 041-4285486, Mob: 078-2580480
E: mail@awe-engineers.com
W: www.awe-engineers.com

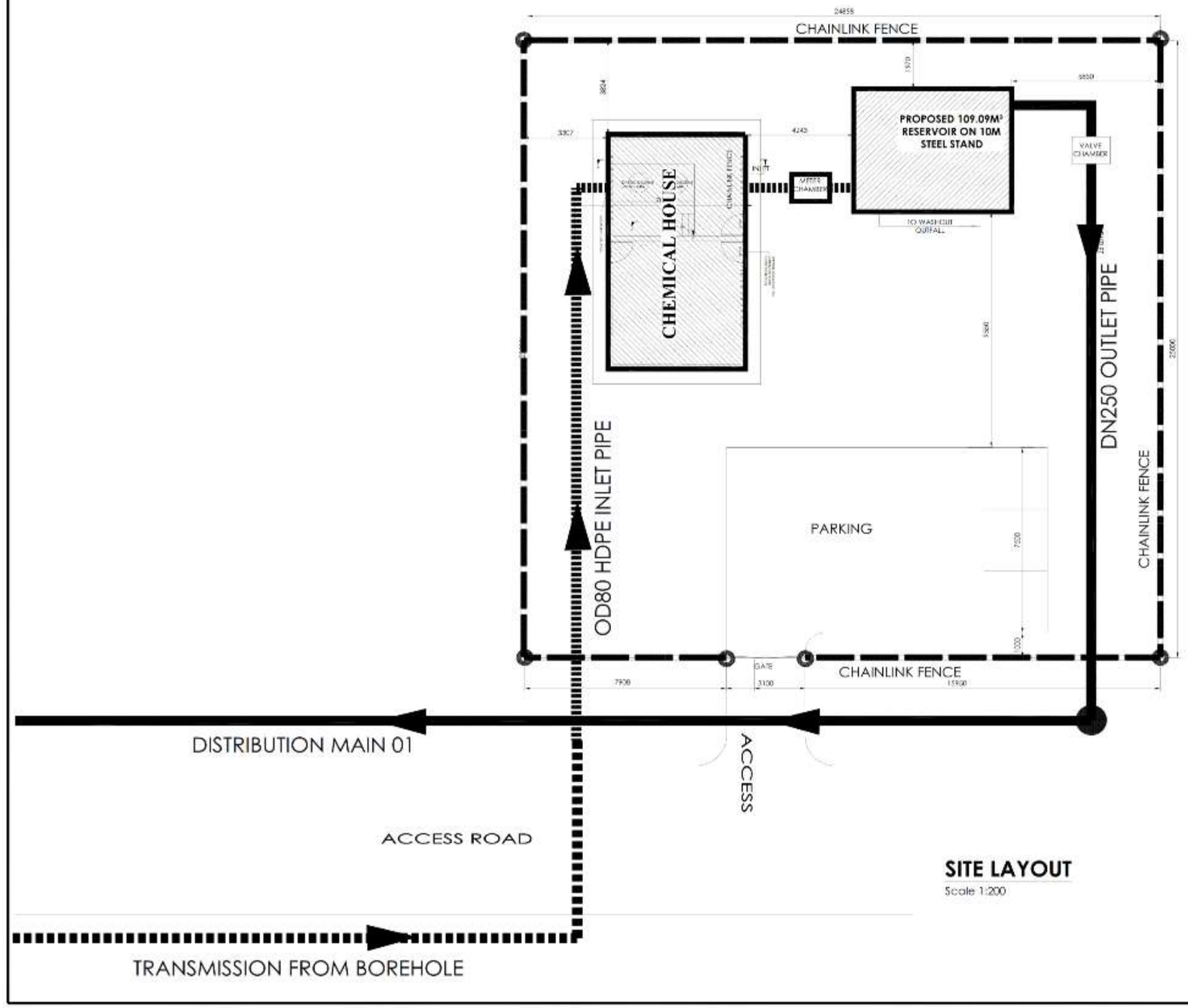
Drawing Title

TRANSMISSION MAIN
CH 4+800.00 - CH 5+400.00

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Drg No: KID/W/2.1.8 Cad file No 013



SITE LAYOUT
Scale 1:200

AMENDMENTS

No	Date	Revision

NOTES

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3. For Site location see Dwg. KIDWK0.0.0
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LEGEND

Client:

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M1, 37 Shrivamba Road, Bugolobi
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T: 041-4286466, Mob: 075-2580450
E: mail@awe-engineers.com
W: www.awe-engineers.com

Drawing Title

109.09M³ RESERVOIR TANK
SITE LAYOUT

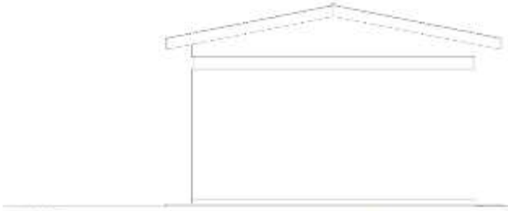
Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,OOM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

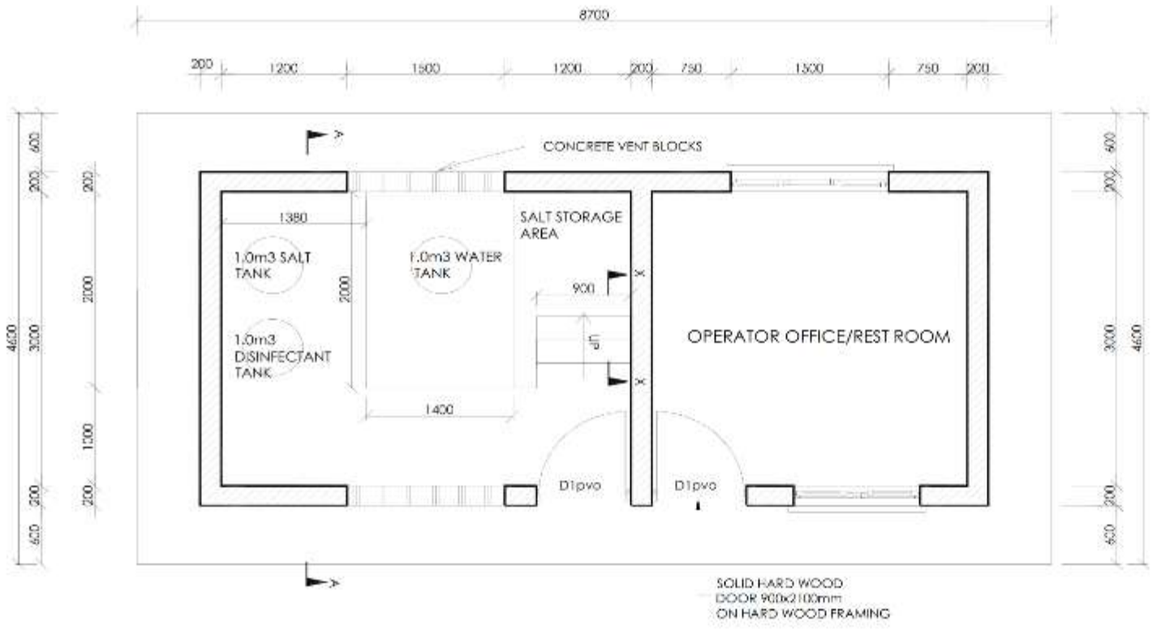
Dra No: KIDWK0.0.0 Cad file No 013

FRONT ELEVATION

REAR ELEVATION



TYPICAL SIDE VIEW



GROUND PLAN

Scale: 1:50

AMENDMENTS

No	Date	Revision

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LEGEND

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Civil, Environmental Engineers & Project Management Consultants
Mr. JV Ntinyonma Road, Kagaba
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T: 041-4286486, Mob: 070-2560480
E: mail@awe-engineers.com
W: www.awe-engineers.com

Drawing Title

CHEMICAL HOUSE
GROUND PLAN AND ELEVATIONS

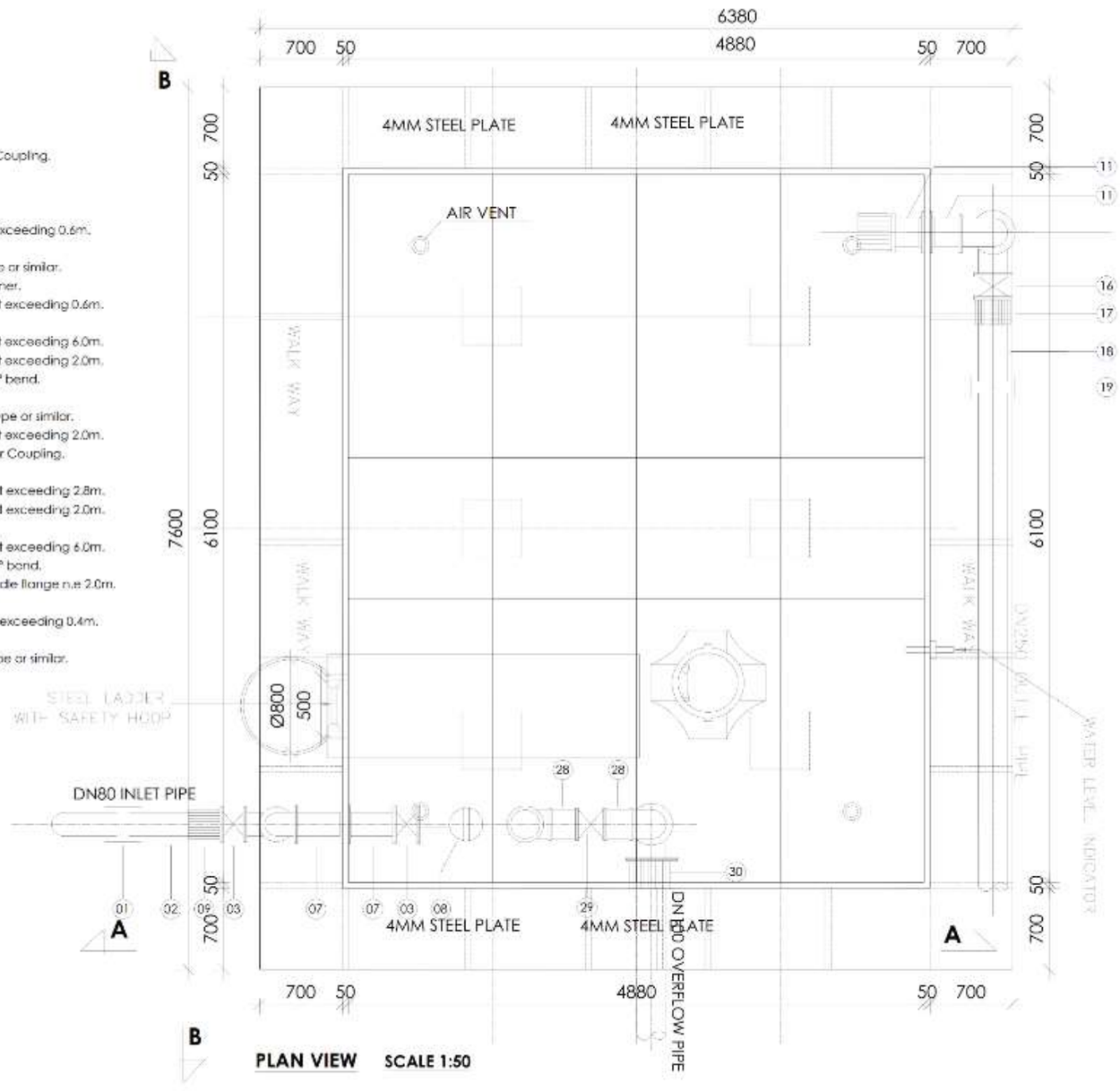
Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500		**Designed:**	GB,AM,ODM,IN,JO
		Drawn:	A.E
Date:	OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
		Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Drg No: [illegible] Cad file No 013.

PIPE FITTING SCHEDULE

1. 1No.DN80 Vicking Johnson or Similar Coupling.
2. 1No.DN80 Pipe not exceeding 2.0m.
3. 1No.DN80 All Flanged Gate Valve.
4. 1No.DN80 All Flanged 90° bend.
7. 2No.DN80 Double Flanged Pipe not exceeding 0.6m.
8. 1No.DN80 Flanged Ball Float Valve.
9. 1No.DN80 Flanged Adaptor,Maxi type or similar.
10. 1No.DN250 Flanged Outlet Pipe Strainer.
11. 2No.DN250 Double Flanged Pipe not exceeding 0.6m.
12. 1No.DN250 All Flanged 90° bend.
13. 2No.DN250 Double Flanged Pipe not exceeding 6.0m.
14. 1No.DN250 Double Flanged Pipe not exceeding 2.0m.
15. 1No.DN250 All Flanged Duck foot 90° bend.
16. 1No.DN250 Flanged Gate Valve.
17. 1No.DN250 Flanged Adaptor,Maxi type or similar.
18. 1No.DN250 Double Flanged Pipe not exceeding 2.0m.
19. 1No.DN250 Vicking Johnson or Similar Coupling.
20. 1No.DN100 Flanged Bel Mouth.
21. 1No.DN100 Double Flanged Pipe not exceeding 2.8m.
22. 1No.DN100 Double Flanged Pipe not exceeding 2.0m.
23. 1No.DN100/50 All Flanged Tee.
24. 2No.DN100 Double Flanged Pipe not exceeding 6.0m.
25. 1No.DN100 All Flanged Duck foot 90° bend.
26. 1No.DN50 All Flanged Pipe with puddle flange n.e 2.0m.
27. 1No.DN50 All Flanged 90° bend.
28. 1No.DN50 Double Flanged Pipe not exceeding 0.4m.
29. 1No.DN50 Flanged Gate Valve.
30. 1No.DN50 Flanged Adaptor,Maxi type or similar.



