



Republic of Uganda

Ministry of Water and Environment

INTEGRATED WATER MANAGEMENT AND DEVELOPMENT PROJECT

**ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE
PROPOSED LARGE SOLAR POWERED PIPED WATER SUPPLY AND SANITATION
SYSTEMS IN GASPA RURAL GROWTH CENTRE, KIRYANDONGO DISTRICT**



ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT

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AUGUST 2022



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MAMBO BADO,
NAKAWA DIVISION, NAKAWA DIVISION,
LUZIRA, KAMPALA

NOTICE DT-2074
Notice Date :
Taxpayer BRN
Taxpayer TIN
1000343951
Payment Registration Number
2230000675058



Payment Registration Details

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY -> ENVIRONMENT IMPACT			
Tax Head : ASSESSMENT -> FEES PAYABLE ON PROJECTS -> Total value is more than 2.5bn but does not exceed 5bn-EIA Submission fees			
Amount (In UGX) :	673,045	Base Value (In UGX) :	0.00
Gross Amount :	2,991,306,694.00	Identity Proof Type :	NA
BPAF Serial Number :	NA	Identity Proof Number:	NA
Application Reference	GASPA WATER SS	Reference Date :	18/07/2022
Country Of Registration:	-		

CHEQUES ONLY

Bank	Cheque No	Amount (UGX)
ISm	101293	673,045

Amount in words: Six hundred and seventy three thousand, forty five only

Three thousand, forty five only

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Currency	Amount
50,000/=	
20,000/=	
10,000/=	
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500/=	
200/=	
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PLOT M 193/4 NAKAWA INDUSTRIAL AREA, URA TOWER, 8TH FLOOR, KAMPALA

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LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
EHS	Environment Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FDG	Focus Group Discussions
GBV	Gender Based Violence
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HC	Health Centre
IUCN	International Union for the Conservation of Nature
IWMDP	Integrated Water Management and Development Project
KII	Key Informant Interview
MBGL	meters below ground level
MoGLSD	Ministry of Gender, Labour and Social Development
MWE	Ministry of Water and Environment
MoH	Ministry of Health
NEMA	National Environment Management Authority
NUWS	Northern Umbrella of Water and Sanitation
NGOs	Non-Government Organization
OHS	Occupational Health and Safety
OPM	Office of the Prime Minister, Government of Uganda
PCR	Physical Cultural Resources
PLA	Participatory Learning & Action
RAP	Resettlement Action Plan
RGC	Rural Growth Centre
RWC	Refugee Welfare Council
SEA/SH	Sexual Exploitation and Abuse and Sexual Harassment
SEP	Stakeholder Engagement Plan
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	United Nations High Commission for Refugees
UTM	Universal Transverse Mercator
VECs	Valued Environmental Components
WASH	Water, Sanitation and Hygiene
WCS	Wildlife Conservation Society
UCSAP	Uganda Climate Smart Agricultural Project

EXECUTIVE SUMMARY

The Ministry of Water and Environment (MWE) together with National Water and Sewerage Corporation (NWSC) are implementing the Integrated Water Management and Development Project (IWMDP) with funding from the World Bank and Government of Uganda. The project aims at improving access to water supply and sanitation services, capacity for integrated water resources management and the operational performance of service providers. Under component 1.2 of the IWMDP, districts that host about 70% of refugees will be supported with provision of piped water supply and sanitation services. The target areas include Yumbe, Arua, Moyo (including Obongi district newly created from Moyo), Adjumani in West Nile, Lamwo in Northern and Kiryandongo in Central Uganda. In Kiryandongo district, there will be 3 large solar powered piped water supply systems and 10 public toilets to serve both refugee and host communities located in 3 Rural Growth Centres (RGCs) namely Nyakabaale, Gaspa and Mutunda. As a requirement, MWE contracted JBN Consults and Planners Limited to undertake the Environment and Social Impact Assessment (ESIA), in accordance with the National Environment Act, 2019 and the World-Bank Safeguards policies.

The ESIA studies were conducted between November and December 2021. It was aimed at preparing a framework to ensure that environmental and social impacts and risks accruing from the proposed infrastructure are identified and mitigation measures put forward. Basing on the ESIA findings, the proposed IWMDP project triggered several WB-OPs namely – Environmental Assessment (OP4.01), Natural Habitats (OP4.04), Physical Cultural Resources (OP 4.11), Involuntary Resettlement (OP4.12). This report therefore presents the findings of the ESIA exercise undertaken by the Consultant to assess the likely environmental and social impacts of the proposed project in Gaspa RGC.

The proposed project will be located in Gaspa RGC (Kibeka, Kyembera, Ranch 37 and Southern parishes) in Kiryandonga Sub County, Kiryandongo Refugee Settlement and Bweyale Town Council in Kiryandongo District. It will cover a core beneficiary area of 5 parishes and 8 villages. By design, the project will have 2 water sources (2 borehole DWD 77380 with 37.0m³/hr yield; and DWD 77381 with 85.7m³/hr yield). It will have other components namely - a submersible pump and pump house, transmission mains, a storage reservoir with 200m³ capacity (cold pressed steel tank elevated on steel tower), distribution network (17,920m in length; 200 start-up domestic connections including yard taps; 25 new public stand points, PSPs), 2 VIP Latrines at Nyakataama primary school and Kalwala primary school, waterborne public toilets in Gaspa trading centre and Magamaga Market, intensification lines and a DOSATRON online proportional chemical dozer. The electricity supply at the water sources will comprise of multi crystalline PV solar panels rated at 280pW 24 Volts DC cells with a control unit and other system support structures. There is no hydroelectricity in the Project Area, however, erection of poles is underway to extend the national electricity grid which will be tapped into to power up the electric components of the system. The Northern Umbrella of Water and Sanitation (NUWS) is proposed to operate and manage the water supply system. The project has a Capital Investment Cost Estimate of US\$ 2,991,306,694 (Exclusive of VAT and Contingency). The ESIA team assessed the baseline conditions in all the site locations, engaged stakeholders and identified impacts and risks, as well as alternatives to the design and ESMP.

The Physical Environment baseline conditions show that the project area lies in Kamudini catchment in the Upper Nile Water Management Zone. It's generally a plateau land with an average elevation of 1,295 meters above sea level. It has a bi-modal rainfall pattern with an annual long-term average rainfall of 1200mm. The area is divided into three major climatic zones of high, medium and low rainfall. The drainage system consists of extensive wetlands, predominantly Nanda which drains eastwards towards the Victoria Nile, the largest surface water source in the district.

The soils are mainly sandy loam soils, a number of rocky/stony patches, with observable Laterite rock outcrops while some areas are loose due to modification by agricultural activities hence susceptible to erosion. The hydrogeology is characterised by crystalline bedrocks of the Precambrian era containing water in fractures and fissures. The aquifer is constituted of weathered Precambrian formation (regolith) the potential of which is greatly enhanced by the under laying fractured crystalline bedrock of the same age. The average annual rainfall of the area is approximately 1,400 mm per annum, approximately 10% (140mm) of which recharges the aquifers annually. The groundwater flows in the same manner as surface water, westerly towards Victoria Nile in the northern parts, while In the southern parts, it flows south towards Gaspa and then to Victoria Nile. The air quality baseline measurements for Particulate matter, NO₂, SO₂, CO and VOCs were within the required limits except for PM10. Noise levels were above the maximum permissible noise limits for Gaspa Trading Centre, Goshen Primary School, Tecwa Primary School, Panyadoli HC III and Canrom Primary School and this was mainly attributed to the vibrant human activity in the area.

The Biological Environment studies undertaken at the borehole site, reservoir and water supply network corridors (covering about 1.86 km² of the project area of influence) indicate that there are 150 plant species distributed among 36 families in the project area. Seven of the encountered species were identified as invasive. Out of the 150 plant species encountered, one species: *Mondia whitei*, is listed as vulnerable on the IUCN Red list of Uganda of 2016. There are 11 butterfly species of least concern representing four families. Five species of amphibians, listed as species of least concern (2 toads and 3 frogs - all representing three families and three genera). Seven reptile species, listed as species of least concern, were recorded during the survey. Three species were lizards and four species were snakes. Thirty-four species of birds were positively identified, representing 20 families and 31 genera. All the bird species were listed as species of least concern. Five mammal species, listed as species of least concern, belonging to four families and four genera were registered in the project area.

The Socio-Economic baseline conditions indicate that the area Kiryandongo Sub County in which Gaspa RGC is located has a total population of 80,357 people (40,621 males; 39,736 females) living in 15,377 households. The area has an average household size of 5.2 which is slightly higher than the country's average household size of 4.7. The population density (people /km²) is at 123, the lowest in Kiryandongo district (Bweyale TC at 852; 805 in Kigumba TC; 498 in Kiryandongo TC; 405 in Kiryandongo refugee settlement; 183 in Kigumba SC). 75.1% of the population are dependent on subsistence farming as their major occupation. It was noted that water scarcity is rampant and directly linked to incidence and prevalence of water related diseases. Between 2015 – 2021, there were 365,549 reported cases (OPD) for diseases and illness related to Cough or Cold, Malaria,

Diarrhoea, Intestinal worms, Gastrointestinal Disorders, Pneumonia, STIs, GBV related injuries, Typhoid, Stomach Aches, HIV/AIDs, Covid19 (DHO/HMIS2, 2015-2021). However, the burden of water related diseases is likely to reduce due to provision, access and utilization of safe and clean water.

Secondary data from MWE / Water Atlas 2016 showed that access to safe water in Kiryandongo district stands at 71%, with rural access at 77% and urban access at 48%. Within Kiryandongo SC, there are 776 domestic water points which serve about 230,429 people. By type of technology, 58% of household population are served by deep boreholes, 40% by shallow wells, 2% by protected springs and none by rain water harvest. From a gender perspective, women and children take a heavy burden of full-filling productive roles at household and community level, and this mainly involves collection of water, and other related tasks. This exposes them to extreme vulnerability.

Further still, in order to obtain timely baseline data, the ESIA team conducted a socioeconomic survey. Findings of the survey indicate that 65.5% of the households (HHs) walk a distance of more than 500 meters to nearest water source; 5.1% move 300-500 meters; 15.5% move 100-300 meters and 13.9% move less than 100 meters. In terms of time for water collection, 37.8% of the households collect in the morning hours between 7.00am and 10.00am; 31.1% collect between 10.00am-2.00pm; 28.4% between 2.00pm-7.00pm; 2.7% between 5.00am-7.00am. About 54.1% households spend at least 1 hour waiting at a water source point; 29.7% spend between 2-4 hours; 10.8% spend less than 30 minutes and 5.4% spend 2 hours. In many of the health facilities, there is no water within all treatment wards and in waiting areas. This implies a lower status of WHO minimum standards for water, sanitation and hygiene services in health facilities. Much as the World Bank has supported some education facilities with rain water harvesting tanks, in most of the schools there is no reliable source of water, no menstrual health facilities such as private rooms, sanitary pads, disposal pits, etc. Additionally, much as latrine coverage is low, the uptake of water borne toilets and septic tanks will increase upon completion of piped water supply. It's also anticipated that there will be an increase deliberate emptying of faecal sludge into storm drainage and swamps and this will consequently cause environmental and health-related problems. The operation and maintenance of the solar piped water system may invoke local governments and refugee administration units to enforce and/or pass new laws and regulations regarding eligibility of connections, operation and maintenance.

Potential Impacts were identified as well. The positive impacts of the project include -a) improving the living standards and the wellbeing of the residents of Gaspa RGC through increased provision of safe water within an easy reach of the household and boosting the pipe water supply; b) creation of employment opportunities (both direct and indirect) for local people especially youth and women; c) reduced incidences of diseases; d) reduced domestic violence; e) improved education outcomes; f) improved on-site supply of water in health care facilities (WinHCF); g) benefits to the local economy and transfer of skills and technology among others. The identified negative impacts were categorized into those affecting the physical, biological and human environments. The major impacts included social misdemeanour and conflicts due to influx of immigrant labour, gender-based violence, contraction and spread of COVID 19, occupational health and safety risks and depletion of ground water resources. The identified moderate impacts

included soil erosion, loss of fauna habitat, destruction of vegetation, solid waste generation, reduced traffic safety, loss of land, child labour and destruction of physical cultural resources. While, the minor impacts included land use cover change, noise and vibrations, and air pollution.