AMENDMENTS

No	Date	Revision

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T: 041-4288466 Mob: 078-7588466
E: mail@awe-engineers.com
W: www.awe-engineers.com

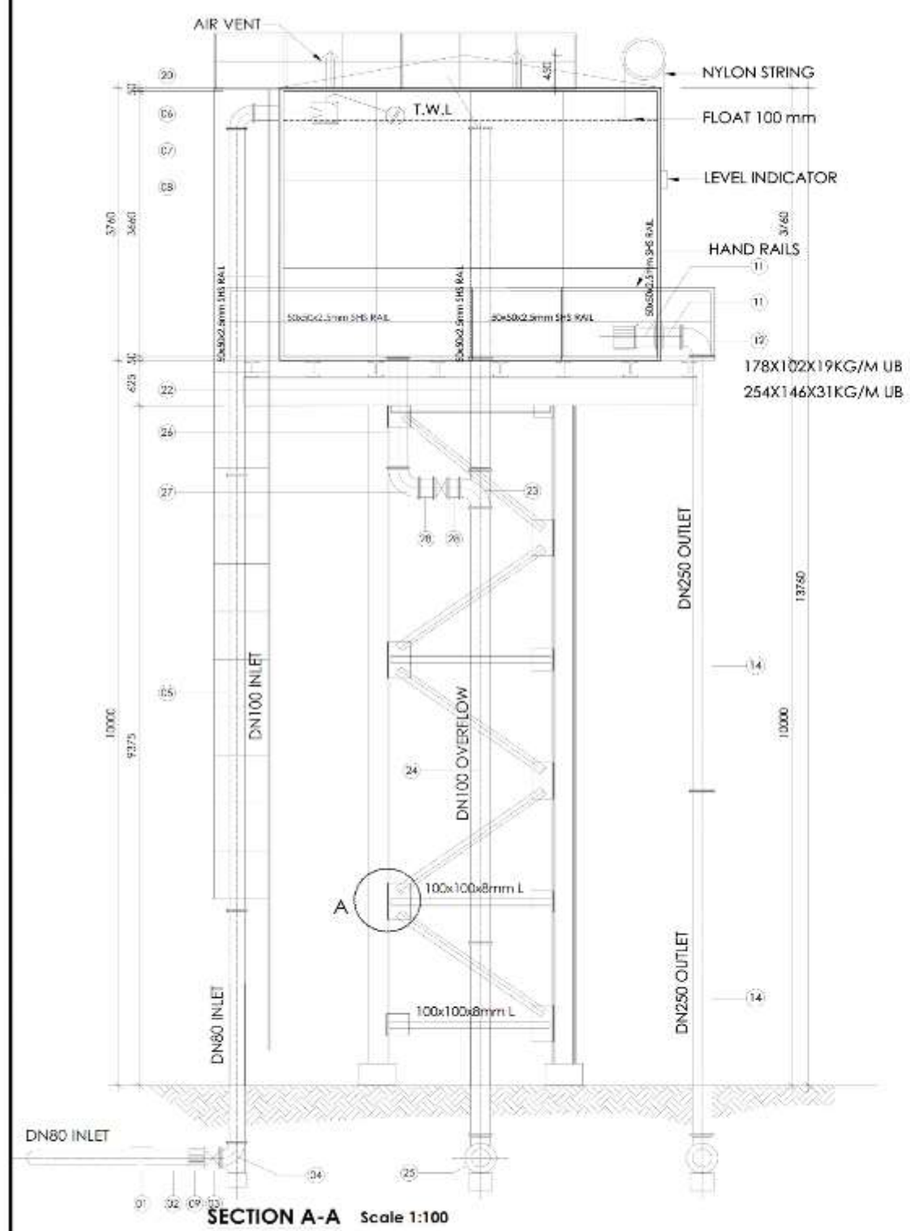
Drawing Title

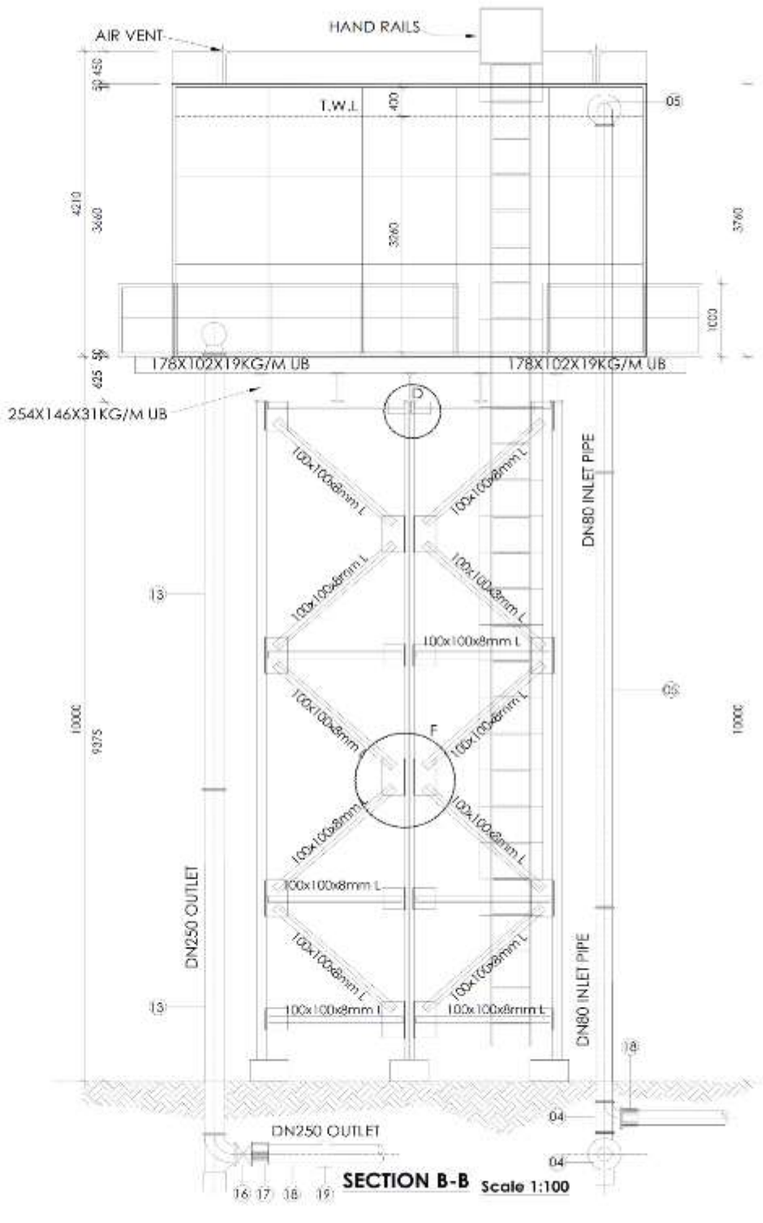
109.09M³ RESERVOIR TANK
TOP PLAN

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Dra No: KDWW/3.2.0 Cad file No 013.





AMENDMENTS

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T: 041-425646, Mob: 075-3580480
E: awe@awe-engineers.com
W: www.awe-engineers.com

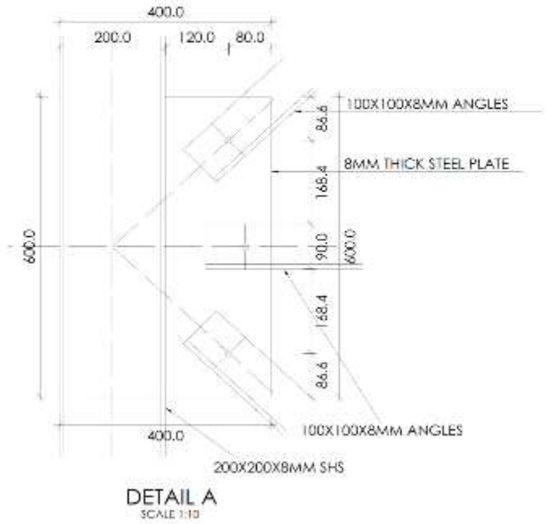
Drawing Title

109.09M³ RESERVOIR TANK
SECTION A-A & SECTION B-B

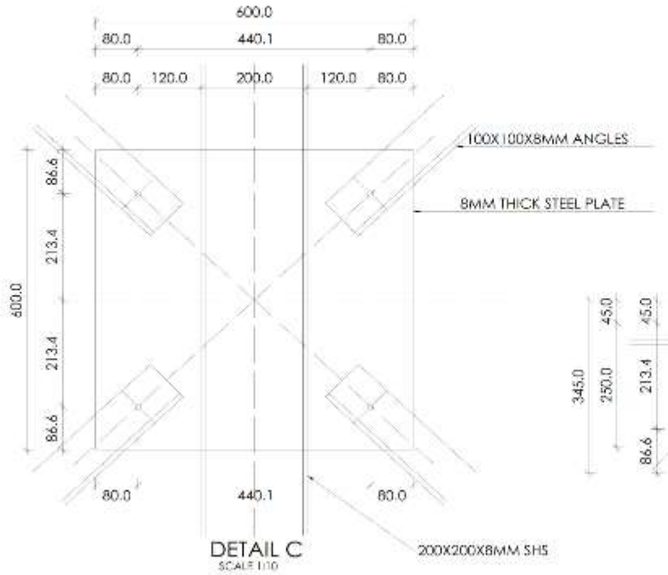
Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

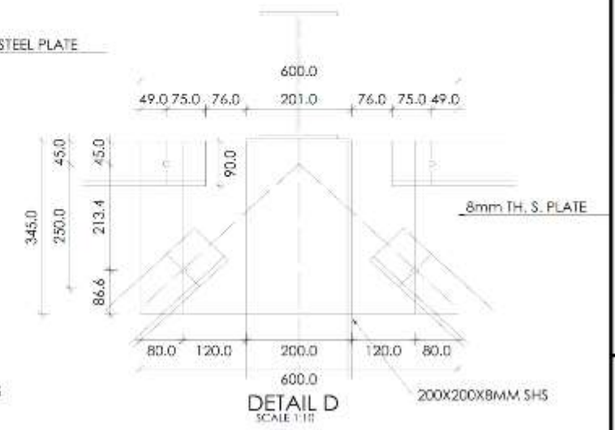
Drg No: KIDW/0.2.1 | Cad file No 013.



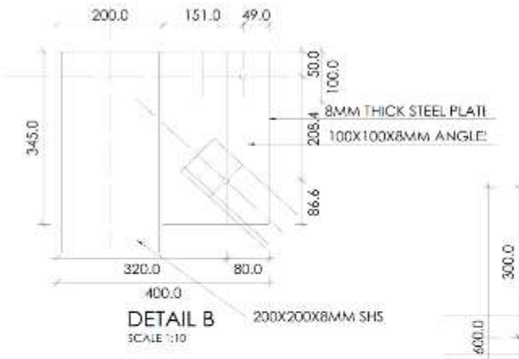
DETAIL A
SCALE 1:10



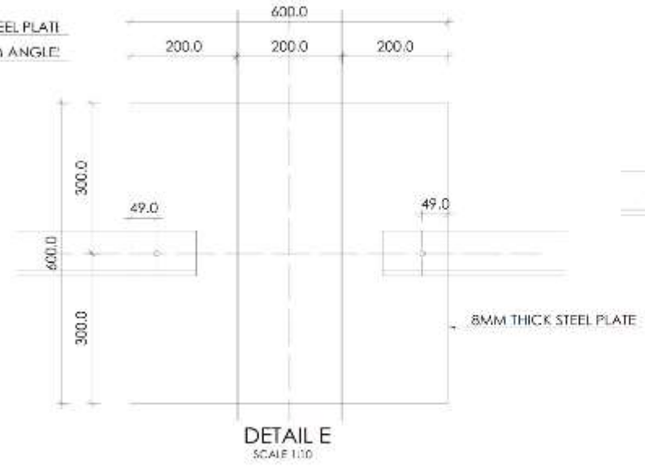
DETAIL C
SCALE 1:10



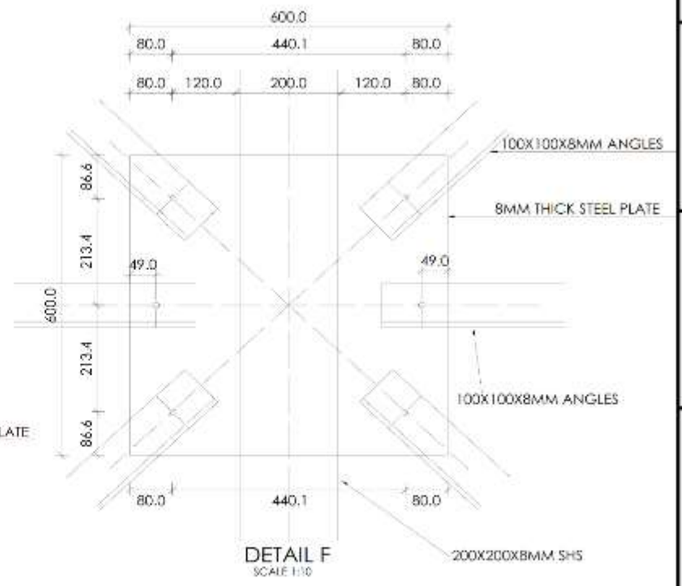
DETAIL D
SCALE 1:10



DETAIL B
SCALE 1:10



DETAIL E
SCALE 1:10



DETAIL F
SCALE 1:10

AMENDMENTS

No	Date	Revision

NOTES

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LEGEND

Client:

THE REPUBLIC OF UGANDA
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Consultant:

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M1, 27 Entebbe Road, Ggaba
P.O. Box 23328, Kampala, UGANDA.
T: 041-4288499, Mob: 075-2288488
E: mail@awe-engineers.com
W: www.awe-engineers.com

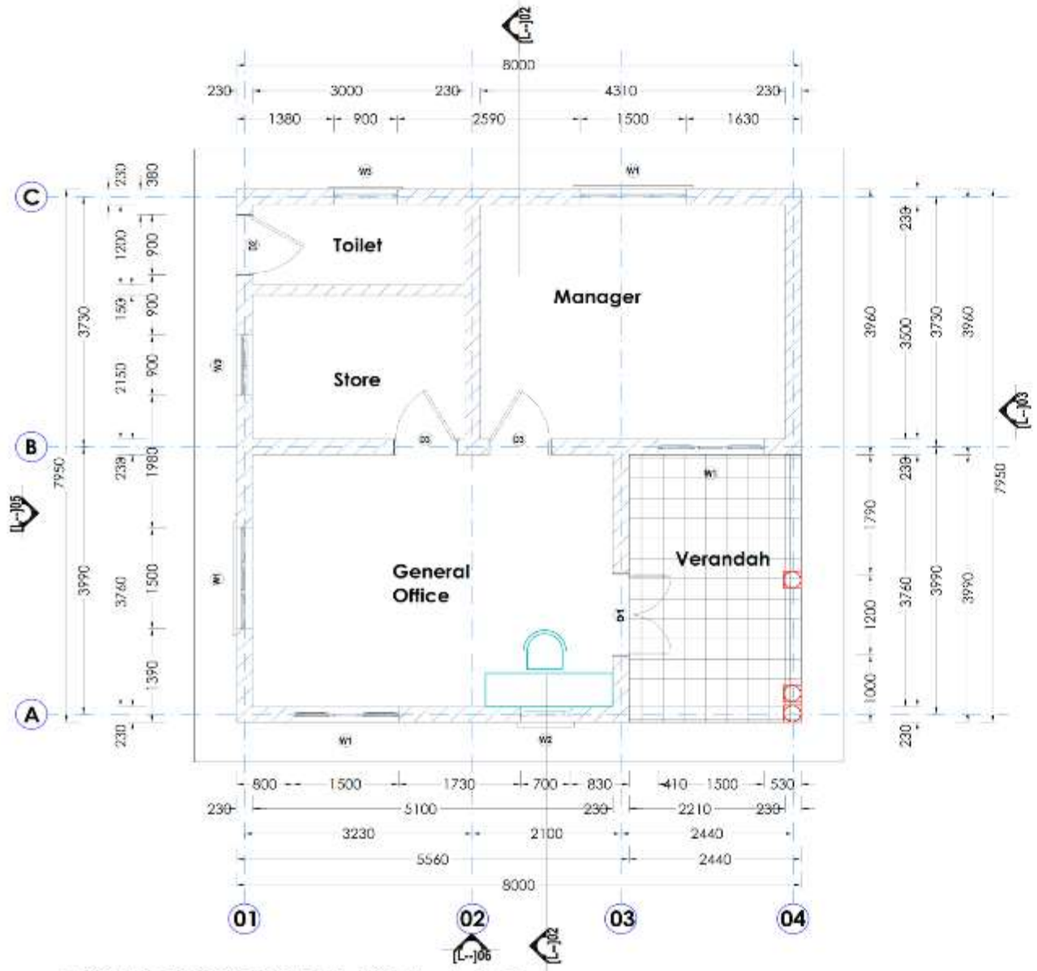
Drawing Title

109.09M³ RESERVOIR TANK
DETAILS

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

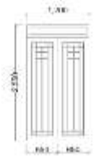
Dra No: KID/W/3.2.2 Cad file No 013.