The ESIA also conducted an Analysis of Alternatives with the primary objective of determining the best economic, environmental and social option of the project. These included; (i) the “No Project” alternative and an analysis on (ii) alternative project sites, and (iii) alternative technology. The No Project alternative would result in avoidance of the negative environmental and social impacts predicted to accrue from the project. However, the existing poor water supply and sanitation in the area would continue to exist. Therefore, No Project Alternative would be the least preferred from the socio-economic perspective because the population would not get the much-needed potable water supply and sanitation services. The analysis of alternatives project sites and technology focused on different alternative water sources including surface water from the Victoria Nile were considered, different water treatment methods and alternative sanitation systems. With the pros and cons of each analysed to inform the selection process, options were considered based on the environmental and social acceptance, and the cost and the skills requirement for operation and maintenance of the technology.

In terms of Stakeholder Consultation and Information Disclosure, relevant and adequate project information were provided to stakeholders to enable them to understand the project risks, impacts and opportunities so as to allow them to participate in the project and offer comments. The methods of consultation such as interviews, in-depth interviews and Focus Group Discussions and questionnaires were used to consult the following stakeholders: - The district technocrats consulted included; Chief Administrative Officer (CAO), District Planners, District Education Officer, District Environmental Officer, District Water Officer and the District Community Development Officer. At local level, the LC. 1 Chair persons of Kalwala, Mirima, Gaspa, Tecwa, Ndoyo, Kitwanga and Kitongozi communities as well as residents within the Project Impacted Areas were consulted. The consulted stakeholders at all levels endorsed the project. They perceive the project as a source of employment, an opportunity to improve access to safe and clean water, improvement in hygiene and sanitation particularly in Gaspa RGC, improvement of health and the elimination of water borne diseases, increased revenues and incomes. However, they noted that the project might displace people from their land without adequate compensation and, insecurity might result because of influx of migrant workers. The views of the stakeholders were considered when identifying project impacts and development of mitigation measures.

The assessment of project environmental and social impacts considered identification and analysis of positive and negative impacts expected from all the project phases. For positive impacts, enhancement measures were recommended in order realise maximum benefits from these impacts. The major positive impacts identified were: Social acceptability, community involvement and ownership of the project before project construction, short-term employment opportunities for local communities during the construction phase, and improved / increased access to safe and clean water within communities, improved public health conditions and health security, reduction in gender-based violence, improved education outcomes due to access to safe water in schools and early childhood development centres, improved provision and utilization of

water services among Internally displaced persons and refugees in ranch 18 (Abaduda area), reduced extreme water vulnerabilities among rural and urban host and refugee communities, rural transformation through improved living conditions (reliable and affordable piped water supply) and improved local governance and social accountability during the operation phase of the project.

The analysis further indicated that there were no major negative impacts expected from the project for both the construction and operation phases, except for depletion of groundwater resources that may arise from water over abstraction as a result of increased demand of water in the RGC. This impact will, however, be mitigated by acquiring abstraction permits from DWRM to facilitate adherence to agreed rates of abstraction, and limiting issuance of abstraction permits in the project vicinity, ground water level monitoring, and developing and implementing a catchment management plan for the Victoria Nile in which the project lies and a source protection plan specific to the project water sources.

Other analysed project negative impacts include moderate rated impacts (generation of solid waste, increased risk of road accidents, influence on child labour & young worker (14-17 years), risk of sexual exploitation and abuse and sexual harassment, risk of contracting and spreading covid-19, and destruction of physical cultural resources), and minor rated impacts (impacts on land use/cover and ownership, deterioration of landscape and visual aesthetics, susceptibility to soil erosion, loss of vegetation cover, loss of habitat for fauna, disturbance and degradation of wetland ecosystems, noise and vibrations, and air pollution) for the construction Phase, and moderate impacts (risk of pollution from mismanagement of sanitation facilities and loss of jobs for water vendors) and minor impact (solid waste generation, increased cost per unit / reduced affordability and Occupational Health and Safety Risks) during the project operation phase.

Cumulatively, over abstraction of water due to increased water demand leading to depletion of ground water resources may also be expected. However, similar to the operation phase major impact, the same mitigation measures are recommended to sustainably manage the ground water aquifers.

Furthermore, an Environment and Social Management Plan (ESMP) was prepared that elaborates the measures to be implemented in order to mitigate or optimize the project's identified potential impacts identified and for each measure, responsibilities and costs are provided. Additionally, an Environmental and social management monitoring plan (ESMP) was prepared in order to ensure that mitigation measures are effectively implemented. It considered key monitoring indicators which include (but not limited to) - Vegetation loss and remedial restoration measures instituted; Noise, and air pollution control measures in place and how they operate; Erosion control measures; Control measures for traffic accidents; OHS measures for workers; Public health observance; Solid waste management measures; Employment opportunities; Gender Based Violence; Sexual Exploitation and Abuse (SEA) and Defilement; Violence Against Children (Child Labour); Control of Spread of COVID 19; and HIV/AIDS interventions and related sexual behaviours among workers Labour recruitment and GBV aspects.

In conclusion, the proposed development of a water supply system and sanitation facilities in Gaspa RGC, Kiryandongo District will improve the capacity to deliver effective Water, Sanitation

and Hygiene services to the refugee and host communities of the district. The benefits to the local economy will be in addition to reduced morbidity, increased enrolment of children in educational institutions, increased productivity of households and reduced incidences of domestic violence. The positive outcomes of implementing the project will infer positive change to the climate change, gender, health and educational vulnerabilities associated to water supply in the area. The negative environmental and social impacts of the proposed project in both the construction and operation phase can be mitigated through implementation of the provisions in the ESMP to address stakeholder concerns, so as to have a minimal or no effect on the natural environment as well as cultural and social functions and processes of the project affected communities. The project is an intervention of the Central government (MWE) with support from the World Bank that will require collective action from stakeholders such as the Local government and regional actors in the WASH sector for its effective implementation. MWE will spear head the supervision of the construction contractor and the operator to ensure negative impacts from the project are minimised. This should entail among others, undertaking of annual environmental and social audits following provisions of the ESMP to ensure continuous improvement of the project's processes and products.

1 INTRODUCTION

1.1 BACKGROUND

The Ministry of Water and Environment (MWE) together with National Water and Sewerage Corporation (NWSC) are implementing the Integrated Water Management and Development Project (IWMDP) with funding from the World Bank and Government of Uganda. The Project Development Objective is to improve access to water supply and sanitation services, capacity for integrated water resources management and the operational performance of service providers in project areas. In particular under Component 1.2, IWMDP provides support to Refugee and Host Communities, with financing from the IDA 18 Refugees Sub-Window. The sub-component supports activities designed to improve the sustainable provision of water supply and sanitation services to refugee settlements and host communities. The sub-component's target districts where about 70 percent of the refugees in Uganda are being hosted are: Yumbe, Arua, Moyo (including Obongi district newly created from Moyo), Adjumani in West Nile, Lamwo in Northern and Kiryandongo in Central Uganda.

MWE proposes to implement 3 large solar powered piped water supply systems and sanitation facilities in refugee settlement and host communities of Kiryandongo district. The Ministry contracted JBN Consults and Planners to undertake the Environment and Social Impact Assessment (ESIA), in accordance with the National Environment Act, 2019. This report therefore presents the findings of the ESIA exercise undertaken for the proposed water and sanitation system in Gaspa Rural Growth Centre (RGC). The Consultant assessed the likely environmental and social impacts of the proposed project in line with the Guidelines for Environmental Impact Assessment in Uganda” (NEMA, July 1997), the National Environmental Impact Assessment Regulations, 2020 and the World Bank environmental and social safeguards policies.

1.2 PROJECT JUSTIFICATION

Uganda is the principal refugee hosting country in Africa and one of the top five in the world. According to the United Nations High Commission for Refugees (UNHCR)/ Office of the Prime Minister (OPM) data¹, by 30th September 2021, Uganda was host to 1,524,352 refugees, of which 72,833 (about 4.8% of the total refugee population) were living in Kiryandongo District. With a total population of about 322,300 individuals, Refugees make up about 23% of Kiryandongo District's population. The current large inflow of refugees into the district has exerted substantial stress on the social infrastructure and services. As such, there are exceptional constraints on the district's capacity to deliver effective Water, Sanitation and Hygiene (WASH) services to the refugee and host communities, giving rise to the need for collective action from the Central government and development partners to address the WASH challenges therein.

In order to address the water supply and sanitation gaps in Kiryandongo District, 3 solar powered piped water supply systems and 10 toilets have been proposed. These water supply and sanitation infrastructure will be implemented in the RGCs of Nyakabale, Gaspa and Mutunda as part of the strategy to improve access to clean water, improved sanitation and hygiene in the refugee settlements and host communities.

¹ <https://data2.unhcr.org/en/country/uga> (Accessed on 9th November 2021)

1.3 RATIONALE OF ESIA

The National Environment Act, 2019, section 113 (1) requires that, any developer who proposes to undertake a new project which falls within Schedule 5 of the Act is required to undertake an Environmental and Social Impact Assessment (ESIA) as prescribed by and reiterated in the National Environment (Environmental Impact Assessment) Regulations 2020, section 3(a)(ii). The proposed development of water supply systems and sanitation facilities in Kiryandongo District are under the categories of “Utilization of Water Resources and Water Supply” as well as “Waste Management Facilities” which are listed under schedule 5 section 4 (i) and schedule 4 Part 2 section 9(d) respectively of the Act, that requires mandatory environmental and social impact assessment before implementation. Therefore, an Environmental and Social Impact Study was conducted before approval of the proposed project activities by the National Environment Management Authority (NEMA) for implementation.

Furthermore, this ESIA was carried out in pursuance of the World-Bank Safeguards policies {Environmental Assessment (OP/BP/GP 4.01), Natural Habitats (OP/BP 4.04), Physical Cultural Resources (OP 4.11), Involuntary Resettlement (OP/BP 4.12) etc.} for investment project financing and the World Bank Group Environmental, Health, and Safety (EHS) Guidelines. This project falls under Environmental Assessment Category B given that Environmental and Social impacts are localized, site specific and small to moderate in scale.

1.4 OBJECTIVES AND TECHNICAL SCOPE OF THE ESIA

The consultant undertook ESIA studies for the proposed development of water supply systems and sanitation facilities in Gaspa RGC, Kiryandongo District. The overall objective of the assignment is to detail the potential adverse bio-physical and socio-economic impacts of the proposed Water Supply and Sanitation System and propose mitigation measures.

In undertaking this assignment, the consultant aimed to provide the following:

- (i) Description of the Policy, Legal and Regulatory Frameworks;
- (ii) Description of the Administrative/Institutional framework;
- (iii) Description of baseline environment and social conditions of potentially affected areas, including a detailed environmental and social baseline;
- (iv) Description of project's potential impacts, including (direct, indirect and cumulative impacts);
- (v) Identification and analysis of project's potential impacts (positive and negative) and recommendation of feasible measures to avoid, minimize or mitigate the negative impacts and severity;
- (vi) Propose mitigation measures, assess their expected effectiveness and any residual enhance the positive impacts;
- (vii) Analysis of proposed alternatives identified during the feasibility study;
- (viii) Evidence based meaningful public consultation/Stakeholder engagement and disclosure;
- (ix) Impact assessment on any auxiliary/associated facilities that may be impacted upon by the project;

- (x) Social risk assessment and identification of existing service centres including but not limited to gender issues, vulnerable groups aspects, and labour influx, including Social conflict, Gender Based Violence (GBV), Violence against children (VAC);
- (xi) Develop chance finds procedures to facilitate the handling of any unknown or known physical cultural resources, recommend grievance redress mechanism to facilitate the handling of any complaints that may arise during project implementation;
- (xii) Development of an Environmental and Social Management plan (ESMP) clearly identifying institutional roles and responsibilities for implementing the mitigation measures, including potential gaps in capacity to implement the measures and how such gaps will be addressed;
- (xiii) Development of an environmental monitoring plan with clear monitoring indicators and institutional roles for tracking the implementation of and compliance with the proposed mitigation measures; and
- (xiv) Description of Inter-Agency coordination.

1.5 ESIA REPORT STRUCTURE

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

Table 1-1: ESIA Report Structure

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 and categorization of the Project.
Chapter 2	Project description which gives details of project components, location, and the proposed project activities, area of influence, project management, project proponents and cost estimates.
Chapter 3	Description of ESIA approach and methodology
Chapter 4	Outline of different laws, policies, regulations and international guidelines and conventions relating to implementation activities of the proposed project as well as ESIA study.
Chapter 5	Description of Biophysical and Socioeconomic baseline information of the project area
Chapter 6	Public consultation and stakeholder engagement processes and the outcomes of such meetings
Chapter 7	Analysis of project alternatives, a comparison of the options and their significance
Chapter 8	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
Chapter 10	Conclusion
Chapter 11	References
Chapter 12	Annexes

2 PROJECT DESCRIPTION

IWMDP intends to undertake construction of a water supply system and sanitation facilities in refugee settlement and host communities, Kiryandongo district. These water supply and sanitation infrastructure will be implemented as part of the strategy to improve access to clean water, improved sanitation and hygiene in Gaspa RGC.