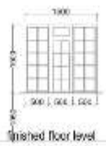
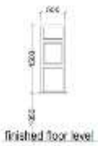
GROUND FLOOR PLAN [L--]01 Scale 1:75

Water Office Block

Door schedule

MARK	D1	D2	D3
SIZE			
LOCATION	General office	Toilet	manager & store
DESCRIPTION	steel casement door	steel casement door	wooden panelled door

Window schedule

MARK	W1	W2	W3
SIZE			
	finished floor level	finished floor level	finished floor level
LOCATION	General office & manager	General office	toilets & store
DESCRIPTION	steel casement window	steel casement window	steel casement window

AMENDMENTS

No	Date	Revision

NOTES

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Drawing Title

WATER OFFICE BLOCK
FLOOR PLAN, DOOR AND WINDOW SCHEDULE

Scale: Vertical Scale: 1:200 Horizontal Scale: 1:2000		**Designed:**	GB,AM,ODM,IN,JO
		Drawn:	A.E
Date:	OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
		Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Dra No: KIDWI0.0.0 Cad file No 013.

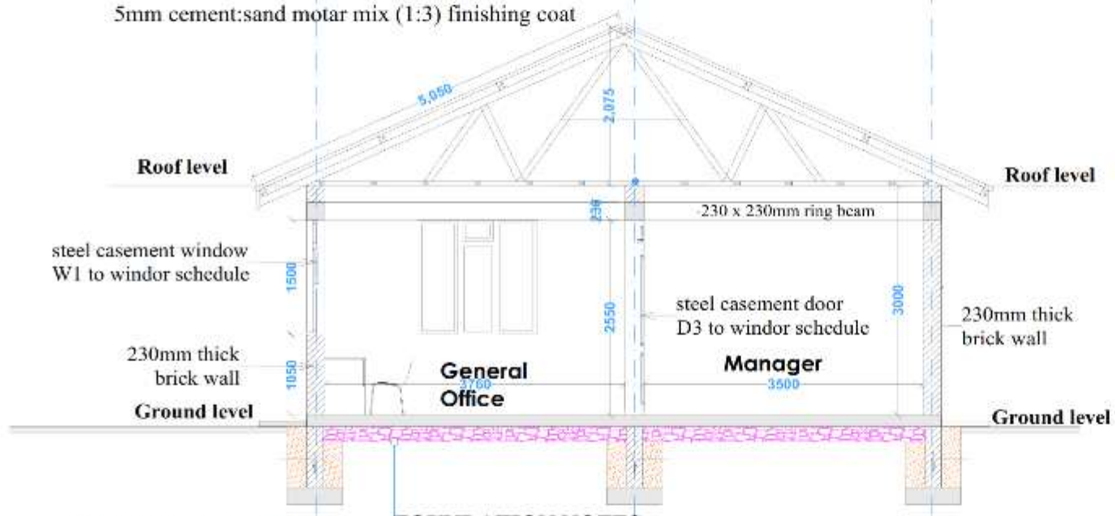
A B C

CEILING NOTES

100 x 50mm Blanderings & ceiling joist Btn
tie beam At 600mm c/c
15mm thick cement:sand motar mix (1:3) on
Stretched eml
5mm cement:sand motar mix (1:3) finishing coat

ROOF NOTES

Roof pitch 25°
Pre-painted roofing eco tiles on
75 x 50mm purlins on
150 x 50mm Rafters at 1800mm c/c with
150 x 50mm structs and ties on
150 x 50mm Tie Beam on
150 x 75mm Wall plate
Fascia and Barge boards are to be 225 x 25mm



SECTION L[--]02 scale 1:75
Water Office Block

FOUNDATION NOTES

100mm high skirking (mahogany) on
Floor finish as specified on
25mm thick cement screed on
150mm thick concrete floor slab mix(1:3:6)12mm agg on
200mm thick well compacted & approved hardcore filling on
Consolidated murram
690 x230mm concrete strip foundation slab mix(1:3:6)19mm agg in
Well levelled and rammed trenches whose depths are to be determinrd on site
Levels are to be checked before ground breaking

AMENDMENTS

No	Date	Revision

NOTES

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T: 041-4288486, Mob: 078-2580480
E: mail@awe-engineers.com
W: www.awe-engineers.com

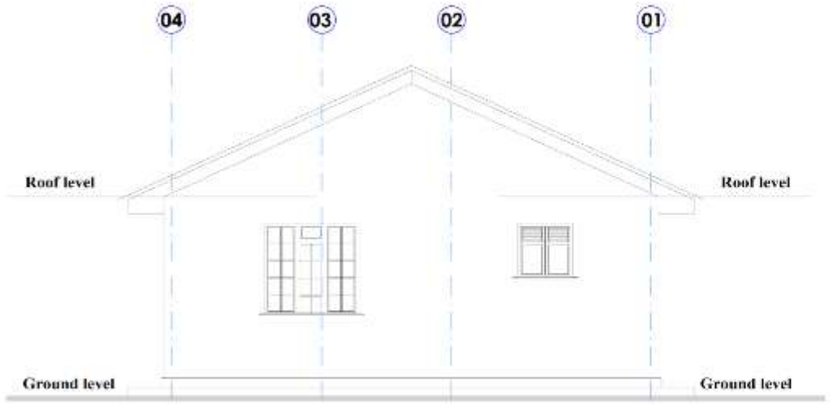
Drawing Title

WATER OFFICE BLOCK
SECTION S-03

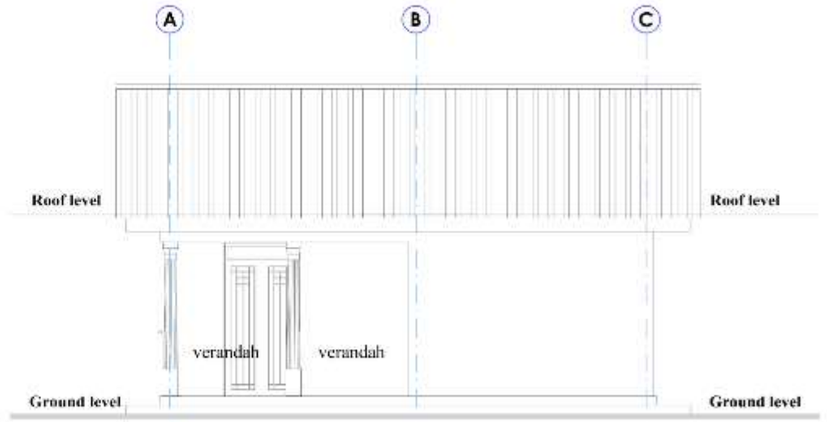
Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

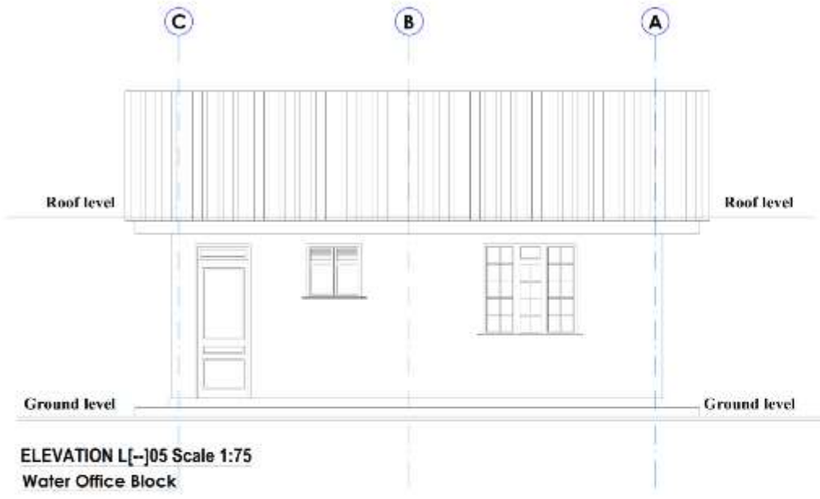
Drg No: KID/W/5.1.1 Cad file No 013.



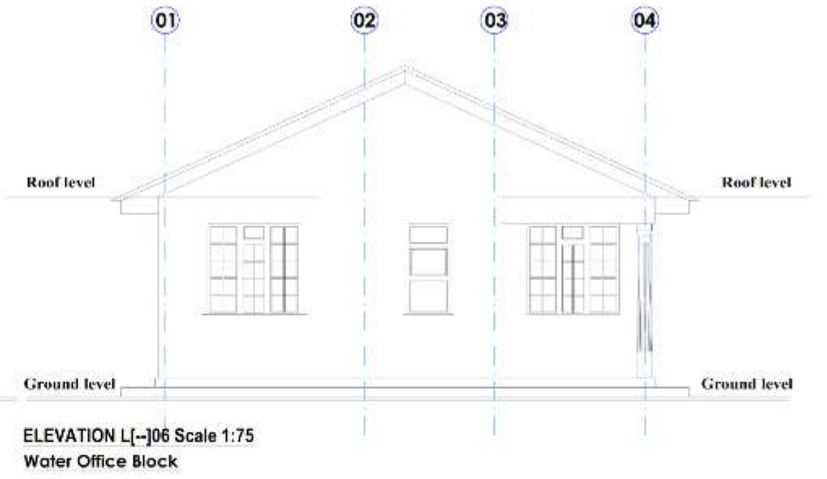
ELEVATION L[--]04 scale 1:75
Water Office Block



ELEVATION L[--]03 scale 1:75
Water Office Block



ELEVATION L[--]05 Scale 1:75
Water Office Block



ELEVATION L[--]06 Scale 1:75
Water Office Block

AMENDMENTS

No	Date	Revision

NOTES

1. All dimensions are in metres unless stated otherwise.
2. All levels are in metres above sea level.
3. For Site location see Dwg. KID/W/0.0.0
4. All valves, hydrants and washout locations are identified by marker post in positions.
5. Structural details are not included

LEGEND

Client:

THE REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT
Rural Water Supply and Sanitation Department (RWSSD)

Project:

Feasibility study, Detailed Engineering Design, Environmental and Social Impacts Assessment of piped water supply and sanitation systems in selected Rural Growth Centres across the country

CONSTRUCTION OF KIDERA WATER SUPPLY AND SANITATION SYSTEM

Consultant:

AIR WATER EARTH (AWE) LTD
Civil, Environmental Engineers & Project Management Consultants
Mt. 27 Bbaayenga Road, Bugoloobi
P.O. Box 224251, Kampala, UGANDA
T: 041-4266455, Mob: 078-2580480
E: mail@awe-engineers.com
W: www.awe-engineers.com

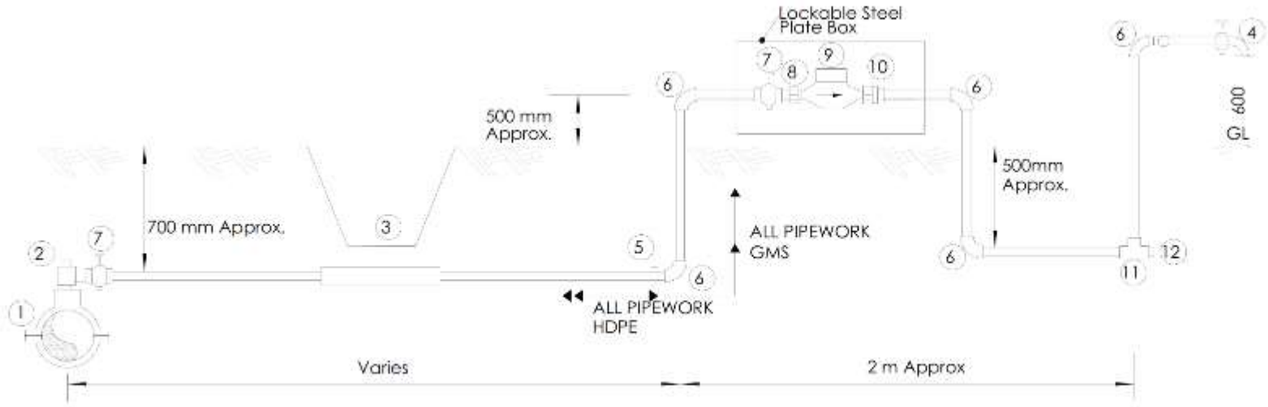
Drawing Title

WATER OFFICE BLOCK
ELEVATIONS

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Drg No: KID/W/5.1.2 | Cad file No 013.



SCHEDULE OF FITTINGS

ITEM No	DESCRIPTION	No REQUIRED PER CONNECTION
1.	Saddle Clamp	1
2.	HDPE Outlet type swivel ferule	1
3.	1m Length GMS sleeve	1
4.	Brass Tap	1
5.	PE/GMS Adaptor	1
6.	GMS Elbow	5
7.	Brass Gate Valve	2
8.	Male threaded connector	1
9.	Water meter	1
10.	Adjusting coupling	1
11.	GMS equal tee	1
12.	Plug	1

NOTES

1. GMS pipe ends to be screwed with tapered threads to ISO R7 and to be supplied with sealing PTFE tape
2. GMS pipe fittings to be malleable cast iron to BS 143 and BS 1256 with female threaded ends
3. The adjusting coupling shall be made of bronze or brass with a threaded female connection at the outlet end. It shall incorporate sufficient adjustment to permit removal of the meter
4. All PE connections shall be of the compression type
5. Diameter of pipe varies

AMENDMENTS

No	Date	Revision

NOTES

1. All dimensions are in metres unless stated otherwise.
2. All levels are in metres above sea level.
3. For Site location see Dwg. KID/WI/0.0.0
4. All valves, hydrants and washout locations are identified by marker post in positions.
5. Structural details are not included

LEGEND

Client:

THE REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT
Rural Water Supply and Sanitation Department (RWSSD)

Project:

Feasibility study, Detailed Engineering Design, Environmental and Social Impacts Assessment of piped water supply and sanitation systems in selected Rural Growth Centres across the country

CONSTRUCTION OF KIDERA WATER SUPPLY AND SANITATION SYSTEM

Consultant:

AIR WATER EARTH (AWE) LTD
Civil, Environmental Engineers & Project Management Consultants
M1, 27 Bbuyumba Road, Bugolobi
P.O. Box 23420, Kampala, UGANDA.
T: 041 4288466, Mob: 078 [illegible]
E: mail@awe-engineers.com
W: www.awe-engineers.com

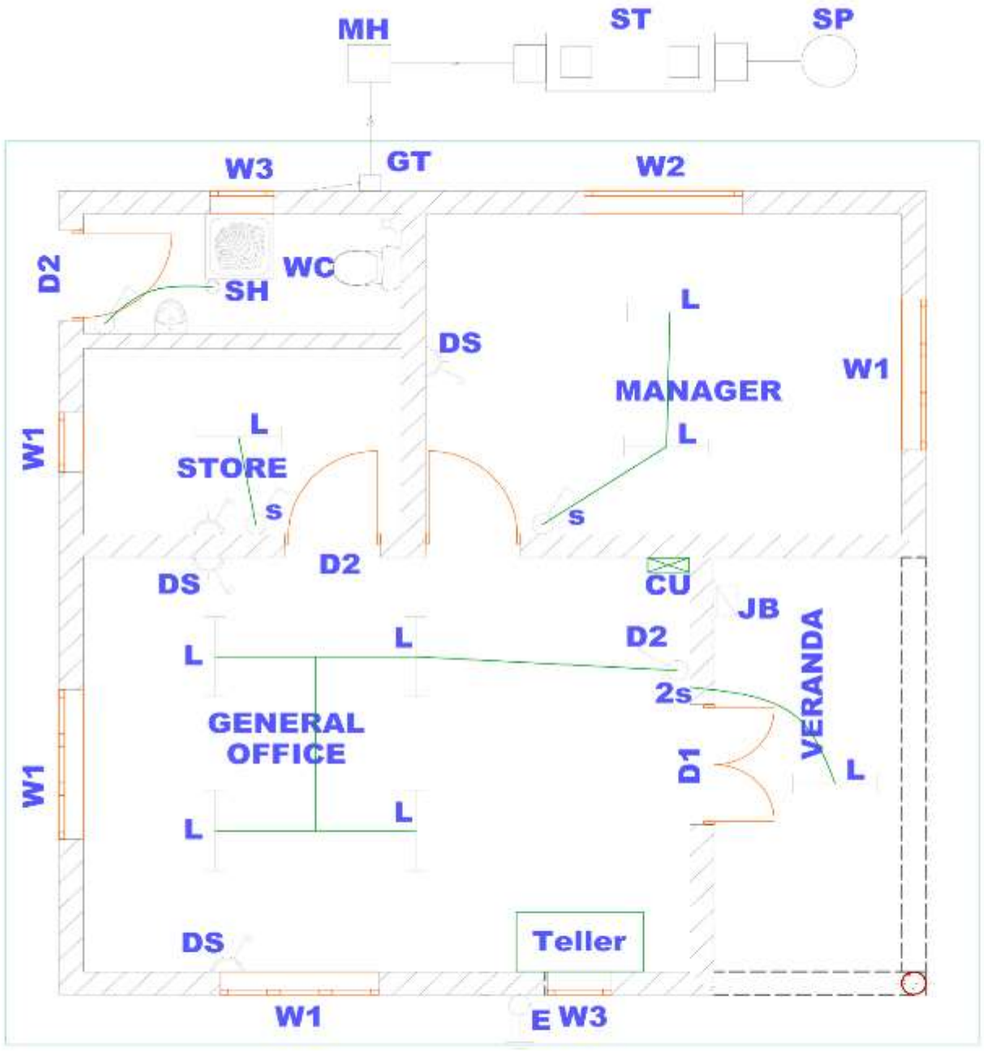
Drawing Title

TYPICAL YARD TAP CONNECTION

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Dra No: KID/WI/7.2.0 Cad file No 013



ELECTRICAL& MECHANICAL LAYOUT **Scale 1:50**

AMENDMENTS

No	Date	Revision

NOTES

1. All dimensions are in metres unless stated otherwise.
2. All levels are in metres above sea level.
3. For Site location see Dwg. KIDWR:0.0
4. All valves, hydrants and washout locations are identified by marker post in positions.
5. Structural details are not included

LEGEND

Client:

THE REPUBLIC OF UGANDA
MINISTRY OF WATER AND ENVIRONMENT
Rural Water Supply and Sanitation Department (RWSSD)

Project:

Feasibility study, Detailed Engineering Design, Environmental and Social Impacts Assessment of piped water supply and sanitation systems in selected Rural Growth Centres across the country

CONSTRUCTION OF KIDERA WATER SUPPLY AND SANITATION SYSTEM

Consultant:

AIR WATER EARTH (AWE) LTD
Civil, Environmental Engineers & Project Management Consultants
Mt. 27 Bhagwanji Road, Bugolobi
P.O. Box 22420, Kampala, UGANDA
T: 041-4266593, Mob: 078-2580480
E: mail@awe-engineers.com
W: www.awe-engineers.com

Drawing Title

WATER OFFICE BLOCK
MECHANICAL AND ELECTRICAL INSTALLATION

Scale: Vertical Scale: 1:250 Horizontal Scale: 1:2500	**Designed:**	GB,AM,ODM,IN,JO
	Drawn:	A.E
Date: OCT/2019	**Checked:**	Dr.M.R & Dr. L.K
	Approved:	Eng.Dr.M.R

DETAILED ENGINEERING DRAWING

Drg No: KIDWR:1.0 Cad file No 013.

ANNEX C: SAMPLE SIZE DETERMINATION

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384

ANNEX D: PARTICIPANT LISTS ATTACHED

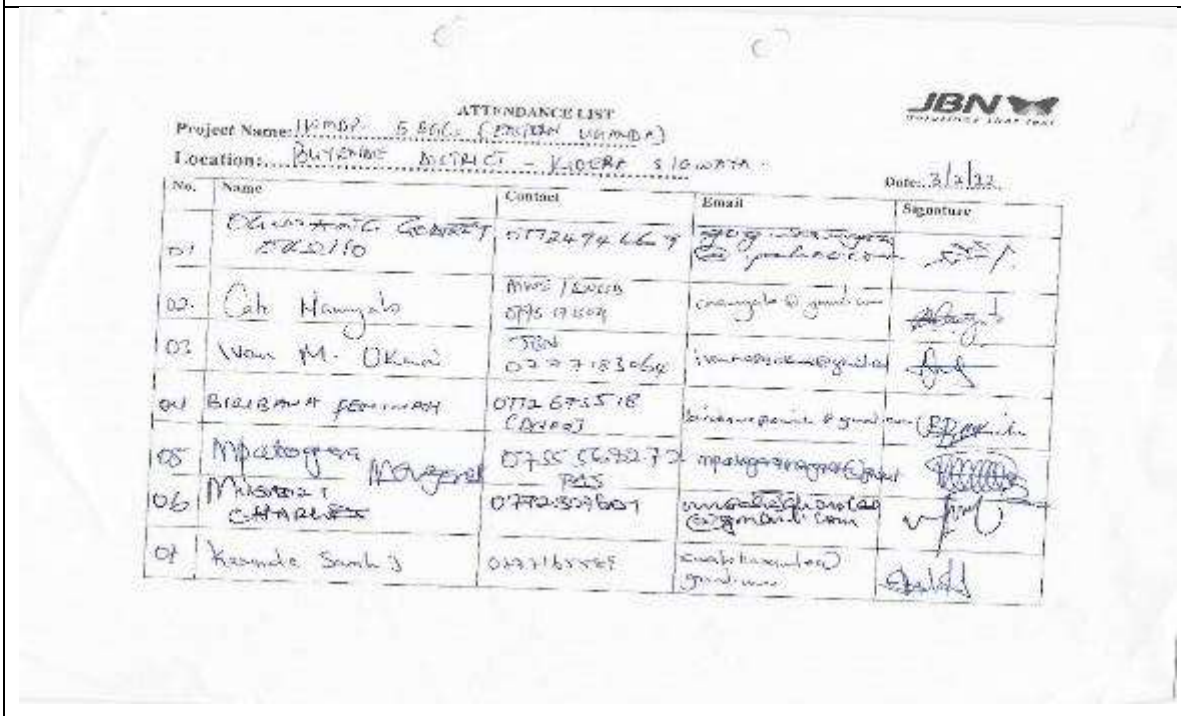
JBN consults&planners

ATTENDANCE LIST

Project Name: IWMDP - SBAGs (Eastern Uganda) ESMP/ESSP

Location: Mbale City Council Hall Date: 24/Jan/2022

No	Name	I/M	Designation	Contact/ Email	Signature
1.	JAMES SEGUYA	M	PE		
2.	Maurice Edema Madira	M	ESS-IWMDP	edemamaurice@gmail.com	
3.	Esther Tumusiime	F	R.S.O.C		
4.	Martha Najega	F	SEHSO		
5.	Eric Baich	M	Senior Sociologist		
6.	Cate Namyalo	F	Senior Environmental Officer		
7.	Atoma Godfrey	M	Volunteer		
8.	Sarah Sekat Kawuda	F	Environmental Consultant		
9.	Nelson OMAGOR	M	ESIA T/L		
10.	Sekuma S. Peter	M	Hydrogeologist		
11.	Adupa W. MATOVU	M	RAP		
12.	Martin Habenge	M	Project Manager JBN		
13.					
14.					



JBN

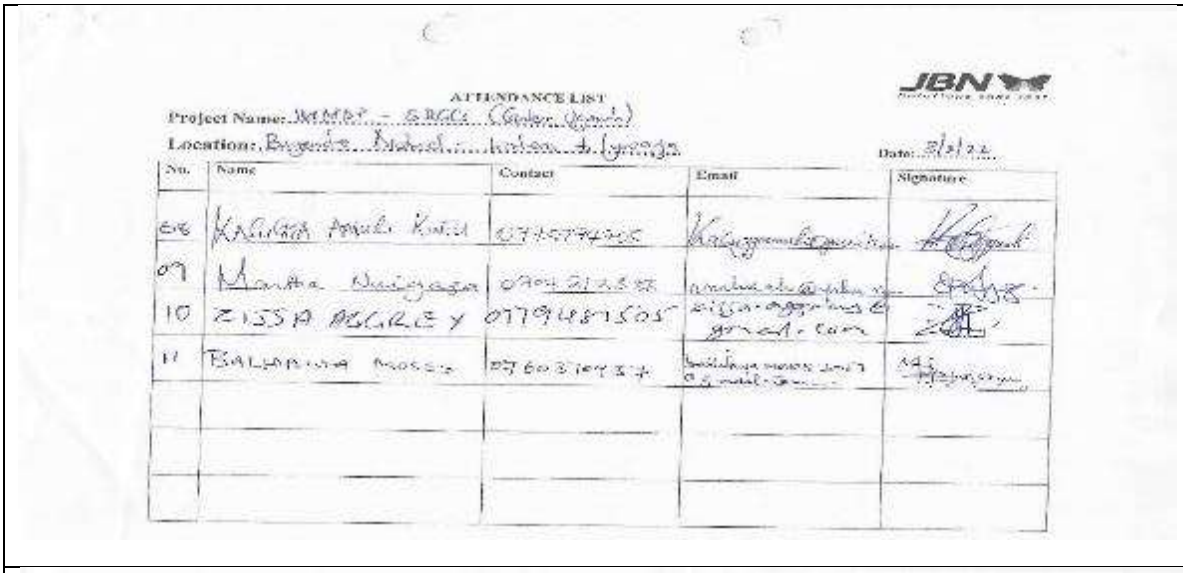
ATTENDANCE LIST

Project Name: IWMDP - SBAGs (EASTERN UGANDA)

Location: BUTEBERE DISTRICT - KIOGA SIDE WATER

Date: 3/2/22

No.	Name	Contact	Email	Signature
01	[illegible]	0772474669		
02.	Cate Namyalo	[illegible] 0775 191609	cnamyalo@gmail.com	
03	Noah M. Okwii	[illegible] 0777183064	[illegible]	
04	BIRUBAMA JEREMIAH	0772675518 (CADEO)	[illegible]	
05	Mpalogger [illegible]	0755 562772 PAS	mpalogger@gmail.com	
06	Musazi Charles	0772509607	[illegible]	
07	Kawuda Sarah	[illegible]	[illegible]	



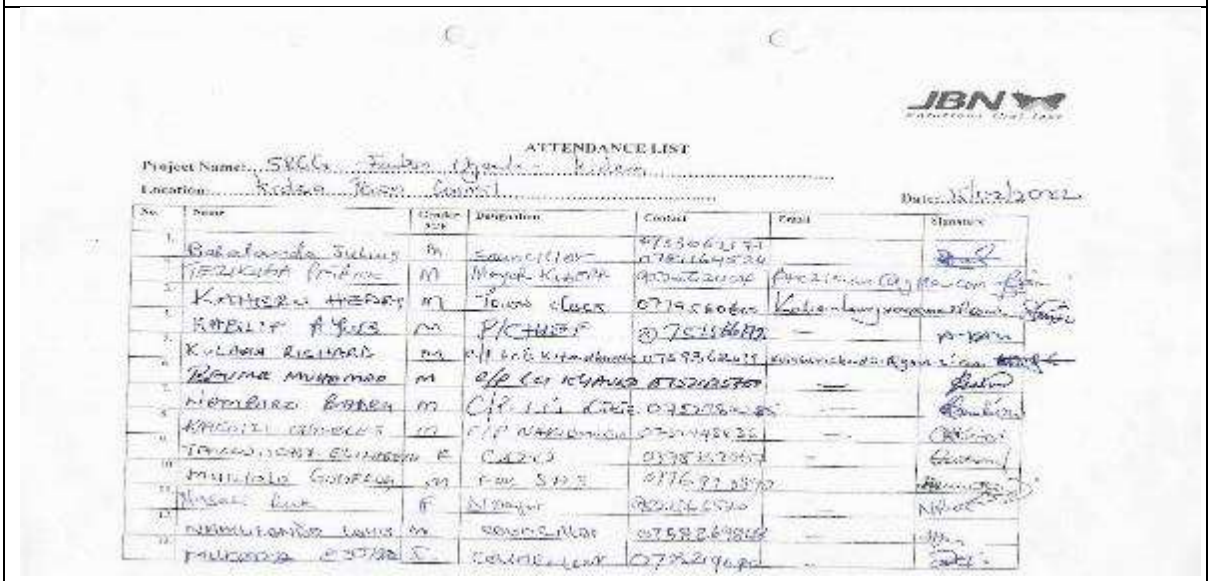
ATTENDANCE LIST

Project Name: MMDP - SRGC (Eastern Uganda)

Location: Bugondo Island, Kaliro District

Date: 8/3/22

No.	Name	Contact	Email	Signature
08	KALUMBA Ronald Kutesa	0774077405	Kalumbaronald@yahoo.com	
09	Martha Nwanyagaga	0701212857	marthanwanyagaga@yahoo.com	
10	ZIISA ASGARE Y	0779481505	ziisayasgare@gmail.com	
11	BALYAKUNA MOSES	0760316743	balyakunamoses2017@gmail.com	