2.1 PROJECT PROPONENT AND COST ESTIMATES

Project and Contacts:

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Ministry of Water and Environment,
Directorate of Water Development,
Rural Water Supply Department
Plot 3-7, Kabalega Crescent Road,
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The project has a Capital Investment Cost Estimate of US\$ 2,991,306,694 (Exclusive of VAT and Contingency) as evidenced by a certificate of the valuation of capital investment of the project issued by a qualified and registered valuer as in annex 12.

2.2 PROJECT LOCATION

The proposed water supply systems and sanitation facilities will be located in Kiryandongo District in the Gaspa RGC, covering areas in the Sub counties of Kiryandongo, Kiryankende and Kichwabugingo (**Figure 2-1**).

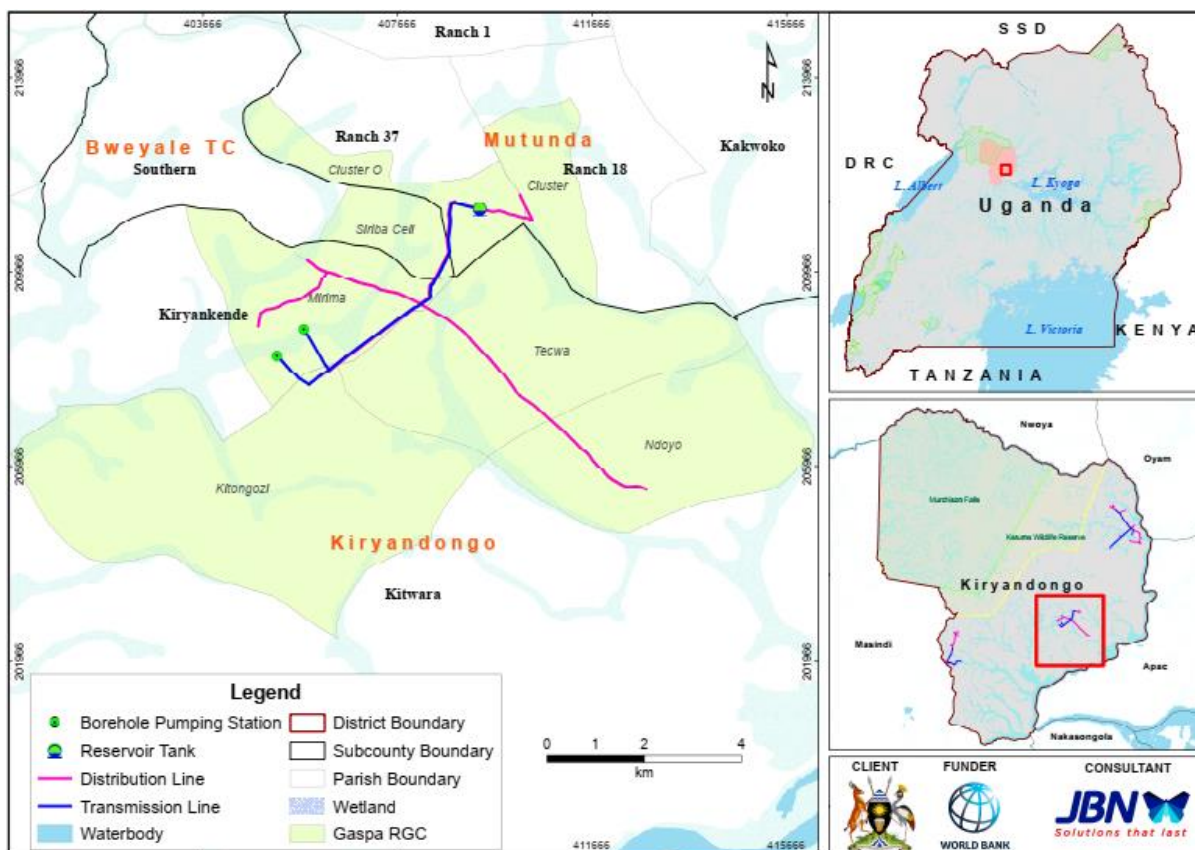


Figure 2-1: Location of the proposed water supply systems and sanitation facilities

2.3 PROJECT AREA OF INFLUENCE

The proposed piped water supply and sanitation project covers Gaspa RGC which is located about 8km South East of Bweyale Town Council. It comprises of 3 parishes namely, Kikube, Kyembera, Southern Ward and Ranch 18 (Table 2-1). There, supply will also cover a number of education, health and religious institutions in the RGC (Table 2-2), among others.

Table 2-1: Administrative structure (zoning) of the project area of influence

Subcounty	Parish	Village	Project Component
Kiryandongo	Kyembera	Mirima	S, T, D, I, E
	Kyembera	Kalwala	SF
	Kikube	Nyakataama	SF
	Kibeka	Ndoyo	D,I
	Kibeka	Kitongozi	T,D,I,E
	Kibeka	Tecwa	T,D,I
Kiryandongo Refugee Settlement	Ranch 37	Cluster O/Q	SF
Bweyale Town Council	Southern	Siriba Cell	T,R,D,I

S=Water Source, T=Transmission, R=Reservoir, D=Distribution, I=Network Intensification, E=Electricity Line and SF=Sanitation Facility.

Table 2-2: Institutions in the Project area of influence

Subcounty	Parish	Village	Institution Name
Kiryandongo	Kyembera	Mirima	Gaspa Pentecostal Church Mirima Main Mosque Taqua Goshen Blessing P/S
		Kalwala	Kalwala P/S
		Nyakataama	Nyakataama P/S
	Kibeka	Kitongozi	Kitongozi Community Centre
	Kibeka	Tecwa	Tecwa P/S
Kiryandongo Settlement	Refugee	Ranch 18	Cluster O/Q Canrom P/S Panyadoli HC III

2.3.1 WATER DEMAND IN THE PROJECT AREA

The water supply system was designed in reference to a 20-year design period starting with the year 2023. The population growth rate for Kiryandongo District is estimated at 2.97%. The Average Day Demand which depicts the daily water consumption by domestic and nondomestic consumers is subject to seasonal climatic variations, harvest seasons, and other factors such as transient population, and religious and cultural festivals. To allow for increased demands during these seasons, a maximum day peak factor of 1.3 was applied to the system design capacities. **Table 2-3** below summarizes the projected daily water demand for the design period in the project area.

Table 2-3: Projected water demand in the project area

Year	Year					
	2021	2023	2028	2033	2038	2043
Estimated Total Population	10,206	10,820	12,524	14,497	16,780	19,425
Projected Water Demand (m³/day)	188.08	199.4	230.81	287.46	333.33	386.58

Source: MWE, Feasibility Study and Design Report, 2021

2.4 MAIN PROJECT COMPONENTS

2.4.1 SOLAR POWERED PIPED WATER SUPPLY SYSTEMS

2.4.1.1 WATER SOURCES

The project will utilise two boreholes (DWD 77380 and DWD 77381), drilled between 23rd June, 2021 and 7th July, 2021, and test pumped from 18th to 25th July, 2021. The 52- and 36-hours test pumping yields for these production boreholes (DWD 77380 and DWD 77381) were 40.0m³/hr and 90.0m³/hr, respectively. This translates to a potential lifespan of 20 years for the aquifer given the projected water demand of 386.58m³/day in the RGC by the year 2043 according to the project's Feasibility Study and Design

Report (MWE, 2021). The water quality as shown in the water quality analysis Section (5.2.8) shows that the water quality from these boreholes conforms to the national drinking water standards.

At the water sources (Figure 2-2), a submersible pump with capacity specified in Table 2-4 will be installed at each 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 dimension (30m x 30m) will be constructed using G12 chain link and barbed wire fastened to G.I poles of dimension 75 x 75 x 3mm at a spacing of 2.5m c/c. G.I poles will be secured in a concrete foundation. Paspalum grass will be planted in the compound area. The proposed water sources DWD 77380 and DWD 77381 are both located in Mirima village.

Table 2-4: Details of water sources

RGC	Borehole Yield	GPS Coordinates	Pump Capacity	Daily (16 hours pumping regime)	
Gaspa	DWD 77380 (37.0m ³ /hr)	405106E, 208535N	Head 173m, Flow 30.0m ³ /hr	480	1280
	DWD 77381 (85.7m ³ /hr)	405656E, 209091N	Head 209m, Flow 50.0m ³ /hr	800	

Source: MWE, Feasibility Study and Design Report, 2021



Figure 2-2: Project Water Source Sites

2.4.1.2 WATER RESERVOIRS

The water supply system in Gaspa RGC will include one reservoir comprised of a cold pressed steel tank elevated on a steel tower as detailed in **Table 2-5**. 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).

The Storage Reservoir will be located in Siriba Cell, Bweyale Town council with a capacity of 200m³. The required storage capacity is 193m³ entailing 50% of the maximum day demand for Gaspa RGC. The pressed steel tank will be erected on a 15m tower height with square 1.22m panels measuring 8.54m long, 7.32m wide, and 3.66m high.

Table 2-5: Specifications of the reservoirs

RGC	Reservoir	GPS Coordinates	Capacity (m ³)	Tower Height (m)
Gaspa	Siriba Reservoir	Cell 409261E, 211274N	200	15

Source: MWE, Feasibility Study and Design Report, 2021



Figure 2-3: Proposed reservoir site in Siriba Cell, Gaspa RGC

2.4.1.3 TRANSMISSION AND DISTRIBUTION

Water will be pumped from the boreholes using independent transmission mains into the storage reservoir. From there, the distribution network will be fed by gravity from the storage reservoirs. 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 gained by use of existing public roads and proposed access roads, as the pipes will be buried in the road reserves.

The piping network will traverse Siriba Cell, Mirima, Kitongozi and Tecwa

Table 2-6: Specification of transmission system and distribution network

RGC	Transmission Length (m)		Distribution Total Length (m)
	Source 1	Source 2	
Gaspa	6,617	6,552	17,920

The 30 m³ (8 l/s) water in the transmission main from Source DWD 773780 will flow through a uPVC-OD 160 PN10 from the borehole to the reservoir inlet level covering a chainage of 6.617 km and a head of 173 m, while the 50 m³ (14 l/s) water in the transmission main from Source DWD 773781 will flow through a uPVC- OD 160 PN16 from the borehole to the reservoir inlet level covering a chainage of 6.552 km and a head of 209 m.

The distribution network(s) for the project area will be gravity fed from the Storage Reservoir tank. The networks were designed for the year 2043 at a peak hour factor of 2.0. Both the uPVC and HDPE of various specifications as specified in the feasibility study report (MWE, Feasibility Study and Design Report, 2021) will be used to distribute water in the project area covering a total of 17.92 km (Table 2-7).

Table 2-7: Proposed distribution Network for Gaspa RGC

Pipe Details	Length (km)
OD 160 uPVC PN10	2.935
OD 110 uPVC PN10	0.024
OD 90 HDPE PN10	5.141
OD 63 HDPE PN10	7.724
OD 50 HDPE PN10	2.096
Total	17.920

Source: MWE, Feasibility Study and Design Report, 2021

2.4.1.4 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. An estimated 12Km of pipe work is planned for intensification in the villages of Siriba Cell, Mirima, Kitongozi, Tecwa and Ndoyo villages. The location of the service pipes will not be known until applications for connections are received.

2.4.1.5 DISINFECTION FACILITIES

Disinfection of the water from the wells will be effected by the installation of a DOSATRON online proportional chemical dozer at the distribution 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.

2.4.1.6 ACCESS ROADS

Access to majority of the project components will be gained through existing public roads, given their convenient location in close 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 2-8**. The land tenure system in the area is customary which will necessitate compensation due to the land take as captured in the project RAP.

Table 2-8: Access roads for project components

RCG	Project Component	Land Requirements
Gaspa	Borehole DWD 77380 Access Road	654m ² (109m long, 6m wide)
	Borehole DWD 77381 Access Road	708m ² (118m long, 6m wide)
	Gaspa Reservoir Access Road	60m ² (10m long, 6m wide)



Figure 2-4: Access Road to reservoir site in Gaspa RGC



Figure 2-5: Access Road to Borehole DWD 77381

2.4.1.7 POWER SUPPLY

The water supply system will be powered by solar power augmented by hydroelectricity.

2.4.1.7.1 SOLAR POWER SUPPLY

The power requirements at the pump stations would be provided using:

Borehole DWD 77380: The system will consist of multi crystalline PV solar panels rated at 280pW 24 Volts DC, 140No. cells, with a control unit, support structure, and electrical accessories and cabling at the pump station; and 1No. 100 KVA diesel generator at the pump station.