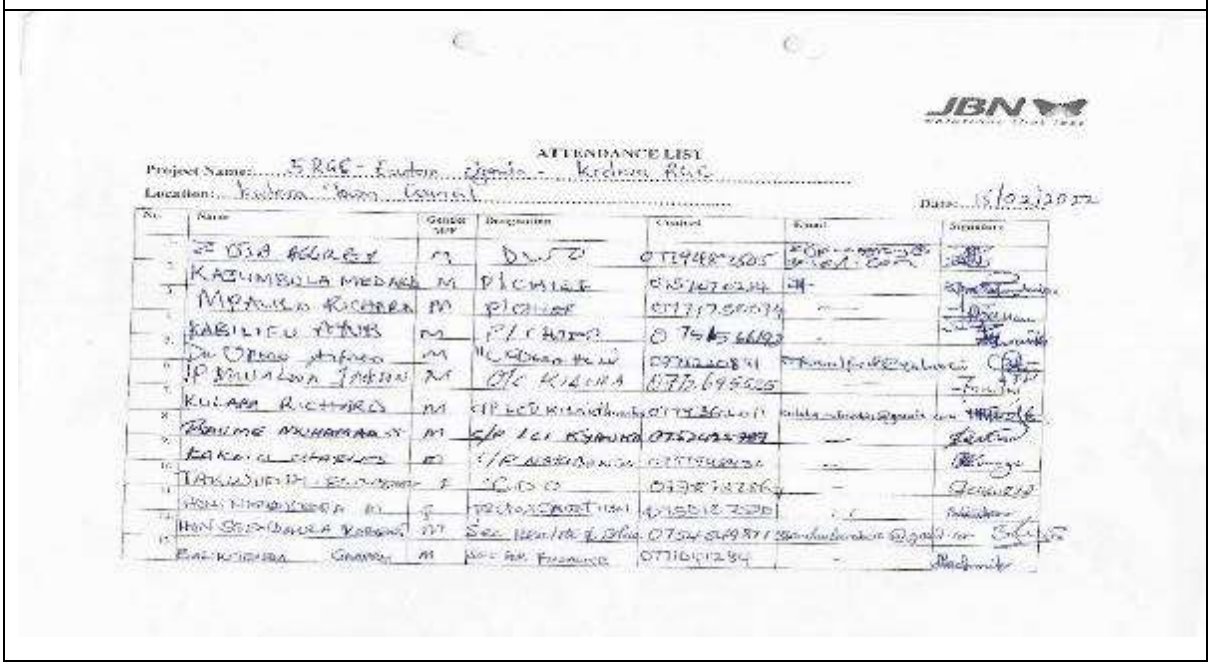
ATTENDANCE LIST

Project Name: SRGC Eastern Uganda - Kaliro

Location: Kaliro Town Council

Date: 8/3/2022

No.	Name	Gender M/F	Designation	Contact	Email	Signature
1.	Bakalanda Julius	M	Councillor	0753062177 / 0781164930		
2.	TEKUKA Pridus	M	Mayor Kaliro	0701220100	Pridus.tekuka@yahoo.com	
3.	KATHERU HERBERT	M	Town Clerk	0775560600	Kaliro.lawyerpeace@gmail.com	
4.	KABELIF AYUB	M	P/CHIEF	0701166879	—	
5.	KULABA RICHARD	M	P/L LCC Kyamukuku	0759362033		
6.	BOUME MUHAMAD	M	O/C LCI KYAMUKU	0752042789	—	
7.	NDEMBIRE BARBRA	M	C/P LCI CHIEF	0752026480	—	
8.	KAKOZI CHARLES	M	C/P KABERAMAIDO	0751148636	—	
9.	TAKWONDHA ELIZABETH P.	F	CLERK	0778433967	—	
10.	MUKISA GODFREY	M	P.W. SUB	0776778870		
11.	NAKAFU EVE	F	NURSE	0701166790	—	
12.	NSEREKO MOSES	M	SENIOR MAN	0752626488	—	
13.	MUKOOSA GEOFFREY	M	CRIME DESK	0772690400	—	



ATTENDANCE LIST

Project Name: SRGC - Eastern Uganda - Kaliro RLC

Location: Kaliro Town Council

Date: 15/03/2022

No.	Name	Gender M/F	Designation	Contact	Email	Signature
1.	ZIISA ASGARE	M	DPC	0779481505	ziisayasgare@gmail.com	
2.	KALUMBULA MEDARD	M	P/CHIEF	0753167034	—	
3.	MPANGA RICHARD	M	P/CHIEF	0773750074	—	
4.	KABELIFU AYUB	M	P/CHIEF	0701166879	—	
5.	DR OPIO JAMES	M	C/CLERK KALIRO	0772362811	drjamesopio@yahoo.com	
6.	JP KAMULEGA JAMES	M	O/C KALIRO	0775695505	—	
7.	KULABA RICHARD	M	C/P LCC KYAMUKU	0759362033	kulaba.richard@gmail.com	
8.	BOUME MUHAMAD	M	O/C LCI KYAMUKU	0752042789	—	
9.	KAKOZI CHARLES	M	C/P KABERAMAIDO	0771148636	—	
10.	TAKWONDHA ELIZABETH P.	F	CLERK	0778433967	—	
11.	NAKAFU EVE	F	PROSECUTOR	0701166790	—	
12.	HON SSEKIBUULA KASIM	M	Sec Health & Edu	0754849871	ssekibuulakasim@gmail.com	
13.	BALIKUDEMBA GRAHAM	M	Sec for Finance	0771611284	—	

Stakeholder consultation record:

Name of Assignment:

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

Date: 7/05/2022

Location: KIDERA S/C / BUNDIBUGYO DISTRICT

Project name: SOLAR POWERED WATER SUPPLY AND SANITATION FACILITIES (KIDERA P&C)

Proponent: MWE

	Name of person/ official met:	Gender M	Gender F	Village	Designation	Contact (Tel/email)	Sign/ Initial
12	TABUHIDHI ELIZABETH		✓	Kiwamba	Business Lady	0778732562	
13	[illegible] ROBERT	✓		Kyamuhuka	Business	0758 729 914	
14	SSEKANDWA MICHEAL	✓		KIDERA	PEASANT	0759 834457	
15	ISEMERA STEPHEN	✓		KIDERA	BUSINESS MAN	0703886985	
16	MALIRE ROGERS	✓		KIDERA	BUSINESSMAN	0752025612	
17	GINDUKA ISA	✓		KITEGE	KITEGE BUSINESS	0757573785	
18	BUKIEMBA PAUL	✓		Kitete	Blue Hooper	0753605260	
19	Kabyemera David	✓		Kyamuhuka		0756953859	
20	MPENDO MOSES	✓		Kyamuka	PEASANT	0759015984	
19	MBASALAZI JANE		✓	KITEGE	BUSINESS	0755816357	
20	TUSABE OLIVIA		✓	KITEGE	Business Lady	0704645752	

Stakeholder consultation record:

Name of Assignment:

Purpose of consultation (tick appropriate box):				
	ESMF		Environmental Audit	
	RPF		RAP	
	ESIA		Other (specify)	

Date: 7/5/2022

Location: KIDERA S/C

Project name:

Proponent:

	Name of person/ official met:	Gender M	Gender F	Village	Designation	Contact (Tel/email)	Sign/ Initial
1	Mubiza Mamon	✓		Kitete	PEASANT	0754155219	
2	Nambiro Badru		✓	Kitete	CIVILS	0752980085	
3	Mulikenda Amasa Muhangwa	✓		Kabyanga	PEASANT	0757468021	
4	IRUMBA MOSES	✓		Kyamuhuka	PEASANT	0757315018	
5	BAKSIRIKA SAKARIAS		✓	Kitete	(LOCAL)	0780267045	BAKSIRIKA
6	SHEIKH MUHAMAD SALIM BAGUME	✓		KYAMUKA	CIVIL ENGR	0752025789	
7	GEORGE ZILABA MUKAMBI	✓		Kyamuka	PEASANT	0785208884	
8	Bogere Bilala	✓		Kyamuka	PEASANT	0775216183	
9	Isabalwa Robert	✓		Kabyanga	Business	0786076205	
10	TWINOMUGISHA BRIAN ESTER		✓	Kitete	PEASANT	0780734955	

Stakeholder consultation record:

Name of Assignment:

Purpose of consultation (tick appropriate box):

ESMP			Environmental Audit	
RPF			RAP	
ESIA ✓			Other (specify)	

Date: 7/05/2022

Location: KIBELA SUB-COUNTY/BUTENDE DISTRICT

Project name: SOLAR POWERED SUPPLY AND SANITATION FACILITIES (KIBELA RGC)

Proponent: MWE

Name of person/ official met	Gender M	Gender F	Village	Designation	Contact (Tel/email)	Sign/ initial
MAMGOBI ROSE		✓	Kelu		0755238030	
HAMGOBI BIELLA	✓		Kelu		0781943636	
KALANZI KENNEDY	✓		Kabuyuka		0703229020	
NAKABUGO SCOVIA		✓	Kabuyuka		0703089355	NAKABUGO
MAMGABI SUZAN		✓	Kabuyuka		-	
MUKINDI LIVINGSTONE	✓		Kabuyuka		0757221958	
ALI DESOLAH	✓	✓	Kabuyuka			
BAGALWA JOHN	✓		Kabuyuka		0754251927	
MALWA PETU		✓	Kabuyuka		0771280865	
MUSANA LEVI	✓		Kabuyuka		0758745981	

Stakeholder consultation record:

Name of Assignment:

Purpose of consultation (tick appropriate box):

ESMP			Environmental Audit	
RPF			RAP	
ESIA ✓			Other (specify)	

Date: 07/05/22

Location: KIBELA SUB-COUNTY/BUTENDE DISTRICT

Project name: SOLAR POWERED SUPPLY AND SANITATION FACILITIES (KIBELA RGC)

Proponent: MWE

Name of person/ official met:	Gender M	Gender F	Village	Designation	Contact (Tel/email)	Sign/ initial
Masanja Rashid	✓		Kibele		0752881709	
Mukamba Godfrey	✓		[illegible]		0752438088	
NAKATO MARIAM		✓			0702515843	
Mutekanga Wilson	✓		[illegible]		0753143989	
MR. WAMSWA SIMON	✓		Kibe		0754230075	
WAMBUGO CHARLES	✓		"		0754733309	
Bilubana Judith		✓	"		0742876589	
Ndimukika Abdu	✓		"		0758288142	
Balitenge Isa	✓		"		0759306899	
Namugaya Aziza		✓	"		0752719427	

Stakeholder consultation record:

Name of Assignment:

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

Date: 07/05/22

Location: KIDELA SUB-COUNTY / BUYENDE DISTRICT

Project name: SOLAR POWERED SUPPLY AND SANITATION FACILITIES (KIDELA RGC)

Proponent: MWE

Name of person/ official met:	Gender M	Gender F	Village	Designation	Contact (Tel/email)	Sign/ Initial
Mugarura Innocent	✓		Kitete		0774021654	
Waiduka Adam	✓		11		—	
Muwanga Ruggers	✓		Kyanika		0767752674 0712635920	
Kiyomo Moses	✓		Kiranika		0776570481 0712570481	
Namukamba Sauya		✓	Kyanika		0756753007	
Basiuka Shamim		✓	Kitete		—	
Musoga Jackline		✓	Kyanika		0754432441	
Batuli Joshua	✓				0751916226	
Makumbi Ayub	✓		Kitete		0700002597	
Grenah Emma	✓				D781928501	

Stakeholder consultation record:

Name of Assignment:

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

Date: 7/05/2022

Location: KIDELA SUB-COUNTY / BUYENDE DISTRICT

Project name: SOLAR POWERED SUPPLY AND SANITATION FACILITIES (KIDELA RGC)

Proponent: MWE

Name of person/ official met:	Gender M	Gender F	Village	Designation	Contact (Tel/email)	Sign/ Initial
BERUKA JOSEPH	✓		Maribanga		0788820409	
KIATALW TOMASON	✓		Maribanga		0751821420	MUTALW
EJOKU BERNARD	✓		Maribanga		0700880533	EJOKU
SEGAKIA AYUB	✓		Maribanga		0702541165	
BAMEGAMYA MOSES	✓		Maribanga			
Isabirye Julius	✓		Maribanga		0751343414	
MUGANDERI KASIME	✓		Maribanga		0755034464	
Sekiwaala James	✓		Maribanga		0775079598	
NIKUSUI DINNER	✓		Maribanga		0761626410	
MAKUMYA FINSA	✓		Maribanga		0705794250	

Stakeholder consultation record:

Name of Assignment:

Purpose of consultation (tick appropriate box):

ESMF			Environmental Audit	
RPF			RAP	
ESIA ✓			Other (specify)	

Date: 7/05/2022

Location: KIDELA SUB-COUNTY / BUYENDE DISTRICT

Project name: SOLAR POWERED SUPPLY AND SANITATION FACILITIES (KIDELA RGC)

Proponent: MWE

Name of person/ official met:	Gender M	Gender F	Village	Designation	Contact (Tel/email)	Sign/ Initial
NACALENE ESTHER		✓	Kidela	member	0707264062	
SERUSO IBRAHIM	✓		Kidela	"	0706136972	
Wandera Charles	✓		Kitela	"	0701484677	
Turyanabo Stanley	✓		Kidela	"	0752655668	
TULUAGA ABDUL	✓		Kidela	"	0756833999	
MUNAYA SULIU	✓		Kyanika	"	0706137696	
NALUKenge EMILIANA		✓	Kyanika		0758199592	
Opiti ELIA	✓		Kyanika		0752613723	
Kakeeza Akimu	✓		Kidela	"	0756685532	
NAICAYIMA HAMUM		✓			0758417373	
NANSENJA JAMAT		✓			0706074287639 4	

Stakeholder consultation record:

Name of Assignment:

Purpose of consultation (tick appropriate box):

ESMF			Environmental Audit	
RPF			RAP	
ESIA ✓			Other (specify)	

Date: 7/05/202

Location: KIDELA SUB-COUNTY / BUYENDE DISTRICT

Project name: SOLAR POWERED WATER SUPPLY AND SANITATION FACILITIES (KIDELA RGC)

Proponent: MWE

Name of person/ official met:	Gender M	Gender F	Village	Designation	Contact (Tel/email)	Sign/ Initial
Bikabo [illegible]					0787189058	
Nankyama Olivia "A"					0781430888	
MUSAH JOSEPH			Kyanika		0759605504	
MUDEY Tom			Mudeka		0787285278	
Mukasa Ronald			Kyanika		0704090798	
KWIERE ASAIRAF			Kyanika		0742882627	
KARTA JULIOS PATRISI			Kyanika/Kitele		0703423706	
MACIDO ISABIRYE			Kitele B		0700304762	
KIBEMENDI KATONGOLE			Bunakasaka		-	
KASALA GODFREY			Kyanika		0754247927	
MAYINJA Sulaiman			Kivanuga		0752454478	
NASANGA CAROLINE			Kitele B		0707538060	
NABIRE ZAINA			Kyanika		0754782642	

ANNEX E: WATER QUALITY RESULTS

Water quality for the proposed Water Supply Borehole

Republic of Uganda

MINISTRY OF WATER AND ENVIRONMENT
NATIONAL WATER QUALITY REFERENCE LABORATORY - ENTEBBE

Certificate of Analysis

Client Name : MAA Technologies Limited
Client Address : Kampala
Sample type & Location : Ground water sample from a borehole at Nakibengo village, Buyende district
Date received :21st April 2021
Analysis Completion data : 23rd April 2021
Sampled by : client

TEST RESULTS

Source Name		Borehole at Nakibengo, DWD 61681	Potable water standards (DEAS12:2018 Maximum permisible for Natural potable Water)
Village		Nakibengo	
Sub county		Kidera T.C	
District		Buyende	
Lab Identifier code		E46341	
Turbidity	NTU	8.2	25
Colour	PtCo	50	50
pH	units	7.3	5.5-9.5
Electrical Conductivity	µS/cm	1132	2500
Total disolved solids	mg/l	792	1500
Total Hardness as CaCO3	mg/l	400	600
Calcium hardness as CaCO3	mg/l	180	600
Magnesium hardness as CaCO3	mg/l	220	600
Calcium	mg/l	72	150
Magnesium	mg/l	53	100
Sodium	mg/l	26	200
Potasium	mg/l	1.7	50
Total Alkalinity	mg/l	500	-
Bicarbonates	mg/l	610	-
Fluoride	mg/l	0.57	1.5
Sulphates	mg/l	57	400
Chlorides	mg/l	73	250
Nitrates as N	mg/l	0.64	10
Nitrites as N	mg/l	0.001	0.9
Ammonium as N	mg/l	0.05	0.5
Phosphates as P	mg/l	0.26	0.7
Total Iron	mg/l	0.3	0.5
Manganese	mg/l	0.099	0.1

Notes;
*Samples are analyzed on as received basis. The client does bear sampling responsibility as to the representative characters of the sample delivered. Results are therefore based on the sample delivered and analyzed.

Checked by

23 APR 2021

Water Quality Management Department
Directorate of Water Resources Management
Waterquality.laboratory@mwe.go.ug
P.O Box 19, Entebbe
Tel: 041-321342

Issued by

PRINCIPAL ANALYST
LABORATORIES
23 APR 2021
NATIONAL WATER QUALITY REFERENCE LABORATORY - ENTEBBE

Water quality for the nearby Borehole

Republic of Uganda

MINISTRY OF WATER AND ENVIRONMENT
NATIONAL WATER QUALITY REFERENCE LABORATORY - ENTEBBE

Certificate of Analysis

Client Name : JBN Consults and Planners Ltd
Client Address : Block 216, Plots 577 & 578, Dr Asea Road, Ntinda
Sample type : Ground Water
Date received : 11th April 2022
Analysis Completion data : 14th April 2022

TEST RESULTS

Source Name		Kidera GW2 Borehole	Drinking water standards (IDEAS 12 2018 Maximum permissible for Natural Potable Water)
Village		Kidera	
Subcounty		Nakibengo	
District		Buyende	
Date Sampled		11-Mar-22	
Lab Identifier code		E51488	
Turbidity	NTU	0.43	25
pH	Units	6.79	5.5 - 9.5
Electrical Conductivity	µS/cm	790	2500
Total Dissolved Solids	mg/L	553	1500
Total Hardness as CaCO3	mg/L	315	600
Fluoride	mg/L	0.28	1.5
Sulphates	mg/L	57	400
Chlorides	mg/L	76	250
Nitrates as N	mg/L	0.39	10
Nitrites as N	mg/L	0.0201	0.003
Manganese	mg/L	0.0059	0.01
Total Iron	mg/L	0.32	0.5
E. Coli	CFU/100mls	<1	<1

Notes;
Samples are analyzed on as received basis.
The client does bear sampling responsibility as to the representative characters of the sample delivered. Results are therefore based on the sample delivered and analyzed. mg/l-stands for milligrams per liter

Checked by:

LABORATORY MANAGER
14 APR 2022
NATIONAL WATER QUALITY REFERENCE LABORATORY ENTEBBE

Water Quality Management Department
Directorate of Water Resources Management
P.O Box 19, Entebbe
Tel: 041-321343

PRINCIPAL ANALYST LABORATORIES
14 APR 2022
NATIONAL WATER QUALITY REFERENCE LABORATORY ENTEBBE
Sign:.....

ANNEX F- LIST OF PLANTS

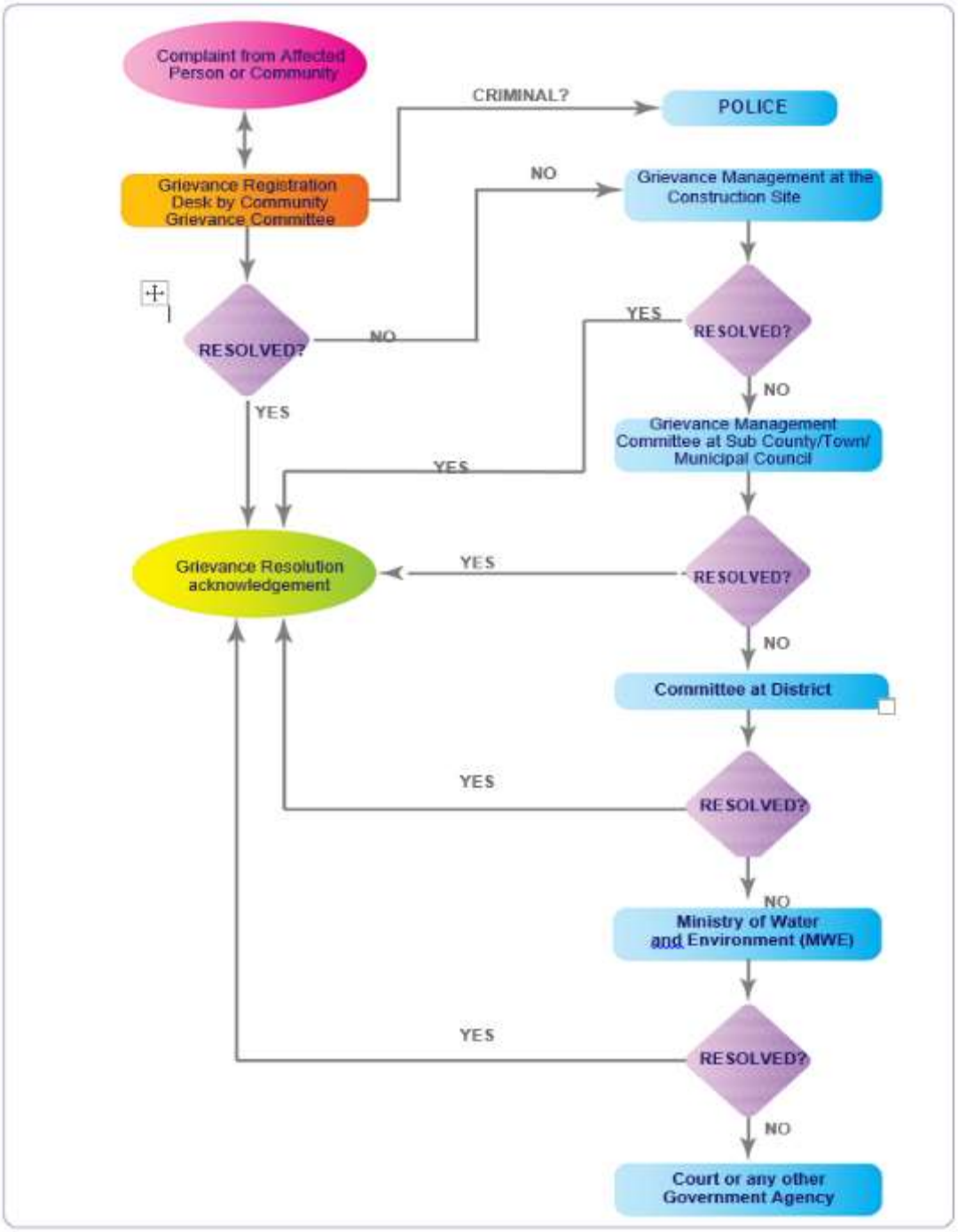
S/N	Family	Species	Pipeline -tank	Reservoir Tank	Nakibengo Borehole	Lifeform	Status
1	Acanthaceae	*Asystasia gangetica*	**0**	**0**	**1**	Herb	LC
2	Amaranthaceae	*Alternanthera pungens*	**1**	**1**	**1**	Herb	LC
3		*Amaranthus spinosus*	**0**	**0**	**1**	Herb	Invasive
4		*Pandiaka angustifolia*	**0**	**0**	**1**	Herb	LC
5	Anacardiaceae	*Lannea schweinfurthii*	**0**	**0**	**1**	Tree	LC
6		*Mangifera indica*	**1**	**1**	**0**	Tree	LC
7	Asclepiadaceae	*Periploca nigrescens*	**0**	**1**	**0**	Liana	LC
8	Asteraceae	*Ageratum conyzoides*	**1**	**1**	**0**	Herb	LC
9		*Aspilia africana*	**0**	**0**	**0**	Herb	LC
10		*Aspilia kotschyi*	**0**	**1**	**0**	Herb	LC
11		*Bidens pilosa*	**1**	**1**	**1**	Herb	Invasive
12		*Chromolaena odorata*	**0**	**0**	**0**	Liana	Invasive
13		*Conyza sumatrensis*	**0**	**1**	**0**	Herb	Invasive
14		*Crassocephalum montuosum*	**1**	**1**	**0**	Herb	LC
15		*Synedrella nodiflora*	**0**	**0**	**1**	Herb	LC
16		*Tridax procumbens*	**0**	**0**	**1**	Herb	LC
17		*Vernonia amygdalina*	**0**	**1**	**1**	Shrub	LC
18	Bignoniaceae	*Markhamia lutea*	**0**	**0**	**1**	Tree	LC
19		*Stereospermum kunthianum*	**1**	**0**	**1**	Tree	LC
20	Capparidaceae	*Capparis erythrocarpos*	**0**	**1**	**0**	Liana	LC
21		*Crateva adansonii*	**0**	**0**	**1**	Tree	LC
22	Caricaceae	*Carica papaya*	**0**	**0**	**1**	Tree	LC
23	Combretaceae	*Combretum collinum*	**1**	**0**	**1**	Tree	LC
24		*Commelina africana*	**1**	**0**	**0**	Herb	LC
25		*Commelina benghalensis*	**1**	**0**	**0**	Herb	Invasive
26		*Commelina diffusa*	**0**	**1**	**0**	Herb	LC
27		*Terminalia schimperiana*	**0**	**0**	**1**	Tree	LC
28	Cucurbitaceae	*Momordica foetida*	**0**	**0**	**1**	Liana	LC
29	Euphorbiaceae	*Euphorbia candelabrum*	**1**	**1**	**0**	Tree	LC
30		*Euphorbia tirucalli*	**0**	**0**	**1**	Shrub	LC
31	Fabaceae	*Albizia coriaria*	**0**	**0**	**1**	Tree	LC
32		*Cassia occidentalis*	**1**	**0**	**1**	Herb	LC
33		*Cassia siamea*	**0**	**1**	**1**	Tree	LC
34		*Indigofera arecta*	**0**	**1**	**0**	Herb	LC
35		*Indigofera circinella*	**0**	**1**	**0**	Herb	LC

S/N	Family	Species	Pipeline -tank	Reservoir Tank	Nakibengo Borehole	Lifeform	Status
36		*Indigofera hirsuta*	**1**	**2**	**0**	Herb	LC
37		*Indigofera mimosoides*	**0**	**1**	**0**	Herb	LC
38		*Parkinsonia aculeata*	**0**	**0**	**1**	Shrub	LC
39		*Tamarindus indica*	**0**	**0**	**1**	Tree	LC
40	Lamiaceae	*Hyptis suaveolens*	**0**	**0**	**1**	Herb	Invasive
41		*Leonotis nepetifolia*	**0**	**0**	**1**	Herb	Invasive
42		*Leucas deflexa*	**1**	**0**	**0**	Herb	LC
43		*Ocimum gratissimum*	**1**	**0**	**0**	Herb	LC
44		*Ocimum lamiifolium*	**1**	**0**	**0**	Herb	LC
45		*Ocimum punctatum*	**1**	**1**	**0**	Herb	LC
46	Lauraceae	*Persea americana*	**0**	**0**	**1**	Tree	LC
47	Malvaceae	*Sida acuta*	**1**	**0**	**1**	Herb	Invasive
48		*Sida alba*	**0**	**0**	**1**	Herb	LC
49		*Triumfetta rhomboidea*	**0**	**0**	**1**	Herb	LC
50	Meliaceae	*Melia azedarach*	**0**	**0**	**1**	Tree	Invasive
51	Moraceae	*Artocarpus heterophyllus*	**0**	**0**	**1**	Tree	LC
52		*Ficus amadiensis*	**0**	**0**	**1**	Tree	LC
53		*Ficus glumosa*	**0**	**1**	**0**	Tree	LC
54		*Ficus natalensis*	**1**	**0**	**1**	Tree	LC
55		*Ficus ovata*	**0**	**0**	**1**	Tree	LC
56		*Ficus thonningii*	**0**	**0**	**0**	Tree	LC
57		*Milicia excelsa*	**0**	**1**	**0**	Tree	LC
58	Palmae	*Borassus aethiopicum*	**0**	**0**	**1**	Tree	LC
59	Poaceae	*Cynodon nlemfuensis*	**0**	**0**	**1**	Herb	LC
60		*Eleusine indica*	**1**	**1**	**1**	Herb	LC
61		*Imperata cylindrica*	**1**	**0**	**1**	Herb	Invasive
62		*Melinus repen*	**1**	**0**	**1**	Herb	LC
63		*Panicum maximum*	**0**	**1**	**1**	Herb	LC
64		*Paspalum notatum*	**1**	**0**	**1**	Herb	LC
65	Polygalaceae	*Securidaca longipedunculata*	**0**	**1**	**0**	Tree	LC
66	Rhamnaceae	*Maesopsis eminiii*	**0**	**0**	**1**	Tree	LC
67		*Ziziphus pubescens*	**1**	**0**	**1**	Shrub	LC
68	Rubiaceae	*Gardenia ternifolia*	**0**	**0**	**1**	Shrub	LC
69	Sapotaceae	*Euclea racemosa*	**1**	**0**	**0**	Shrub	LC
70	Simaroubaceae	*Harrisonia abyssinica*	**0**	**1**	**1**	Shrub	LC
71	Solanaceae	*Solanum incanum*	**0**	**0**	**1**	Herb	LC
72	typhaaceae	*Typha domingensis*	**1**	**0**	**1**	Herb	LC