Borehole DWD 77381: The system will consist of multi crystalline PV solar panels rated at 280pW 24 Volts DC, 284No. cells, with a control unit, support structure, and electrical accessories and cabling at the pump station; and 1No. 200 KVA diesel generator at the pump station.

2.4.1.7.2 HYDROELECTRICITY POWER SUPPLY

The backup power requirements at the pump stations will be provided using:

Borehole DWD 77380: This requires the supply and installation of 1No. 100 KVA 11,000 Volts / 433Volts, 50Hz, 3 phase transformer; a 12.0 Km extension of the 33KV overhead power line with 3-line conductors at the pump station; and 415Volts, 50Hz, 3 phase diesel electric generator with prime rating of 100 KVA.

Borehole DWD 77381: the supply and installation of 1No. 200 KVA 11,000 Volts / 433Volts, 50Hz, 3 phase transformer; a 12.0 Km extension of the 33KV overhead power line with 3-line conductors at the pump station; and 415Volts, 50Hz, 3 phase diesel electric generator with prime rating of 200 KVA.

2.4.1.8 WATER OFFICE BLOCK

The water office block will be constructed at Gaspa trading centre, for running the day to day operations of the water supply system. The water office block will consist of a reception area and operations office furnished with working benches, shelves and lockable cabinets.

2.4.2 SANITATION FACILITIES

The project will construct 2 VIP Latrines at institutions and 2 waterborne public toilets to serve the residents in trading centres. The waterborne toilets will be connected to septic tank and soak pit systems. The septic tank which will be emptied on a need basis and the faecal sludge taken to the nearest waste stabilisation ponds located at Kiryandongo hospital. All sanitation facilities will be gender disaggregated (male, female & disability). The proposed sanitation interventions in Gaspa RGC are detailed in **Table 2-9** below.

Table 2-9: Sanitation Facilities

Location	GPS Coordinates	Type of Facility	Number of	
			Facilities	Stances
Nyakataama P/S	394567E, 205389N	VL	2	5
Kalwala P/S	402154E, 209708N	VL	2	5
Gaspa Trading Centre	407994E, 209721N	WBT	1	6

Magamaga Kiryandongo Settlement	Market in Refugee	407337E, 212428N	WBT	1	6
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WTB = Waterborne toilets

VL= VIP Latrine

2.5 AUXILIARY FACILITIES

2.5.1 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.

2.5.2 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.

2.5.3 WASTE HANDLING AND DISPOSAL

During the construction, the contractor shall generate both hazardous and non-hazardous wastes including vegetation stripped from site, soil excavated from foundation sites, packaging waste (cement bags, paper, polythene sheets, and wood pallets), metal scrap, wire cuttings, wooden planks, polyethene sheets, PET water bottles, empty paint and solvent containers and waste oil from construction equipment or vehicles. Some of the waste materials such as paints, cement, adhesives, waste oil and cleaning solvents contain hazardous substances. The generated waste must be managed in by a licenced waste handler in accordance with the national environment (waste management) regulation 2020 and Local Government Act (Amended) 1997.

2.6 PROJECT MANAGEMENT

During construction phase, the project shall have a supervising consultant who shall oversee the implementation of the project on behalf of the developer. The supervising consultant will have in place an environmental and social safeguards team comprising of Gender and GBV officer, Health & Safety officer and environmental safeguards officer, social safeguards officer, among others.

The operation and management option is to handover the water supply system and public sanitation facilities to the Northern Umbrella of Water and Sanitation (NUWS). 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. The Umbrellas organisation is under the Urban water department of the Ministry of Water and Environment and can effectively plan and manage

budgets agreed within a contract framework. It can use experience gained elsewhere in the past 5-years to extend services to rural & urban poor areas.

2.6.1 LABOR FORCE

For the proposed solar motorized piped water supply project, several staff for the contractor (approximately 100 workers), Supervising consultant (approximately 10 workers), Stakeholder Engagement Consultant (approximately 10 workers) and MWE staff (approximately 5 staff) will be required during the construction phase. The major categories will include key staff, skilled, semi-skilled and unskilled workers. It's estimated about 130 workers will be deployed at the project site. The management of workers will be in accordance with Uganda labour laws, the World Bank safeguards policies and EHS requirements/guidelines.

3 ESIA APPROACH AND METHODOLOGY

3.1 GENERAL APPROACH

This ESIA was carried out in line with requirements of the legal, policy and regulatory framework of Uganda as well as the World Bank Operation Policies. The ESIA methodology presented is in line with the Environmental Impact Assessment Regulations, 2020, the National Environment Act 2019 (**Figure 3-1**), 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. Reference was also made to the NEMA Conditions of Approval of the ESIA Terms of Reference (**Annex 1**).

The ESIA study involved the following steps:

- i. Determining the issues/scope that the ESIA should address (scoping study);
- ii. Review the applicability of legal and institutional framework to the proposed projects;
- iii. Discussion of proposed project alternatives;
- iv. Consultation with stakeholders;
- v. Baseline surveys in form of data collection field surveys to establish the baseline environment, supplemented by desk-based data collection to fill any data gaps;
- vi. Impact identification and the evaluation of significance (Identification of mitigation measures (where required) to reduce the significance of, or avoid, any identified adverse impacts, evaluation of impacts, post-mitigation, to determine the significance of residual impacts, and assessment of cumulative impacts with other past, present and reasonably foreseeable future developments and plans);
- vii. Identification of appropriate monitoring requirements; and
- viii. Preparation of the ESIA study reports.

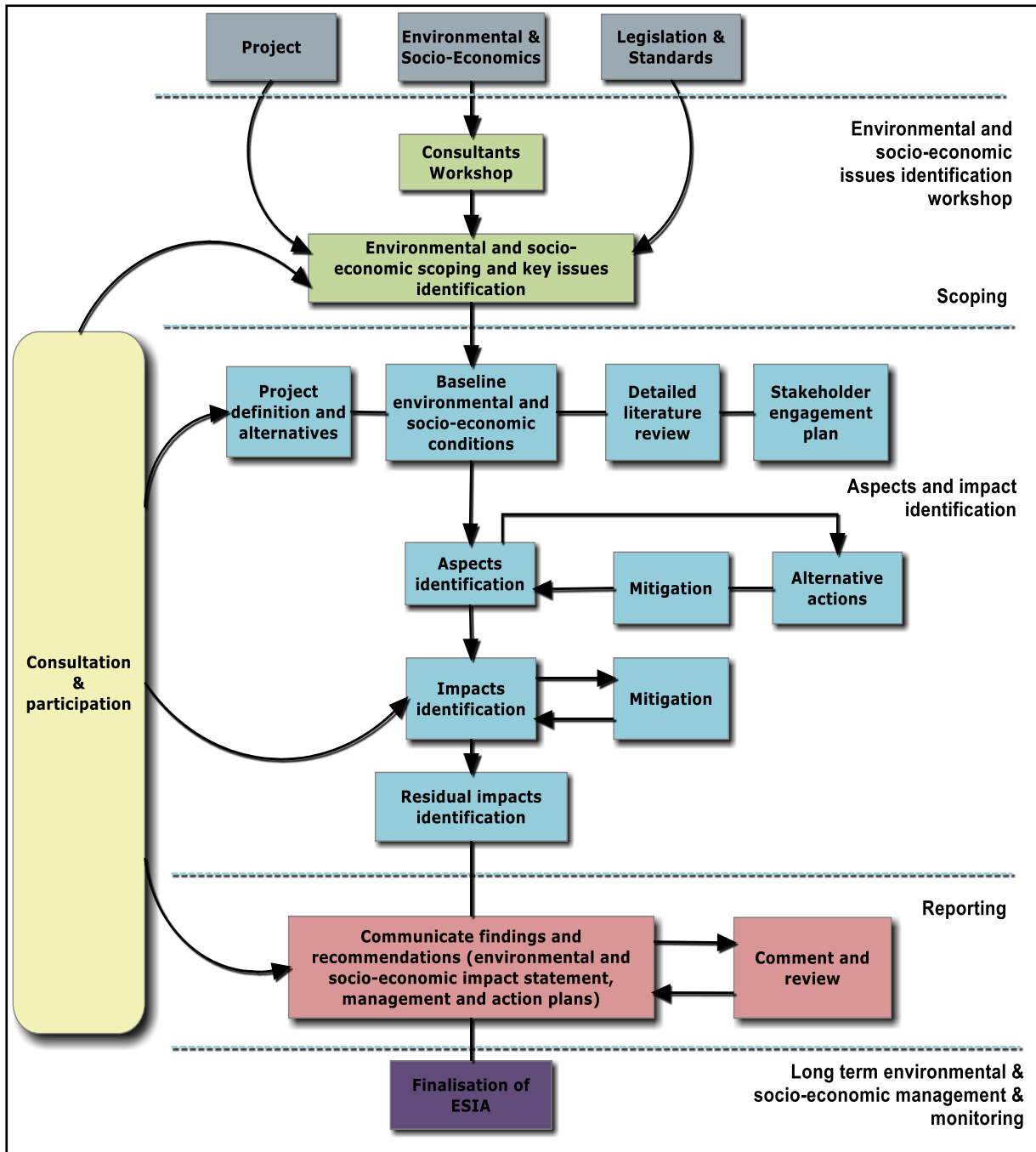


Figure 3-1: ESIA Approach

Pursuant to this approach, the following sections provide detail on how each stage of the ESIA process was applied to the proposed project.

3.2 DOCUMENT REVIEW

To gain a clear insight on baseline parameters and project characterization, a number of planning, regulatory documents, and reports were reviewed as presented below.

- i) Relevant policies and legislation of Uganda;
- ii) Relevant international covenants;
- iii) IWMDP Environmental and Social Framework;

- iv) IWMDP Resettlement Policy Framework;
- v) IWMDP Project Appraisal Document;
- vi) Water Resources Assessment Reports for Gaspa RGC;
- vii) Borehole Drilling & Test Pumping Reports for Gaspa RGC;
- viii) Feasibility Study Reports for Gaspa RGC;
- ix) Draft Engineering designs for the proposed project components;
- x) Kiryandongo District Development Plan (FY 2020/21-2024/25); and
- xi) UBOS National and District Statistical Abstracts for 2014, 2016 and 2017.

3.3 SCOPING STUDY

The purpose of the scoping phase was to identify key sensitivities and those activities with the potential to contribute to, or cause, potentially significant impacts to environmental and socioeconomic receptors and resources and to evaluate siting, layout and technology alternatives for the proposed Projects.

This stage determined the most important issues, problems, and alternatives that should be addressed in further environmental and social analyses. The consultant gathered an initial identification of the relevant environmental policies, laws, and regulations of Uganda. Also, an initial review of capacity issues concerning the prevention and mitigation of environmental impacts for individuals (in communities, professional associations and organizations, policy makers, etc.), for organizations (government departments, NGOs, private sectors etc.) and as regards an enabling environment (policies, laws, regulations, incentives, partnerships, etc.) was conducted by the consultant. The output of this stage facilitated the consultant to develop the tasks for the ESIA through consultation so as to ensure that the process and output are focused on the key issues.

The scoping report formed a basis for development of Terms of reference that define the scope of the proposed impact assessment. Approval of the ESIA Terms of Reference by NEMA (**Annex 1**) formed a basis for the detailed field studies for the proposed project.

3.4 BASELINE DATA COLLECTION AND SURVEYS

The description of the baseline environmental and socio-economic conditions provides information on receptors and resources that were identified during scoping as having the potential to be significantly affected by the proposed Project activities. It also describes baseline conditions that have been used to make the assessment.

3.4.1 BIODIVERSITY ASSESSMENT

3.4.1.1 FLORA ASSESSMENT

To study the vegetation structure and composition of Gaspa RGC, a combined methodology of field observations and sampling, guided by a Global Positioning System (GPS Garmin 62CSx) was used to locate plots along the proposed project pipeline alignment, Borehole sites and Reservoir site. The systematic sampling technique was utilised 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 were selected automatically according to a predetermined pattern. Plots were laid within the limits of 30m alternating along the proposed transmission and distribution

routes. Standard nested circular plots were located across all the study areas, 0.5 km intervals were used along water transmission and distribution lines from the Boreholes to the Reservoir site and random sampling technique was applied to sample vegetation at the proposed reservoir, sump and borehole sites. Circular plots consisted of a 10m radius plot (where trees ≥ 10 cm of DBH (Diameter at breast height) were identified and counted), 5m radius plot (where lianas, shrubs and trees ≤ 10 cm 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). Sample specimens for Plant species that could not be instantly identified were collected, photographed and pressed on site for further confirmation at Makerere University Herbarium (MHU) where identification and archiving were done.