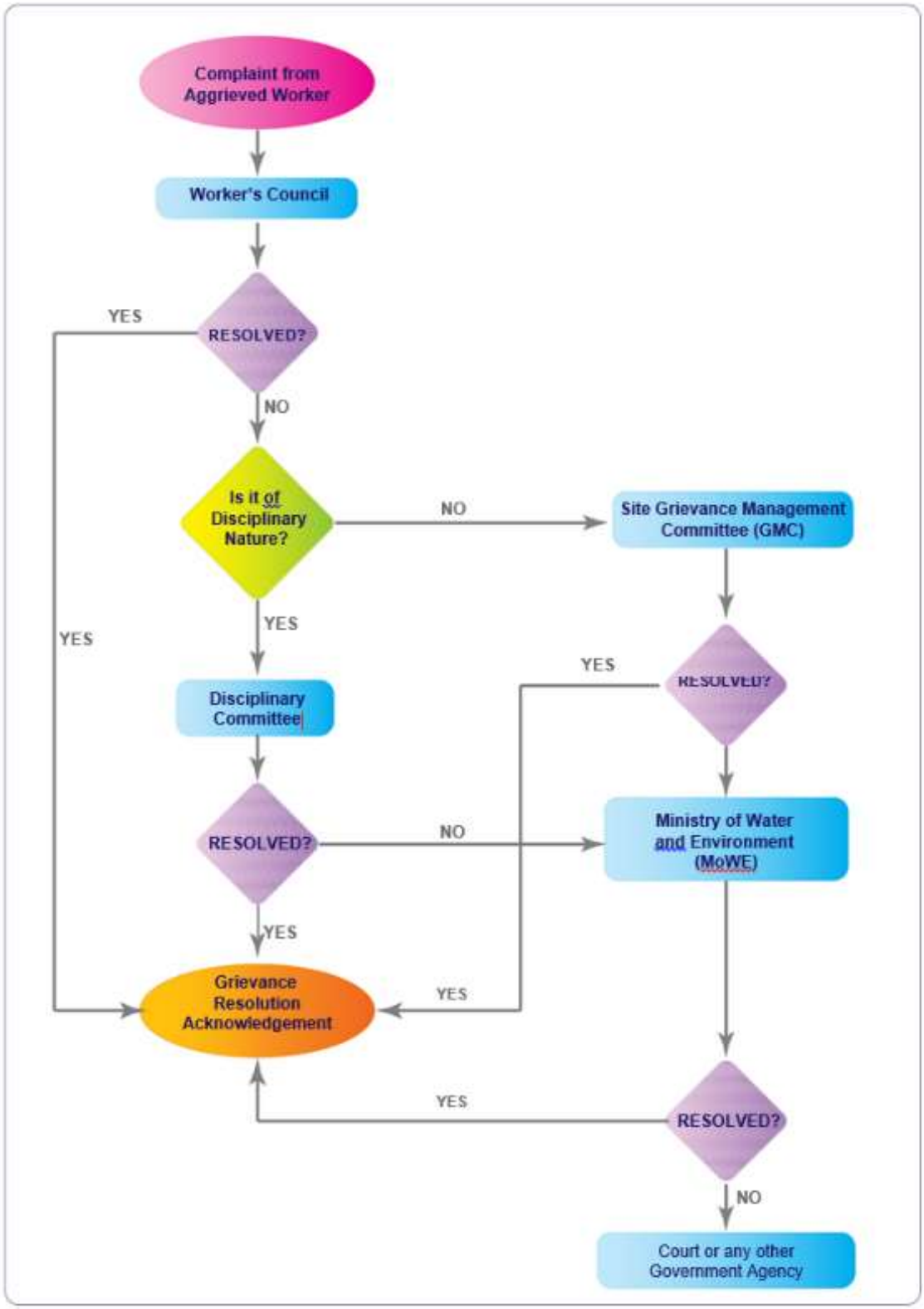
S/N	Family	Species	Pipeline -tank	Reservoir Tank	Nakibengo Borehole	Lifeform	Status
73	Verbenaceae	*Clerodendrum umbellatum*	**0**	**0**	**1**	Herb	LC
74		*Lantana camara*	**0**	**0**	**1**	Shrub	Invasive
75		*Stachytarpheta indica*	**1**	**0**	**1**	Herb	Invasive

ANNEX G: GRIEVANCE REDRESS MECHANSIMS AND FORMS

Community Grievance Flow Chart



Workers Grievance Flow Chart



Village Level GRC Reporting Template

District……

Sub-county……

Village……

Indicators

SN	Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1.	No of grievances related to project activities logged per month												
2.	Number of grievances that received timely response (within 7 days)												
3.	Number of grievances received and addressed at village level												
4.	Number of recurrent complaints received (over a period of 15 days)												
5.	No. of meetings held												
6.	Number of unresolved grievances												
7.	Number of grievances referred from village to sub-county level for addressing												
8.	Number of grievances referred to other legal institutions e.g. LCs, Police, Courts of Law												

Provide details on recurrent complaints raised (attach evidence where necessary)

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Subcounty Level GRC Reporting Template

District……..

Sub-county……..

Indicators

SN	Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1.	No of grievances related to project activities logged per month												
2.	Number of grievances that received timely response (within 14 days)												
3.	Number of grievances received and addressed at sub county level												
4.	Number of recurrent complaints received (over a period of 15 days)												
5.	No. of meetings held												
6.	Number of unresolved grievances												
7.	Number of grievances referred from sub county to district level for addressing												
8.	Number of grievances referred to other legal institutions e.g. LCs, Police, Courts of Law												

Provide details on recurrent complaints raised (attach evidence where necessary)

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District Level GRC Reporting Template

District .....

Indicators

SN	Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1.	No. of grievances related to project activities logged per month												
2.	Number of grievances that received timely response (within 14 days)												
3.	Number of grievances received and addressed at district level												
4.	Number of recurrent complaints received (over a period of 15 days)												
5.	No. of meetings held												
6.	Number of unresolved grievances												
7.	Number of grievances referred from the district to national level for addressing												
8.	Number of grievances referred to other legal institutions e.g. LCs, Police, Courts of Law												

Provide details on recurrent complaints raised (attach evidence where necessary)

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National Level GRC Reporting Template

Indicators

SN	Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1.	No. of grievances related to project activities logged per month												
2.	Number of grievances that received timely response (within 14 days)												
3.	Number of grievances received and addressed at district level												
4.	Number of recurrent complaints received (over a period of 15 days)												
5.	No. of meetings held												
6.	Number of unresolved grievances												
7.	Number of grievances referred from the district to national level for addressing												
8.	Number of grievances referred to other legal institutions e.g. LCs, Police, Courts of Law												

Provide details on recurrent complaints raised (attach evidence where necessary)

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REPORTING AND REFERRAL OF VAC, GBV AND OTHER SEXUAL RELATED CASES ON THE PROJECT.

Stakeholder	Action and support to be provided	Where the case should be Referred?
VAC /GBV Victim	Reports to immediate persons like relatives, friends, peers, and other resourceful persons such as teacher, religious leaders, CSOs, LC, Police Makes a statement providing details on what happened, form of violence, perpetrator, any witnesses.	Immediately refer the case to LC and Police for recording and further investigation.
Community Persons including LCs, parents, guardians, Water user Committees, Project Management Committees, contractors' management teams, Grievance committees, Contractor's worker, Faith based member like church members, CSOs	Reports the case and perpetuator immediately to nearby Local Council, Contractor's supervisor, Probation Officer/ CDOs and Police for further action. Liaises with other actors and ensures that the survivor gets support services such as medical care and check-up, counselling and other basic needs such as food. Follow-up the case with LCs, Police, health services and courts of law.	Refers the case to Police for further investigation.
Police	• Investigates the case, • Signs the PF3 forms and other sources of evidence to support court proceedings, • Supports the child survivor to access required support services and evidence such as a medical report.	Refers the case to State Attorney for committing the perpetuator to courts of Law for hearing and sentencing
Designated Medical Centre	• Medical Examination for bodily harm or other injuries caused, • Produces medical report for police investigations and other evidence for the courts of law, • Provides medical care for the victim survivor to ensure recovery.	Reports to the Police and to the Courts of Law as evidence against the perpetrator.
Probation and Social Welfare Officer/ CDO	• Assess the needs of the survivor/victim and refers the victim to services providers for appropriate support services, •	Reports to Police

Stakeholder	Action and support to be provided	Where the case should be Referred?
	Collects data and information on the victim for processing and management	
Courts of law	• Hears the case, decides on support services to the child survivor or the parents of the child victim, • Sentences the perpetrator according to the existing laws regarding the case.	Commits the person found guilty to serve his/her sentence and orders for any care and support to be provided to the victims
Prison	• Ensures that the person found guilty serves his/her sentence, • Person is rehabilitated.	Freed at the end of serving the sentence.
Contractors	Ensure workers are well screened for VAC&GBV before employment with involvement of LC and Police Ensure workers files and background information is on file for future references Ensure workers are trained in company policies specifically on VAC & GBV VAC & GBV Tool box meetings organized Ensure that there is a site clinic and medical service provider for workers and other victims on referral by the site clinic Have MoU with Police to expedite any investigations and trainings Create awareness to the communities on VAC & GBV risks and referral pathways Cooperate with law enforcement agencies and officials in detecting, investigations and managing VAC & GBV cases Provide any other relevant support to victims	Refer all allegations of VAC & GBV to the Supervising Consultant, VAC&GBV Consultant for independent investigations and reporting to Uganda Police

Stakeholder	Action and support to be provided	Where the case should be Referred?
Local Government (CDOs and other relevant Officials)	Monitors cases of any GBV/VAC allegations on the project Participate in GBV&VAC sensitizations to project workers and communities Provides technical guidance to contractors and communities on any referral pathway for a specific incident Maintains a directory of services providers (Government and Civil Society Organizations) for survivors and victims Links victim and survivors for more support to existing service providers Follows up on the progress of judicial processes for the suspects	Refers to Uganda Police and existing service providers to victims and survivors of VAC & GBV
MWE	Ensure that the Civil works contracts have strong penalties for contractors and workers involvement in VAC & GBV Provides effective orientation of contractors and their staff on safeguards management on the project Deploys dedicated service provider for VAC& GBV on the project sites Monitors VAC & GBV cases in the community and assesses any cases involving the contractors and their workers Provides reports to World Bank on any incidents related to VAC & GBV within 48 hours; provides root cause analysis (RCA) and safeguards correction action plans (SCAP) Make follow up to ensure that all cases are judiciously managed Liaise with other MDAs to ensure appropriate actions to the VAC & GBV victims and offenders	Ensures zero occurrence of VAC cases in relation to the Project.

Reporting form for VAC and GBV incidents on the project.

Part I: Details of the Reporter

Name of the Person reporting the case	Address: Location:	Date of reporting the case:
Designation and relationship with the child victim and survivor	Contact details; Tel. No (Landline): Tel. No (Mobile): Email:	Time of Reporting:

Part II: Details of Victim/ Survivor

S/N	Indicators	Details captured
	Name of the victim	
	Sex	
	Date of birth and Age	
	Residence	
	Contacts- telephone	
	Reference number	
	Nature/type of the alleged act of violence:	
	Location: where the incident took place	
	Number of times the victim has encountered such a form of violence	
	Other associated forms of violence the victim has encountered by the alleged perpetrator	
	Relationship of the victim with the alleged perpetrator	

	Impact of the act of violence on the victim i.e. physical, mental, health etc	
	Date or time frame of the act of violence	
	Witnesses (if any) and their observations and their willingness to appear in case of further investigations and their telephone contacts	
	Status of reporting (if there are previous efforts of reporting the case and the person/officer reported to	
	Measures or actions taken	
	Outcomes of the measures if any	
	Recommended actions and support services for the survivor/victim	
	Witnesses Name: Address: Contact number:	Describe the event as witnessed:
	Any other information found necessary to support the case- photographic or recorded evidence	
	Form compiled by: Name: ---------- Signature: ---------- -	Position---------- Date----------

Part III: Details of the alleged perpetuator

Notes		Attach all the necessary supporting information or documents and remember to retain a copy for follow-up
S/N	Indicators	Details captured
1	Name of the alleged perpetrator (attach a photo) if available	
2	Sex	

3	Age (if known)	
4	Residence	
5	Marital status	
6	Contacts- telephone	
11	Consent or non-consent of the perpetrator on committing the act	
12	Previous incidents of violence committed by the alleged perpetrator	
13	Measures taken by the duty bearers and other stakeholders against the perpetrator	
14	Outcomes of the measures if any	
15	Recommended actions against the perpetrator	
16	Any other information found necessary	
17	Form compiled by: Name: ---------- Signature: ---------- Position:---------- Date:----------	Contact details: Tel:----------Email:----------

ANNEX H: A LIST OF INVASIVE SPECIES ENCOUNTERED IN KIDERA WATER DISTRIBUTION AREAS

S/N	Family	Species	Lifeform	Status	Location			Impact	Purpose
					PL	RT	BH		
1	Amaranthaceae	Amaranthus spinosus	Herb	Invasive	0	0	1	Negatively affects production of annual, perennial, plantation, and forest crops	Leaves and young plants are collected for home consumption as a cooked, steamed or fried vegetable, especially during periods of drought
2	Asteraceae	Bidens pilosa	Herb	Invasive	1	1	1	It **reduces yield** because of its fast growth	The sap from the leaves is used to speed up blot clotting in fresh wounds, while the sap from the plant is used to help treat ear infections. The leaves are used to create a powder that's used to treat kidney problems, as a well as an herbal tea to help with flatulence.
3	Asteraceae	Chromolaena odorata	Liana	Invasive	0	0	0	Induces inconsistent responses of the soil C and N fractions	It showed anti-inflammatory, anti pyretic, analgesic, antimicrobial, cytotoxic and many other relevant medicinal properties in an appreciable scale

S/N	Family	Species	Lifeform	Status	Location			Impact	Purpose
					PL	RT	BH		
4	Asteraceae	Conyza sumatrensis	Herb	Invasive	0	1	0	Very high reproductive rate and invade moist deciduous forests, and interrupt successional processes	Leaf sap is used as a remedy for ophthalmia in the form of nose or eye drops. Nasal drops are also given in cases of vertigo and epilepsy. The leaves are made into cigarettes to treat tuberculosis and asthma. They may be used as a vegetable
5	Commelinaceae	Commelina benghalensis	Herb	Invasive	1	0	0	No residual **effect**.	used in the traditional medicine system for the treatment of various ailments like leprosy, sore throat, opthalmia, burns, pain and infammation and also used as de pressant, demulcent, emollient and laxative

S/N	Family	Species	Lifeform	Status	Location			Impact	Purpose
					PL	RT	BH		
6	Lamiaceae	Hyptis suaveolens	Herb	Invasive	0	0	1	None	Traditional population in several parts of the world to **treat inflammation, gastric ulcer and infection** and is used as a crude drug to relieve symptoms related with gastric ulcer or gastritis
7		Leonotis nepetifolia	Herb	Invasive	0	0	1	None	The leaves and stems decoction are applied topically as a treatment for eczema, skin infections and itchiness
8	Malvaceae	Sida acuta	Herb	Invasive	1	0	1	None	used for various purposes such as neurological disorders, headache, leucorrhoea, tuberculosis, diabetes, malarial and other fevers, uterine disorders, rheumatic problem, renal inflammation, asthma, ulcers, childbirth and worms,

S/N	Family	Species	Lifeform	Status	Location			Impact	Purpose
					PL	RT	BH		
9	Meliaceae	Melia azedarach	Tree	Invasive	0	0	1	The leaves, flowers, and fruits have been reported to result in toxic **effects** in animals	Used for medicinal purposes, including 18 skin conditions such as **acne, burns, carbuncles, abscesses, measles, pediculosis, cellulitis, and prickly heat**.
10	Poaceae	Imperata cylindrica	Herb	Invasive	1	0	1	Negatively affects production of annual, perennial, plantation, and forest crops	Used as thatch, short-term forage production, soil stabilisation and paper making
11	Verbenaceae	Lantana camara	Shrub	Invasive	0	0	1	**Induces ecosystems change over space and time**	**Herbal medicine** but other uses like providing a source of firewood, mulch, making hedges, and use as a source of microbicides, fungicides and nematicides, insecticides
12		Stachytarpheta indica	Herb	Invasive	1	0	1	Very high reproductive rate and invade moist deciduous forests, and interrupt successional processes	Leaves - cooked and used as a vegetable

ANNEX I: MINUTES OF THE STAKEHOLDER ENGAGEMENT MEETINGS AND CONSULTATIONS FOR KIDERA RGC, BUYENDE DISTRICT

JBN Solutions that last	MEETING WITH DISTRICT STAKEHOLDERS		
	DATE	04th February 2022	
	MEETING	START	10:10 am
		END	11:20 am
	MINUTES BY	Pascal Bithum	
Venue of meeting	Buyende District Local Government		
Subject of the Meeting	Stakeholder consultations on solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council Buyende District.		