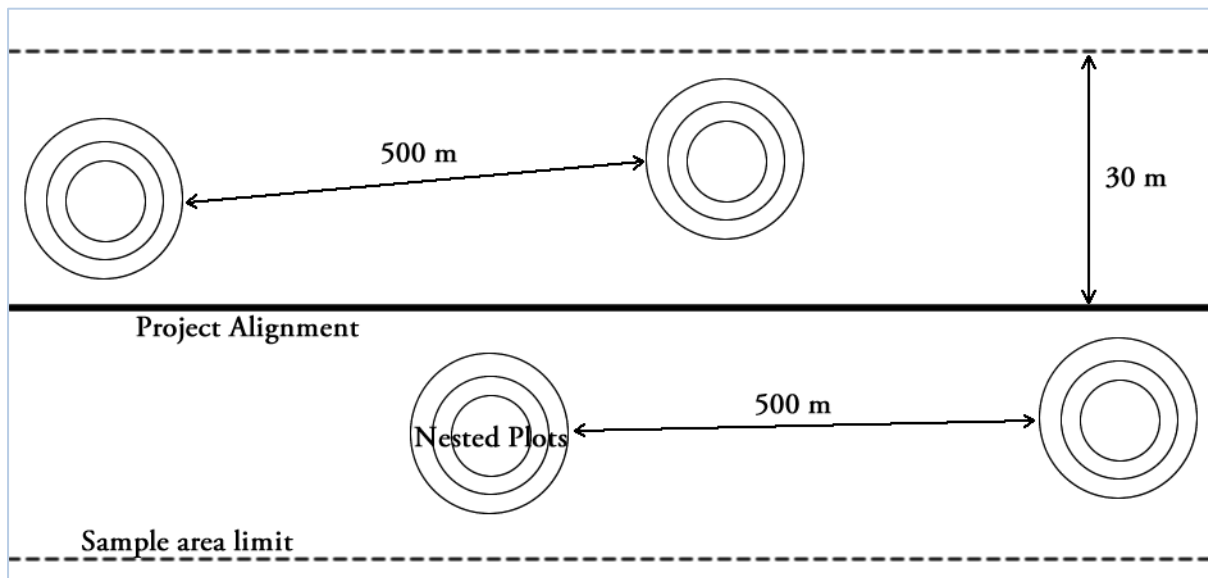


Figure 3-2: Illustration of the flora sampling technique

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 project Area (**Annex 6**).

3.4.1.2 FAUNA ASSESSMENT

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

3.4.1.2.1 LITERATURE REVIEW

Literature was reviewed to understand the project area and also to establish known fauna in the project area.

3.4.1.2.2 INFORMAL COMMUNITY CONSULTATION

During the field visit, the fauna specialist informally consulted the community members. The purpose was to document information on fauna which the fauna 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.

3.4.1.2.3 FIELD SAMPLING

Field sampling was conducted using known scientific methods and international best practices. The methods described below were used to survey the fauna along the project alignment. Six fauna groups were surveyed in the project area for their presence. The groups include Butterflies, Dragonflies, Amphibians, Reptiles, Birds and Mammals.

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 200m of sampling point. The method was used to document the butterfly species richness, as well as estimate their relative abundance.

At each of the sampling point, transects of 10m wide and 100m long were sampled. 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 ecologist 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 between 9am-5pm when weather warmed up (13-17°C).

On spotting an individual butterfly, the fauna ecologist swept the net back and forth to capture the spotted butterfly. On anticipation of a capture, the net was flipped, with the bag hanging over the rim, trapping the individual fly. Trapped butterflies were gently removed from the net and identified. The captured individuals were released once identity was ascertained. If identity of an individual butterfly was not known, the butterfly was photographed and placed in collection envelopes, with details of GPS coordinates, Time and the photograph number written on the labels and taken to Makerere University Museum for identity determination. All trapped butterflies were identified to species level.

Data collected was analysed by (1) Estimating species richness based on recorded species presence or absence at the different sites 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 2020 published IUCN red data list and the National red list of Uganda's threatened species (Wildlife Conservation Society 2016).

A standard field 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, Papilionidae) and genera.

Dragonflies

Pallard's sweep net method (Gall, 1985; New, 1991; Warren, 1992; De Vries 1997) was also used to survey dragonflies at the different project sites. Same design and analysis as for butterflies was adopted (see above). Sampling was 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 for searches) was applied at each site.

Herpetofauna (Amphibians and Reptiles)

Herpetofauna (reptiles and amphibians) were surveyed using a combination of scientifically tested methods as described by Heyer et al, (1994); Fellers and Freel, (1995); Halliday, (1996); and Olson, et al, (1997). The methods included the following:

- i) Visual Encounter Surveys (VES): The method involved 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.
- ii) Audio Encounter Surveys (AES): This method uses 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.
- iii) Dip netting: Using a dip net, ponds, pools, and streams and other water collection points were dip netted. Adult amphibians and tadpoles encountered were recorded.
- iv) Opportunistic Encounters: Herpetofauna species encountered opportunistically while moving in the project area were also recorded.

The methods were used within 200metre radius around forty-four (44) pre-geo-referenced points chosen basing on the different types of habitats represented in the project area including wetlands, woodlands and farmlands / gardens. Sampling was only undertaken during the day because of the curfew imposed by the government of Uganda as one of the restrictions to control the spread of COVID-19 pandemic.

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

Birds

A combination of Timed Species Counts (TSCs), transect walks and opportunistic observations was used to survey bird fauna diversity within the project area (Bibby et al., 2000 and Voříšek et al., 2008). The survey targeted the different habitats identified in project locations.

The fauna ecologist walked along the transect searching for the presence of birds. Each TSC lasted one hour, during which time all bird species seen or heard were recorded in order of detection. The Timed Species Counts (TSCs) and transect walks were supplemented with opportunistic observations by recording species found present within the project area outside the time of the count. Species identified through visual observations and species identified by their vocalizations were also recorded. The fauna ecologists' eye was aided by a 10 x 40 binocular. Efforts were made to sample the different habitats represented in the project area. Sampling was conducted in the early morning and towards the evening. All identifications were made to species level. Birds that were recorded during the survey were ecologically characterized using the following criteria:

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 utilise woodland and forested habitats.
Migrants	A	Afrotropical	Species migrating within Africa
	P	Palearctic	Species breeding in Europe or Asia
	Ap	Afro-Palearctic	Species with both Palearctic and Afrotropical populations

Data analysis was done by 1) compiling Species checklist, 2) determining the species conservation status using IUCN 2020 published Red List of threatened species as well as use of the National Red List for Uganda published by Wildlife Conservation Society in 2016.

Mammals

The mammals were surveyed using three main methods:

- i) Direct observation/opportunistic encounters: This entailed the collection of direct evidence of fauna activity (e.g. sightings, vocalizations). All mammals that were seen or opportunistically sighted or heard vocalizing while moving in and around the project area were identified, counted and recorded;
- ii) 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; and;
- iii) Local consultations: The fauna specialist held discussions with local residents in and around sampling points about the availability of mammal species in the project area.

Nocturnal mammals were excluded since the survey was conducted during day light hours. Mammal identification was based on Kingdon (1974), Delany (1975) and Kingdon et al. (2013). The conservation status of the encountered mammal species was ascertained using the 2020 version of the IUCN Red List of Threatened Species.

3.4.2 NOISE, AIR QUALITY AND VIBRATION ASSESSMENT

3.4.2.1 NOISE MEASUREMENT

Ambient noise measurements were undertaken at five (5) sites: Gaspa Trading Centre, Goshen Primary School, Tecwa Primary School, Panyadoli HC III and Canrom Primary School, selected through purposive sampling based on information gathered about the project footprint and the location of sensitive receptors. Using an Acoustic sound level calibrator type CEL-251 for every point measured, a duly

calibrated Casella CEL-633B Environmental & Occupational Noise Meter was used for the assessment. The equipment was placed on a tripod stand (1.4m high) from ground and switched on to set up the run mode. The equipment does simultaneously recordings for all noise functions it completes and also makes periodic or cumulative data measurements, and stores acquired data on a set recurring interval of time. The noise readings were logged at an interval of 30 minutes and the results later downloaded to a computer for further analysis using the Casella Insight software.

All sound pressure level measurements as presented in the following section, were benchmarked against the National Environment (Noise Standards and Control) Regulations, 2003.

3.4.2.2 AMBIENT AIR QUALITY MONITORING

Ambient air quality monitoring for particulate matter (PM10 & PM2.5) and gas parameters namely: NO₂, SO₂, CO and VOCs was undertaken using a Portable Aeroqual S500 Monitor mounted on a tripod stand about 1.5m above the ground, at selected locations including Gaspa Trading Centre, Goshen Primary School, Tecwa Primary School, Panyadoli HC III and Canrom Primary School, where pollution impacts including dust nuisance would likely be of concern during project implementation. The Aeroqual S500 Monitor was switched on, allowed 3 minutes of zeroing and 7 minutes of stabilizing readings at every site. The monitor was set to start data logging at a frequency of five (5) minutes for per site. Purposive sampling was used to ascertain the selected locations based on information gathered about the project footprint and the location of sensitive receptors (**Annex 7**).

All ambient air quality measurements as presented in the following sections, were benchmarked against the World Health Organisation Air Quality Guidelines (WHO AQG), 2006 and the International Finance Corporation of the World Bank Group (IFC) Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality (2007).

3.4.3 SOCIO-ECONOMIC ASSESSMENT

The consultant applied a Mixed Methods approach in collecting and analysing data and information. Survey questionnaire as a quantitative method was applied during November 2021. 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.

3.4.3.1 SAMPLING PROCEDURES

Study Area & Population: The study covered 7 core villages that make up Nyakabaale RGC with a study population of 3,790 households (VHT Data, 2022).

Sample Size: A sample size of 296 respondent households was covered representing 84.3% of determined sample using Morgan and Krejcie (1970) Sample Size Determination Table as shown in Annex 9.

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.

Sampling Methods	Adult Female	Adult Male	Total	REMARKS
Probability (random) sampling methods				
a) Stratified random	156	140	296	This sampling methods overlaps in all the others.
b) Simple random	156	140	296	
Non-probability (non-random) sampling methods				
c) Purposive sampling				Applied after stratified sampling
Widow / Windower	49	11	60	
d) Cluster sampling	68	40	108	Applied after stratified sampling

3.4.3.2 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.

3.4.3.3 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.

3.4.3.4 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.

3.4.3.5 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.

3.4.4 HEALTH AND SAFETY ANALYSIS

The H&S assessment study assessed the likely direct and indirect safety and health effects of the project activities during both the project construction and operation phases. The study reviewed the project designs, relevant secondary information relating to the project. Additionally, consultative meetings were undertaken with key stakeholders such as Government Ministries and Departments (OSH Department, Ministry of Gender, labour and Social Development, Uganda Police Force), statutory agencies and non-statutory agencies like schools, administrative offices etc.

Generally, OSH assessment targeted both workers' safety and health and community/public safety and healthy parameters within the direct and indirect impact areas and some of the focus parameters included:

- a) Community Health and Safety
 - Life and fire safety from construction and operation works.
 - Traffic safety especially by material haulage fleet (hotspot areas; - schools, markets, trading centres and junctions etc.)
 - Transport of hazardous materials
 - Disease prevention
 - Emergency preparedness and Response
- b) Occupational safety and health
 - Communication and training
 - Hazards (physical, chemical, biological, radiological) and risk management
 - Personal protective equipment
 - Labour and working conditions
 - Construction equipment/machinery safety

c) Safety and Health Management Systems

3.5 IMPACT DESCRIPTION AND ASSESSMENT

The assessment identifies the intensity of the predicted impacts resulting from construction and operation of the project and the resulting level of effect against identified sensitive receptors. These impacts and effects occur a result of an interaction between project works and the identified baseline. To determine the level of effect (severity or significance), the likely intensity of the impact and the sensitivity of the receptor are defined.

3.5.1 IMPACT INTENSITY

The intensity of an impact takes into account all the various impact characteristics in order to determine whether an impact is negligible or significant (**Table 3-1**).

Table 3-1: 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 of the impact)	Very Low - where the impact affects the environment in such a way that natural, and /or cultural and social functions and processes are negligibly affected and valued, important, sensitive or vulnerable systems or communities are negligibly affected.	1
	Low - where the impact affects the environment in such a way that natural, and/or cultural and social functions and processes are minimally affected and valued, important, sensitive or vulnerable systems or communities are minimally affected. No obvious changes prevail on the natural, and / or cultural/ social functions/ process as a result of project implementation.	2
	Medium - where the affected environment is altered but natural, and/or cultural and social functions and processes continue albeit in a modified 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

3.5.2 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. The sensitivity of the receiving environment was determined by specialists based on the baseline data collected during the study, and the generic criteria outlined in **Table 3-2**.

Table 3-2: 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

3.5.3 IMPACT EVALUATION AND DETERMINATION OF SIGNIFICANCE OR SEVERITY

Impact severity describes the actual change that is predicted to occur to the receptor. The significance of an impact is based on expert judgement of the sensitivity (importance or vulnerability) of a receptor and the intensity of the effect that will be caused by a project-induced change. Impacts were identified and significance was attributed considering the interaction between intensity and sensitivity criteria as in the significance matrix (**Table 3-3**). The impact severity is then calculated as the product of the two numerical descriptors;

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

The results are equivalent to **negligible, minor, moderate or major**. This is a semi-qualitative method designed to provide a broad ranking of the different potential impacts of a project. More details are provided in **Table 3-4**.

Table 3-3: 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
	3 Medium	3 Minor	6 Moderate	9 Moderate	12 Major
	4	4	8	12	16

		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
	High	Minor	Moderate	Major	Major

Table 3-4: Impact Severity

Impact Rating	Impact Description	Rating scales
Major: the impact is unacceptable and further mitigation measures must be implemented to reduce the significance	<ul style="list-style-type: none"> Highly noticeable, irreparable effect upon the environment Significant, widespread and permanent loss of resource Major contribution to a known global environmental problem with demonstrable effects Causing mortality to individuals of a species classified as globally or regionally endangered Major expedience of water/air quality and noise guidelines representing threat to human health in long and short term Causing widespread nuisance both on and off site 	> or = 12
Moderate: Impact is considered tolerable but efforts must be made to reduce the impact to levels that are as low as reasonably practical	<ul style="list-style-type: none"> Noticeable effects on the environment, reversible over the long-term Localised degradation of resources restricting potential for further usage Sub-lethal effects upon a globally or regionally endangered species with no effect on reproductive fitness and/or resulting in disruption/disturbance to normal behaviour returning to normal in the medium term Elevated contribution to global air pollution problem partly due to preventable releases Frequent breaches of water/air quality and noise guidelines Causing localised nuisance both on and off site 	> or = 6 but < or = 9

<p>Minor: Impact is considered acceptable</p>	<ul style="list-style-type: none"> • Noticeable effects on the environment, but returning naturally to original state in the medium term • Slight local degradation of resources but not jeopardising further usage • Disruption/disturbance to normal behaviour of a globally or regionally endangered species returning to normal in the short term • Small contribution to global air problem through unavoidable releases • Elevation in ambient water/air pollutant levels greater than 50% of guidelines • Infrequent localised nuisance 	<p>> or = 2 but < or = 4</p>
<p>Negligible: Impacts is almost not felt</p>	<ul style="list-style-type: none"> • No noticeable or limited local effect upon the environment, rapidly returning to original state by natural action • Unlikely to affect resources to noticeable degree • No noticeable effects on globally or regionally endangered species • No significant contribution to global air pollution problem • Minor elevation in ambient water/air pollutant levels well below guidelines • No reported nuisance effects 	<p>= 1</p>

3.5.4 CUMULATIVE IMPACT ASSESSMENT (CIA)

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 of 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.

3.6 FORMULATION OF THE ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

The Environmental and Social Management Plan (ESMP) specified mitigation measures and monitoring actions with time frames, specific responsibilities assigned, and follow-up actions defined in order to check progress and the resulting effects on the environment by the project's implementation activities. The objectives of the ESMP included:

- a. To ensure that all the recommendations in the approved ESIA report are adhered to by the relevant lead agencies/institutions;
- b. To ensure that the prescribed environmental and social mitigation measures as well as the enhancement actions are well understood and communicated to all project stakeholders;
- c. To ensure that the proposed environmental and social corrective/offset measures are implemented throughout the project implementation phases;
- d. To evaluate the effectiveness of environmental and social mitigation/offset measures; and
- e. To evaluate the effectiveness of various evaluation techniques and procedures.

The ESMP is included in **Chapter 9** of this report.

4 POLICY LEGAL AND REGULATORY FRAMEWORK

This chapter presents an overview of the key policies, laws, regulatory and institutional framework relevant to the environmental and social aspects of the proposed solar powered piped water supply system and sanitation facilities. It also identifies relevant agencies, departments, and institutions responsible for the monitoring and enforcement of legal requirements specified therein.

4.1 NATIONAL LEGISLATIONS AND REGULATIONS

The following is a summary of key policy, legal and regulatory requirements governing the proposed project:

Table 4-1: Summary of policies and plans applicable to the proposed project

Policies or Plans	Brief description and its key provisions	Relevance in the Project
The National Environment Management Policy, 1994	The overall policy goal is sustainable development, which maintains and promotes environmental quality and resource productivity for socio-economic transformation. One of the key principles guiding policy development and implementation include the need to conduct and ESIA for projects that are likely to have potential impacts on the environment.	The developer has undertaken an ESIA for the proposed project, for which this ESIS has been prepared.
The National Policy on Conservation and Management of Wetland resources 1995	The overall goal of this policy is to maintain an optimum and sustainable diversity of uses and users and consideration of other stakeholders when using wetland resources. 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. This policy outlines guidelines for wetland resource developers.	The proposed project will have transmission and distribution lines crossing wetlands. Also, some material source sites might be in or adjacent to wetlands. All proposed project implementation activities have to adhere to this policy requirements and undertake proper impact assessment to ensure adverse impacts on the wetland ecosystems are adequately mitigated.
The National Water Policy, 1999	The objective of the policy is to provide guidance on development and management of the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs, with full participation of all stakeholders and mindful of the needs of future generations.	The contractor under the supervision of the project management team (DWD and District local government) will undertake routine monitoring of all water sources to prevent their contamination by project activities in line with this policy.

Policies or Plans	Brief description and its key provisions	Relevance in the Project
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.	The contractor in liaison with Local Council officials (especially Subcounty Community Development Officers) will undertake initiatives to do away with Gender Based Violence-GBV cases relating to project implementation activities.
The Uganda National Land Policy, 2013	The land policy addresses the contemporary land issues and conflicts facing the Country. The vision of the policy is: “Sustainable and optimal use of land and land-based resources for transformation of Ugandan society and the economy” while the goal of the policy is: “to ensure efficient, equitable and sustainable utilization and management of Uganda’s land and land-based resources for poverty reduction, wealth creation and overall socio-economic development”.	All the land acquisition for project components which are to be installed on private land will be conducted following an approved Resettlement Action Plan (RAP), while involvement and discussions with UNRA and the District Local government are required to streamline the implementation of components like transmission pipes in the road reserve (public land).
National Climate Change Policy, 2015	<p>Climate change is a global challenge that requires a concerted effort by all nations. This National Climate Change Policy (NCCP) is Uganda’s integrated response to climate change. It has been prepared and designed within the context of the country’s vision and national development priorities; it provides a clearly defined pathway for dealing with the challenges of climate change within the socio-economic context of Uganda, and looks ahead to the opportunities and benefits of a green economy.</p> <p>The goal of the policy is to ensure a harmonized and coordinated approach towards a climate- resilient and low-carbon development path for sustainable development in Uganda. The overarching objective of the policy is to ensure that all stakeholders address climate change impacts and their causes through appropriate measures while promoting sustainable development and a green economy.</p>	The project design needs to ensure measures are put in place to manage the effects of climate change, while implementation activities will have to ensure the GHG emissions are kept low and enhance opportunities for GHG emissions reduction.
The National Equal Opportunities Policy 2006	<p>The goal of the National Equal Opportunities policy is to provide avenues where individuals and groups’ potentials are put to maximum use by availing equal opportunities and affirmative action.</p> <p>The policy objectives amongst others are to:</p>	Discrimination and stigmatization, which acts as a barrier for marginalized and other groups of people in the project area to accessing employment and support opportunities will be eliminated throughout all project implementation phases. This entails

Policies or Plans	Brief description and its key provisions	Relevance in the Project
	<ul style="list-style-type: none"> a. Guide the planning processes, affirmative action, and implementation of programmes and allocation of resources to all stakeholders. b. Guide the establishment of legal, policy and institutional frameworks of all stakeholders. c. Provide a framework for assessing responsiveness of programmes and activities to equal opportunities, in redressing any imbalances therein. d. Empower marginalized and vulnerable groups for their full participation in all development processes. e. Enhance capacity of implementing agencies to provide quality services with a view to monitoring compliance with affirmative action and the constitutional provisions 	equitable access to services by workers employed at the project.
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.	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.
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.	The contractor will institute structures with human and financial capacity to undertake HIV/AIDS sensitization and prevention of new infections among the project workers and local community throughout all the project implementation phases in line with the provisions of this policy.
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.	The contractor will be encouraged to adopt an equal opportunity employment policy and to incorporate gender aspects and considerations in the recruitment process for both skilled and non-skilled labour force as far as applicable during the project lifecycle.

Policies or Plans	Brief description and its key provisions	Relevance in the Project
The National HIV/AIDS Policy, 2004	The policy aims at guiding multi-sectoral approach to HIV/AIDS control in the country. Section 3.4 of the policy talks about Impact mitigation at individual to community level. The policy aims at providing psychosocial and economic support to all those infected and directly affected by HIV & AIDS. The epidemic has severe short- and long-term effects on various population categories on development efforts at household, community, sector, and national levels. The impact on the labour force in the various sectors in communities and households affects productivity, household income and savings. Objective of this section in the policy is to minimize the socio-economic consequences of HIV & AIDS on the population and promote involvement of the infected and affected in the development efforts. Subsection I under Policy Strategies it specifically requires workplace policies in both public and non-public formal and informal sectors to be appropriately reviewed to cater for HIV&AIDS prevention & care issues in the workplace.	In line with this policy, the contractor in liaison with different local council and Local government officials such Community Development Officers and HIV/AIDS Focal Personnel among others will ensure mainstreaming HIV/AIDS interventions into project plans and implementation activities. The measures are aimed at stemming the new infections, curtailing their spread and stigmatization of victims of HIV/AIDS among the project workforce and neighbouring communities
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. This is in recognition that PWDs can perform to their full potential given the same conditions and opportunities irrespective of their social, economic, and cultural backgrounds. 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.	With limited skills characteristic of most PWDs, accessing employment is a major challenge. Most potential employers do not give chance to PWDs to compete for employment even where they have the necessary qualifications and experience. During recruitment of workers to be employed to undertake construction activities, some PWDs will apply for some jobs and the contactor should give consideration to 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	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

Policies or Plans	Brief description and its key provisions	Relevance in the Project
	Investment Plan (SDIP) whose mission is to create an enabling environment for social protection and social transformation of communities.	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. This involves changing from a predominantly low income to a competitive upper middle-income country within 30 years. It is envisaged that the country will graduate to the middle-income segment by 2017 and reach a per capita of USD 9,500 by 2040. For the country to achieve its Vision 2040, it is necessary to increase access to appropriate and adequate sanitation as well clean and safe water.	The proposed project is aligned to Vision 2040, by improving access to appropriate and adequate sanitation as well clean and safe water in the project area.
The National Development Plan III	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 NDPIII is attaining Increased Household Incomes and Improved Quality of Life of Ugandans, under the theme: “Sustainable Industrialization for inclusive growth, employment and wealth creation”. NDPII aims to stop, reduce and reverse environmental degradation and the adverse effects of climate change as well as improve utilisation of natural resources for sustainable economic growth and livelihood security.	The project implementation will follow the ESMP put forward in this ESIS to ensure sustainable utilisation of natural resources and mitigation of likely impacts on the environment.

Table 4-2: Summary of laws applicable to the proposed project

Laws	Brief description and its key provisions	Relevance in the Project
The Constitution of the Republic of Uganda, 1995	The Constitution requires that the project be implemented without endangering human health and the environment.	The proposed project activities will be undertaken while ensuring safe and healthy environment is maintained as provided for in the Constitution.
The National Environment Act 2019	Specifically, its Fifth Schedule lists projects that require mandatory ESIA to be done before implementation, hence the need for this ESIA to be prepared for the proposed project.	The proposed project falls under Schedule 5 for projects which require mandatory ESIA before implementation, as such, the need to conduct this study.

Laws	Brief description and its key provisions	Relevance in the Project
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. Dispute arising from the compensation to be paid should be referred to the court for decision if the Land Tribunal cannot handle	The key consideration regarding this Act in the project is to ensure landowners affected by the project are adequately and timely compensated.
The Land Act, Cap 227, of 1998	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.	Proposed project activities will be implemented with the footprint covering both private and public land. Therefore land acquisition needs to follow the provisions of the Act.
The Physical Planning Act 2010 and The Physical Planning (Amendment) Act 2020	<p>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.</p> <p>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.</p>	This is a relevant Act to the proposed project activities. Different provision of this act will be implemented during the different phases (construction and operation) of the proposed project.