A. Self-Introductions

Introductions were made by JBN team

The Consultant informed the district technical team about project, the ESIA preparations and the level of progress.

B. General concerns and views

- Created in 2009, Buyende is among the new districts in Uganda. The district social and development sectors are still nascent. The population in the district is young and growing at a fast rate. There are several mushrooming small towns, rural growth centers and landing sites with higher populations compared to the rural areas in the district that require access to social and public services such as water and sanitation. Buyende District needs numerous development projects to reach its full potential. Therefore, the rural water supply and sanitation projects proposed for Igwaya and Kidera Rural Growth Centres are highly welcome.
- Access to safe drinking water is a big problem in Buyende district, 62% of communities lack access to safe drinking water. The problem is greater in the budding small towns, rural growth centres and landing sites in the district. The selected rural growth centres, namely Igwaya and Kidera are the most affected. Although the Ministry of Water and Environment directed phasing out point sources of water in small towns, rural growth centres and landing sites, the main sources of water in these locations remains boreholes. The boreholes are only functional during the wet season and tend to dry up during the dry season. The rate of production of the boreholes is in itself not sufficient to cover the demand for water in these budding urban centres. Some boreholes have low yield while others produce hard and/or saline water. Other sources of water include valley dams and unprotected springs; whose water is not safe for domestic

consumption. The proposed project is therefore timely and will benefit the growing populations in Igwaya and Kidera rural growth centres.

- Coordination of the project among the consultants/contractors, Ministry of Water and Environment, District officials and village authorities should be emphasized.
- Community ownership of the project should be a key component enshrined in project development. The roles and responsibilities of district technical and political teams, town council's/ sub counties, parishes and villages authorities to support the functionality of the project should be defined throughout the project lifecycle.
- Access to proper sanitation in Buyende District is low. Communities in the district practice open defecation and many households do not own standard sanitation facilities, mainly latrines. Issues of sanitation, therefore, need to be streamlined on the project. Good sanitation strategies, such free conditional individual connections upon evidence of proper sanitation facilities (latrines) at household level should be prioritized as an incentive for increased ownership and use of sanitation facilities on the project.

C. Meeting closure.

The meeting ended at 11:20 pm

Meeting with Buyende District Officials on 4th February 2022

Meeting in CAO's office – Buyende District

	MEETING WITH KIDERA TOWN CON		
	DATE	15th February 2022	
	MEETING	START	11:30 am
		END	1:40 pm
	MINUTES BY	Pascal Bithum	
Venue of meeting	Kidera Town Council Officials		
Subject of the Meeting	Stakeholder consultations on solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council Buyende District.		

A. Self-Introductions

Introductions were made by JBN team

The Consultant informed the Town Council technical team about project, the ESIA preparations and the level of progress.

B. General concerns

- The project should ensure the security of the people of Kidera Town Council from migrant workers during the project construction phase
- For recruitment of skilled and unskilled labor on the project, priority should be given to the youth in Kidera Town Council.
- Communities (local authorities such as the LCI) should be engaged on recruitment of locals for available jobs, security of project resources and sourcing of local materials

Therefore, commonly asked questions were;

1. Who will pay the cost of extending water to households? and how much is it likely to cost?
2. How much will a unit of water costs?
3. Who will manage the operations and maintenance of the water system and sanitation facility?
4. What is the project coverage in Kidera Town Council?
5. Will there be compensation for land take on the project?

C. Reaction from the consultant

- The pricing of water on the project is discussed in the project feasibility reports and will be discussed further during the ESIA studies for individual RGCs.

- The proposal for the piped water systems to be managed by the Eastern Umbrella of Water and Sanitation will be discussed further in the ESIA
- The ESIA will assess available jobs on the project and make recommendations on employment of skilled and unskilled community members
- Compensation will be discussed after undertaking a Resettlement Action Plan for the project

D. Meeting closure.

The meeting ended at 1:40 pm

JBN Solutions that last	Community engagement meeting		
	DATE	7th May 2022	
	MEETING	START	10:10 am
		END	11:13am
	MINUTES BY	Pascal Bithum	
Venue of meeting	Kidera Trading Centre		
Subject of the Meeting	Stakeholder consultations on solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council Buyende District.		

Agenda:

1. Self-Introductions
2. Introduction of the project

3. Communication from community members
4. Consultants' response
5. Closure

A. Self-Introductions

Introductions were made by JBN team

The Consultant informed the stakeholders about the ESIA preparations for the solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council Buyende District.

The meeting was jointly shared with community residents of Kyauka, Kitete, Kiwambya, Ngulamubiri, and Kidera in the presence of the respective Parish Chiefs.

Thereafter, enumerators moved to the respective villages to further interact with residents.

B. Reaction from community members

- The community expressed concern on the deceitful people who have continuously given them false hope on water supply in their area and it is hard for them to discern if the project will successfully be implemented.
- There is limited water at Kidera Health Centre IV as during the dry season, patients are required to buy water from water vendors at a fee of UGX 1000 for a 20 litres jerrycan .
- Most of the nearby villages within Kidera parish share water from the seasonal borehole located in Kidera H/CIV with the Health Centre patients and staff. Besides the seasonality of the water, the water is said to be saline.
- Kidera trading centre is densely populated with slums and therein a few sanitation facilities. The district provided only one pit latrine which can not serve the huge population hence more sanitary facilities are required.
- The community complained about poor solid waste management in mainly the trading centre especially Kaveera that has claimed lives of livestock in the area. Measures should be put in place to mitigate the issues of solid waste management.
- The youth community requested to be offered opportunity work as casual labourers and play a role in the development of their community

Therefore, commonly asked questions were;

1. How soon will the water supply process start?
2. Is the piped water going to be at a cost or free? If yes how much will be charge per jerrycan?
3. Will the community member be considered for job opportunities?

4. Are people's land going to be affected? If yes, will they be compensated?

D. Reaction from the consultant

- Studies are on-going to get the in-depth understanding of the project area, including social views and concerns for the project to ensue.
- There will be a fee charged on water as a measure to maintain water supply in the communities
- At the time of recruitment, community members will be considered of opportunities at local area leader's recommendation
- The transmission mains are to pass through road reserves, and RAP team will assess where compensation is required.

D. Meeting closure.

The meeting ended at 11:13 am

Enumerators collecting data from some of the residents in Kidera trading centre

JBN Solutions that last	Community engagement meeting		
	DATE	7th May 2022	
	MEETING	START	11:39 am
		END	12:50pm
	MINUTES BY	Pascal Bithum	
Venue of meeting	Nakibengo Village		
Subject of the Meeting	Stakeholder consultations on solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council Buyende District.		

Agenda:

6. Self-Introductions
7. Introduction of the project
8. Communication from community members
9. Consultants' response
10. Closure

A. Self-Introductions

Introductions were made by JBN team

The Consultant informed the stakeholders about the ESIA preparations for the solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council Buyende District.

The meeting was shared with community residents of Nakibengo, coordinated by the area LC1 chairperson and Parish Chief of Kidera. Thereafter, enumerators moved to different parts of the village to further interact with residents.

1. Reaction from community members

2. The community had lost hope on water supply since the first chosen abstraction point was covered the flooding emanating from the rise in the water table of L.Kyoga. They are thrilled however, with the continuous assessments especially there involvement in the study.
3. The community collects water from open water sources with which they share with their livestock. Water supply will improve the quality and access to clean water.
4. There is a community borehole that brokedown and residents suggested that as the project is being implemented, the borehole should as well be repaired in order to supplement water supply.
5. Some community members raised concerns on whether the water yields from the borehole will be able to supply the huge demanding population.
6. The chairperson LC1 Nakibengo also raised concerns on whether land owners at the abstraction point will be compensated, and what procedures will be followed.
7. The youth in Nakibengo requested to be offered job opportunities to do casual labour rather than offering the jobs to external workers
8. People raised concerns on the location of sanitary facilities, saying Kider trading centre is far from them as a reason, they a toilet should be constructed in Nakibengo Trading centre.

Therefore, commonly asked questions were;

1. Where shall we go to apply for job opportunities?
2. How can one have water extended to their house?
3. How much money will be charged per jerrycan?
4. What will be the payment procedure for the use of water?

C. Reaction from the consultant

- Studies are on-going to get the in-depth understanding of the project area, including social views and concerns for the project to ensue.

- There will be a fee charged on water as a measure to maintain water supply in the communities and this will be discussed in the feasibility study
- At the time of recruitment, community members will be considered of opportunities at local area leader's recommendation
- After project implementation, a water office will be installed to manage water supply and maintenance, therefore consultation can be made with then

D. Meeting closure.

The meeting ended at 12:50 pm

Community meeting with some of their area residents in Nakibengo village

	Community engagement meeting		
	DATE	23rd Feb 2022	
	MEETING	START	10:00 am

		END	11:30am
	MINUTES BY	Pascal Bithum	
Venue of meeting	Kabugudho Primary School		
Subject of the Meeting	Stakeholder consultations on solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council Buyende District.		

Agenda:

1. Self-Introductions
2. Introduction of the project
3. Communication from community members
4. Consultants' response
5. Closure

A. Self-Introductions

Introductions were made by JBN team

The Consultant informed the stakeholders about the ESIA preparations for the solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council, Buyende District.

The meeting was shared with teachers and pupils in the school.

- **Reaction from community members**
- The staff teachers welcomed the project and were very happy to share all the necessary information they had for the success of the project
- The head teacher informed that they have a school borehole which is 50 meters from the school but shared with the community members hence long lines and this affects the performance of pupils since sometimes water is fetched during class hours however much the assigned time for fetching water is before and after classes.
- The school teachers informed that there is a challenge of pupils fighting from the borehole due to most of them wanting to be the first to fetch
- They informed that pupils are unhappy when they are told to fetch water because they have one borehole and some community members always fetch first before the children and they have to wait for their elders to go first.so due to congestion at the borehole and fights, children's safety is minimized.

- The teachers raised a concern of child labor especially on Friday's pupils fail to attend school because it is a market day and they have to help their parents with fishing, digging and market vending.
- Teachers informed that children come late and others miss school because they have to first fetch water for home use.
- The teachers informed that animals and people use the same water source which can result in to diseases like dysentery, cholera and others
- They informed that pupils especially girls fail to complete schools since they are forced into early marriages and others drop out due to early pregnancies.
- The school teachers informed that water fetched is usually for bathing, washing, drinking and on a daily basis they fetch 50 and above jerrycans although the school kitchen has someone assigned for fetching water in that department not pupils.
- The teachers informed that they have a hand washing facility at school. He narrated that the school has six toilets,2 for boys and 3 for girls where by girls share with teachers.
- The head teacher shared that they have both senior woman and man who help in sensitizing the pupils about puberty, dangers of early pregnancies, HIV Counselling and other topics.
- The head teachers informed that the school performance is increasing because of the increase in number of teachers in 2019 they had 10 teachers but now they have 13 of which 3 are female and 10 are male. He emphasized that the commitment which parents have in paying and encouraging their children to study has boosted the school performance and competition pressure from the nearby schools has gradually contributed to better performance.

D. Meeting closure.

The meeting ended at 11:30 am

Community meeting with Teachers in Kabugudho Primary School

JBN Solutions that last	Community engagement meeting		
	DATE	23rd Feb 2022	
	MEETING	START	11:45 am
		END	1:30 pm
	MINUTES BY	Pascal Bithum	
Venue of meeting	Kabugudho Trading Centre		
Subject of the Meeting	Stakeholder consultations on solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council Buyende District.		

Agenda:

1. Self-Introductions
2. Introduction of the project
3. Communication from community members
4. Consultants' response

5. Closure

A. Self-Introductions

Introductions were made by JBN team

The Consultant informed the stakeholders about the ESIA preparations for the solar powered piped water supply and sanitation facilities in Kidera RGC, Kidera Town Council Buyende District.

The meeting was shared with community residents of Kabugudho A, Kabugudho B and some from Nabweyo, coordinated by the area local council chairperson. Thereafter, enumerators moved to the respective villages to further interact with residents.

- **Reaction from community members**
- The Community members welcomed the project and appreciated the ministry of water for the development coming in Kidera and Kabuguudo A in particular
- The community members informed that they spend a lot of time at the borehole like 2 hours of which they always have to do others chores like washing, cooking and others hence water fetching is time consuming
- They informed that in Kabuguudo A they have about 500 households which is close to 1200 population and they all share one borehole which brings about congestion due to high population depending on a single source.
- The community members stressed that they have only one borehole which is located in 100 meters from Kabuguudo trading center and it is shared with 5 LCs like Nabweyo A, Bwinakwita, Kabugudo main, Kabugudo B and Kamasila.
- The one borehole in Kabuguudo A was constructed in 1995 by Buwasa company up to date, there isn't any other water source in the area. The community member mentioned that they had a dam which dried up 3 years back.
- The community members informed that animals and households share the same water source hence leaving it dirty which is too challenging and during dry season it becomes very tough since water becomes scarce.
- Members informed that they don't have water vendors in their area so everyone has to fetch by themselves.
- The community members informed that 90% homesteads own toilets which has boosted good hygiene in their area.
- They informed that they don't own boil water, they just take it as it is
- The community shared a problem of girls getting pregnant when they go to fetch water.
- They informed that they are willing to pay some little money for piped water because even for the borehole they usually pay 600 shillings every for maintenance.

- The. community members had fear of water treatment when piped water comes thinking that such chemicals might be dangerous to their health in a long run
- The community informed that they do not have forests and wetlands
- The community members showed a concern about compensation for those people whose land would be affected by water pipes

E. Meeting closure.

The meeting ended at 1:30 pm

Community meeting Local leaders and some of community residents in Kabugudho trading centre