Laws	Brief description and its key provisions	Relevance in the Project
National Climate Change Act, 2021	The Act gives the force of law in Uganda to the United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement; provides for climate change response measures; provides for participation in climate change mechanisms; provides for measuring of emission, reporting and verification of information; provides for institutional arrangements for coordinating and implementing climate change response measures; provides for financing for climate change; and for related matters.	The project design needs to ensure measures are put in place to manage the effects of climate change. When the District Climate Action Plan is developed, implementation activities will have to ensure alignment.
The Uganda Wildlife Act, 2019	In order to support sustainable utilization of wildlife for the benefit of the people of Uganda, the purpose of the Act among others is to provide for the conservation of wildlife throughout Uganda so that the abundance and diversity of their species are maintained at optimum levels commensurate with other forms of land use.	Considering that some of the water pipes will go through remote section of the countryside involving clearing of vegetation, and excavation of land to create holes etc, this Act is quite relevant, and relevant provisions should be complied forthwith for project implementation.
The Historical Monuments Act, 1968	The Act provides for the preservation and protection of historical monuments and objects of archaeological, paleontological, ethnographical, and traditional interest and for other matters connected therewith. 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.	Some objects of cultural and/or historical significance might be encountered/affected during project implementation and their preservation is called for by this act.
The Public Health Act, Cap 281	Under this Act, the Minister may cause to be made such inquiries as he or she may see fit in relation to any matters concerning the public health in any place. When such a directive is made, the person directed to make the inquiry shall have free access to all books, plans, maps, documents and other things relevant to the inquiry and shall have in relation to witnesses and their examination and the production of documents similar powers to those conferred upon commissioners by the Commissions of Inquiry Act, and may enter and inspect any building, premises or place, for the purpose of inquiry.	The provisions of this Act will be relevant for the project implementation activities such as construction civil works, establishment of ancillary facilities such as workers camps, material holding areas, equipment storage/parking yards as well as maintenance of project machinery to control incidences occupational health and safety accidents, among others. Construction activities will take all possible mitigations to make sure that, all impacts to human and environment are avoided and where not possible or in case of accident, there will be compensation.

Laws	Brief description and its key provisions	Relevance in the Project
The Water Act Cap, 152 1997	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.	Abstraction of water for the project will follow the provisions of the Act including obtaining an abstraction permit from the DWRM. Any disposal of waste shall also need to be in line with the waste discharge regulations; proper management of fuel/oil spills is essential for minimizing chances of water contamination
The National Forestry and Tree Planting Act, 2003	The Act provides for the conservation, sustainable management and development of forests for the benefit of the people of Uganda. It also provides that the Central Government or local government shall hold in trust for the people and protect forest reserves for ecological, forestry and tourism purposes for the common good of the citizens of Uganda.	The project will encourage tree planting as part of its integrated catchment protection and management measures.
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.	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. Additionally, 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.
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.	The project developer will apply to the appointed road authority to carry out activity in the road reserve while also stipulating measures for restoration upon completion of project activity.
The Occupational Safety and Health Act, 2006	The Occupational Safety and Health Act of 2006 makes provisions for the health, safety, welfare, and appropriate training of persons employed in workplaces.	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, sanitary conveniences, washing facilities, First Aid facilities, clean drinking water, and meals among others throughout the project implementation phases in accordance with this act.

Laws	Brief description and its key provisions	Relevance in the Project
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.	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.
The Employment Act, 2006	This Act is the governing legal statutory instrument for the recruitment, contracting, deployment, remuneration, management, and compensation of workers. It provides for matters governing individual employment relationships in terms of circumstances of provision of labour. It is quite explicit on matters of forced labour that, no one should be forced to work, there should be no discrimination with regard to recruitment process, and it prohibits sexual harassment in employment.	This Act is relevant in that, it addresses matters of engagement of workers and their rights while at work. The contractor shall adhere to the provision of this Act for all project-related recruit of workforce.
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.	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.	This act gives guidance to the contractor and their workers on how to handle cases of domestic violence.
The Survey Act, 1964	Section 23 of the Act also points out compensation for injury done by clearance during the act of survey. For the purpose of the topographic survey of the project site this act will be relevant in this project.	In line with the project footprint and land requirements, it is necessary to undertake land survey for this project, as guided by the Act and conducted by a registered surveyor authorized by the commissioner for surveys in Ministry of Lands, Housing and Urban Development.

Laws	Brief description and its key provisions	Relevance in the Project
Access to information Act 2005	<p>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.</p> <p>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.</p>	<p>Upon approval of this ESIA Study by NEMA and the World Bank, the report will have to be published by NEMA and the Project developer on their respective websites to enable stakeholder access to the pertinent information.</p>

Table 4-3: Summary of regulations and standards applicable to the proposed project

Regulations or standards	Brief description and its key provisions	Relevance in the Project
The National Environment (Environmental and Social Assessment) Regulations, 2020	<p>The National Environment Management Authority (NEMA) issued Environmental Impact Assessment Regulations, 2020, for conduct of ESIA's, which are now part of the Environmental Legislation of Uganda.</p>	<p>The developer has undertaken this ESIA study with particular focus on the content specified within the First Schedule of these Regulations.</p>
Water Resources Regulations, 1998	<p>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.</p>	<p>The project implementation will follow the conditions set out in the regulations. The Contractor will be required to abide by provisions of this law in regard to water usage and conservation during use for construction civil works and associated project facilities such material yards, workers' camps among others.</p>

Regulations or standards	Brief description and its key provisions	Relevance in the Project
The National Environment (Wetlands, Riverbanks and Lakeshores Management) Regulations 2020.	These Regulations guide on the development procedures to be followed where developments are to be undertaken in wetlands, riverbanks, and lakeshores.	<p>The some of the proposed project components will cross through wetlands. Likewise, the material source sites might be in or adjacent to wetlands.</p> <p>All proposed project implementation activities have to adhere to these regulations requirements and undertake proper impact assessment to ensure adverse impacts on the wetland ecosystems are adequately mitigated. In addition, where applicable the project will acquire wetland use permits for any activity specified in the second schedule of the regulations.</p>
Draft National Air Quality Standards, 2006	Considering that construction equipment and machinery are powered by diesel/ gasoline engines, pollutants such as CO ₂ , NO _x , SO _x , VOC, and particulates are expected to be emitted. The draft National air quality standards provide the following regulatory limits for these emissions.	A number of proposed project activities such as material haulage, material extraction of both murrum and stones, construction works among others will likely impact on the local ambient air quality. Guided by provisions of these standards, the contractor will adopt appropriate measures to minimize, mitigate and prevent air quality deterioration resulting from project implementation activities.
The National Environment (Waste Management) Regulations, 2020	These Regulations apply to all categories of hazardous and non-hazardous waste, storage and disposal of hazardous waste and their movement into and out of Uganda and to all waste disposal facilities, landfills, and sanitary fills and to incinerators.	Certainly, waste will be generated during project implementation activities especially from contractor facilities such as camps, material yards, among others. The contractor guided by these regulations will ensure that all generated wastes throughout all project implementation phases are appropriately managed/disposed of.
National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 2020	These regulations provide standards for effluent discharge. Schedules 2, 3 and 4 detail maximum permissible limits for regulated contaminants, which must not be exceeded before effluent is discharged into water or on land.	Proposed project activities will certainly generate effluent waste. The contractor should employ appropriate measures to manage effluent waste generated by project activities especially ancillary facilities such as workers' camps, material yards, mechanical workshops and construction site among others.
The National Environment (Noise Standards and	Part III Sec. (1) requires machinery operators to use the best practicable means to ensure that the emission of noise does not exceed the permissible levels.	Indisputably, implementation of proposed project activities and other associated activities will trigger noise generation. These standards shall however be applied to keep the noise levels in

Regulations or standards	Brief description and its key provisions	Relevance in the Project
Control) Regulations, 2003		permissible limits as well as mitigating noise generation at the source.
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. 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.	Requirements of these regulations should be fulfilled by the contractor through instituted structures especially within construction site and workers' facilities such as changing rooms, resting areas, dining among others, to avoid exposure of workers to tobacco Second Hand Smoke and associated health risks.

4.2 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 4-4**.

Table 4-4: 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
Approval of campsites and hoarding plans	DLG	Contractor	Physical Planning Act (Amended) 2020
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

Approvals, Permits and Licenses Required	Issuing Authority	Party responsible for acquiring permit/license	Legal Framework
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

4.3 INTERNATIONAL PROTOCOLS AND CONVENTIONS

The relevant international protocols and conventions for which Uganda is a signatory to as presented in **Table 4-5** below.

Table 4-5: Summary of international protocols and conventions applicable to the proposed project

Protocol or Convention	Purpose
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.

Protocol or Convention	Purpose
United Nations Framework Convention on Climate Change (UNFCCC), 1992	The Convention requires parties to avoid adverse effects on the environment and adopt measures and policies to control carbon dioxide emissions in technologies, taking into account their common, yet differentiated responsibilities, as well as their specific national and regional development priorities, objectives and circumstances. They are required to take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimising adverse effects on the economy, on public health and on the quality of the environment of projects or measures undertaken by them to mitigate or adapt to climate change.
United Nations Convention to Combat Desertification (UNCCD), 1994	Binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. In the 10-Year Strategy of the UNCCD (2008-2018) that was adopted in 2007 with a view to <i>forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas to support poverty reduction and environmental sustainability.</i>
Montreal Protocol for the Protection of the Ozone Layer, 1987	The protocol was designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. All of the ozone depleting substances controlled by the Montreal Protocol contain either chlorine or bromine (substances containing only fluorine do not harm the ozone layer). The provisions of the Protocol include the requirement that the Parties to the Protocol base their future decisions on the current scientific, environmental, technical, and economic information that is assessed through panels drawn from the worldwide expert communities
Stockholm Convention on Persistent Organic Pollutants, 2001	Protects human health and environment from Persistent Organic Pollutants that remain intact in the environment for long periods and can become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife, which can lead to serious health effects.
Strategic Approach to International Chemicals Management, 2006	Fosters sound management of chemicals and to ensure that by the year 2020, chemicals are produced and used in ways that minimise significant adverse impacts on the environment and human health.
International Labour Organisation Convention, 1998	Sets out basic principles and labour rights at work, based on international best practise.

4.3.1 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 UCSAP 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 4-6 below:

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

Table 4-6: Summary of Gap Analysis between Uganda and World Bank Safeguards

World Bank's Safeguard Policies	Uganda's Legal and Regulatory Framework	Gaps identified in Uganda legal and regulatory framework	Provisions for this ESIA
Environmental Assessment (OP 4.01)	<ul style="list-style-type: none"> • National Environment Management Policy, 1994. • National Environment Act No.5 of 2019. • National Environment (Environmental and Social Assessment) Regulations, 2020. 	<ul style="list-style-type: none"> • Independent review is not specifically provided for under ESIA Regulations of Uganda and as a result, the review of ESIA's is commonly reviewed by government agencies; • In the EIA review process, there is no specific legal/regulatory framework that caters for examination of the quality of the ESIA reports. Only conditions of approval/reasons for non-approval of ESIA's are provided by NEMA; • There are no administrative mechanisms for appealing a decision taken on an EIA. 	The WB (as a financing agency has to review reports to ensure compliance with E&S regulations and approve them before releasing the funding)
Natural Habitats (OP 4.04) and Forests (OP 4.36)	<ul style="list-style-type: none"> • The Constitution 1995 as amended; • the National Environment Act No.5 of 2019; • The National Forestry and Tree Planting Act, 2003; • The Uganda Wildlife Act 2019; 	There are general gaps which include lack of Regulations to implement the National Forestry and Tree Planting Act and the Wildlife Act.	UWA has been proposed as one of the responsible institutions over the wildlife incise animals are identified in the project area

	<ul style="list-style-type: none"> • The Land Act Cap 227; • The Fish Act Cap 197; • The Plant Protection Act Cap 31. 		
Physical Cultural Resources (OP 4.11)	<ul style="list-style-type: none"> • The Constitution 1995 as amended • The National Environment Act, 2019 • The Historical Monuments Act, Cap 46 • The Institution of Traditional or Cultural Leaders Act, 2011 	<ul style="list-style-type: none"> • The legal framework is limited in scope. For example, it does not cover certain aspects such as the intangible heritage; • There is no strong institution to regulate and manage heritage resources; • The sites and monuments are not adequately maintained, documented and in addition, some of the antiquities are not collected; • There is limited enforcement of the legal framework related to Physical Cultural Resources in Uganda because most developers and government officials do not understand the importance of conserving physical cultural resources. 	A Chance Findings Procedure (CPF) has been developed and included under section 9.3.13 to guide on the process
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.	
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Table 4-7: 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	<p>The Constitution of Uganda, 1995 recognizes four distinct land tenure systems, Customary tenure, Freehold tenure, Leasehold tenure and Mailo land tenure.</p> <p>Land is valued at open market value and a 15% to 30% disturbance allowance must be paid if six months or less notice is given to the owner.</p> <p>Cash compensation is the recommended option.</p>	<p>World Bank Policy recognises the rights of those affected people:</p> <ul style="list-style-type: none"> • Who have formal legal rights to the land or assets they occupy or use. • Who do not have formal legal rights to land or assets, but have a claim to land that is recognized or recognizable under national law. • Who have no recognizable legal right or claim to the land or assets they occupy or use. <p>Compensation of lost assets at full replacement costs.</p> <p>Cash compensation is recommended where there are active land markets and livelihoods are not land based.</p>	<p>The Ugandan law does not compensate those without legal right or claim to the land.</p> <p>WB OP 4.12 does not consider disturbance allowance.</p> <p>Uganda laws and the WB OP 4.12 are consistent in compensation at full replacement cost and cash compensation.</p>	<p>Alternative land (wherever available) or Cash compensation at full replacement value or (based on market value + 15% to 30% disturbance allowance).</p> <p>All forms of tenancy based on formal or informal rights.</p> <p>In kind compensation should be offered as an option to the PAPs where (alternative land is available for the PAPs).</p>

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
Land Tenants	Leasehold tenure is created either by contract or by operation of the law. The landlord grants the tenants or lease exclusive possession of the land, usually for a period defined and in return for a rent. The tenant has security of tenure and a proprietary interest in the land. Cash compensation is based upon market value of land and disturbance allowance (15-30%). Entitled to compensation based upon the amount of rights they hold upon land.	Must be compensated, whatever the legal recognition of their occupancy.	The Ugandan law does not compensate those without legal right or claim to the land.	Land owners Compensate for land and all assets at full replacement cost or replacement of land at equal/ greater value and compensate for other assets. World Bank OP 4.12 does not recognize depreciated value for replacement of assets (which should be replaced at market value). Additionally, 15% disturbance allowance will be given to the PAPs on top of the compensation.
Land squatters	Leasehold tenure is created either by contract or by operation of the law. The landlord grants the tenants or lease exclusive possession of the land, usually for a period defined and in 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.

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
Owners of non-permanent buildings such as kiosks, butchery shops, wooden shacks for food vendors etc.	Cash compensation based upon rates per m2 established at District level, disturbance allowance (15% or 30%).	Recommends in-kind compensation or cash compensation at full replacement cost. Recommends resettlement assistance.	OP 4.12 does not provide for the disturbance allowance. Ugandan law does not provide for resettlement assistance.	District compensation rates + 15% disturbance allowance. Cash compensation. Livelihood restoration, including identification of alternative sites.
Owners of permanent buildings.	Valuation based on replacement value and guidance from CGV & disturbance allowance (15% or 30%).	Compensation at full replacement cost.	The Ugandan laws are consistent with OP 4.12 in regard to replacement cost.	Cash Compensation at replacement value + 15% disturbance allowance.
Perennial Crops	Cash compensation based upon rates per m2/bush/tree/plant established at District Level and disturbance allowance (15% or 30%).	Compensation at full replacement cost. Income restoration.	OP 4.12 does not provide for the disturbance allowance.	Cash compensation using affected District rates + disturbance allowance.
Seasonal crops	No compensation. 3-6 months' notice given to harvest crops.	No specific provision		No compensation is expected for crops to be harvested. However, in the event that livelihoods are lost compensation will be given.
Loss of income	No specific provision	Livelihoods and living standards are to be restored in real terms to pre-displacement levels or better	The Ugandan legislation does not provide for restoration of livelihoods.	In the context of this project, practical livelihood restoration measures have been proposed.
Vulnerable groups	The 1995 Uganda Constitution stipulates that: "the State shall take affirmative action in favour of groups marginalised on the basis of gender, age, disability or any other reason [...] for the purpose of redressing imbalances which exist against	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	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
	them". This regulation is not fully described in the context of resettlement and land acquisition.		of 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 disclosure	There are no explicit provisions for consultations and disclosure but there are guidelines issued by separate ministries (e.g. roads and energy). The Land Acquisition Act,	Consult project-affected persons, host communities and local NGOs, as appropriate. Provide them opportunities to participate in the planning, implementation, and	While the consultation requirement is inherent in the ESIA, it contains several differences with the requirements of Bank policy.	No gap.

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
	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.	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.		
Grievance mechanism and dispute resolution	The Land Act, 1998 states that land tribunals must be established at all districts. The Land Act empowers the Land Tribunals to determine disputes and it provides for appeal to higher ordinary courts. The Land Acquisition Act provides for the aggrieved person to appeal to the High Court.	Establish appropriate and accessible Grievance Redress Mechanism.	GRC structures exist within the Local Councils of Governance in Uganda, but in most cases, they are dysfunctional and ineffective given the limited projects knowledge.	Grievance committees to be instituted within the procedure and will not replace the existing legal process in Uganda; rather it seeks to resolve issues quickly so as to expedite receipt of entitlements and smooth resettlement without resorting to expensive and time-consuming legal action. If the grievance procedure fails to provide a settlement, complainants can still seek legal redress.
Calculation of compensation and valuation	According to the Land Act, Cap 227 (section 77), the value of	Bank policy requires: (a) prompt compensation at full replacement cost for loss of	There is no equivalent provisions on relocation	Market value is based on recent transactions and thus if alternative property is purchased

Category of PAPs/ Type of Lost Assets/ Impact	Ugandan Law	OP 4.12	Gap Analysis	Provisions for this ESIA and ensuing RAPs
	<p>Customary land shall be the open market value of the unimproved land. Value of the buildings shall be at open market value for urban areas and depreciated replacement cost for rural areas.</p> <p>The crops and buildings of a non-permanent nature are compensated at rates set by District Land Boards</p>	<p>assets attributable to the project; (b) if there is relocation, assistance during relocation, and residential housing, or housing sites, or agricultural sites of equivalent productive potential, as required; (c) transitional support and development assistance, such as land preparation, credit facilities, training or job opportunities as required, in addition to compensation measures; (d) cash compensation for land when the impact of land acquisition on livelihoods is minor; and (e) provision of civic infrastructure and community services as required.</p>	<p>assistance, transitional support, or the provision of civic infrastructure.</p> <p>The basis of compensation assessment is not stated in the Land Acquisition Act (an old law due for review), although the Constitution provides for 'prompt, fair and adequate' compensation. (article 26).</p>	<p>within a reasonable period of the payment of compensation, it is likely that market value will reflect full replacement value.</p> <p>However, local inflation in price land or construction materials can affect what is determined as replacement cost. If this is not reflected in recent transactions, market value may not reflect replacement value.</p>

4.4 WORLD BANK OPERATIONAL POLICIES (OPS)

The large solar powered piped water supply system and sanitation facilities to be constructed under IWMDP interventions in Kiryandongo will be funded by the World Bank, which has Environmental and Social Safeguard policies that are designed to avoid, mitigate, or minimize adverse environmental and social impacts of projects supported by the World Bank. The operational policies triggered in this project are summarized in **Table 4-8** below:

Table 4-8: Summary of how the planned project activities trigger WB OPs

Safeguard Policies	Triggered/ Not Triggered	Remarks
Environmental Assessment OP/BP 4.01	Triggered	The proposed project may have adverse environmental and social impacts through its infrastructure activities, particularly civil works for water supply and sanitation. The project alignment goes through rural growth centres with a number of 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 Environmental Assessment classification of projects requiring an ESIA/ESMP given that its potential of moderate 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	There will be potential loss or degradation of natural habitats including riparian and wetland habitats, due to the planned construction works for transmission and distribution lines in these ecologically sensitive areas. The likely impacts on the natural habitats have been assessed as part of the ESIA and appropriate mitigation measures included in the ESMP
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 there are chances of inadvertently finding PCRs. Chance Finds Procedure has been developed as part of the ESIA to guide in managing of PCRs should they be found during project implementation.
Indigenous Peoples OP/BP 4.10	Not triggered	No known Indigenous Peoples exist within the project area.

Safeguard Policies	Triggered/ Not Triggered	Remarks
Involuntary Resettlement OP/BP 4.12	Triggered	The project will involve land acquisitions for sites planned for the water sources and reservoirs. Therefore, the project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons; and in particular, for this project, economic loss is possible. Acquisition of land should be through free, prior and informed consent; and the potentially affected persons should have the right to refuse land acquisition or restrictions on land use that can result into displacement. In order to guide proper implementation of the involuntary resettlement aspects of the project, a Resettlement Action Plan has been prepared in parallel with this ESIA.
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. The source of water supply for this project are two boreholes.
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 to all the project 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. Project information will remain accessible by them.

4.5 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:

- i. Water and Sanitation
- ii. Air emissions
- iii. Hazardous waste management
- iv. Noise
- v. Occupational health and safety.
- vi. Community health and safety including traffic safety such as during project construction or disease prevention
- vii. Construction and decommissioning.

While most of above WBG guidelines apply to the proposed project in one way or the other, in sections below are discussed five environmental, health and safety (EHS) guidelines that are of relevance to the proposed project, namely:

- a. EHS Guidelines - Water and Sanitation
- b. EHS Guidelines – Air Emissions and ambient air quality
- c. EHS Guidelines – Waste Management
- d. EHS Guidelines – Hazardous Materials Management
- e. EHS Guidelines – Construction and decommissioning

The study will explicitly and adequately evaluate all the occupational health and safety aspects of the proposed project activities for all implementation phases including health and safety aspects of project workforce and the general public (construction phase). Appropriate mitigation measures will be recommended for adoption at relevant stages of project implementation.

4.5.1 WBG EHS GUIDELINES: WATER AND SANITATION

The EHS Guidelines for Water and Sanitation include information relevant to the operation and maintenance of:

- (i) Potable water treatment and distribution systems
- (ii) Collection of sewage in centralized systems (such as piped sewer collection networks) or decentralized systems (such as septic tanks subsequently serviced by pump trucks) and treatment of collected sewage at centralized facilities.

The EHS guidelines outline Industry specific-impacts and their management that comprise;

- (i) Environmental issues associated with water and sanitation projects may principally occur during the construction and operational phases, depending on project-specific characteristics and components
 - a) Drinking water – water withdrawal, water treatment, water distribution,
 - b) Sanitation – faecal sludge and septage collection, sewerage (Domestic wastewater discharges, Industrial wastewater discharges, Leaks and overflows), Wastewater and Sludge Treatment and Discharge (Liquid effluents, Solid waste, Air emissions and odours, Hazardous chemicals, Ecological impacts).
- (ii) Occupational Health and Safety during the construction and decommissioning of Water and Sanitation facilities. Occupational health and safety impacts associated with the operational phase of water and sanitation projects primarily include the following:
 - a) Accidents and injuries
 - b) Chemical exposure
 - c) Hazardous Atmosphere
 - d) Exposure to pathogens and vectors
 - e) Noise
- (iii) Community health and safety impacts during the construction of water and sanitation projects are discussed including;
 - a) Drinking Water - Water Intake (Water Supply Protection), Water Treatment (Drinking Water Quality and Supply, Hazardous Chemicals) and Water Distribution.

- b) Sanitation - Wastewater and Septage Collection (Preventing sewerage system overflows, Preventing build-up of potentially toxic and explosive gases in the sewer), Wastewater and Sludge Treatment (Liquid effluents, Air emissions and odours, Physical hazards)

4.5.2 WBG EHS GUIDELINES: AIR EMISSIONS AND AMBIENT AIR QUALITY

4.5.2.1 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). Uganda currently has (draft) national air quality standards applicable to this project.

In these guidelines “significant” refers to sources which can contribute a net emission increase of one or more of the following pollutants within a given air shed:

- i. Particulate matter of size 10 microns (PM10): 50 tons per year (tpy).
- ii. Oxides of nitrogen (NOx): 500 tpy.
- iii. Sulphur dioxide (SO₂): 500 tpy; or as established through national legislation.
- iv. Equivalent heat input of 50 MWt or greater.

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.

4.5.3 WBG EHS GUIDELINES: WASTE MANAGEMENT

4.5.3.1 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. Large waste volumes will be generated especially at project/construction site, material holding/stockpile yards, site workshop and construction equipment parking lot, batching plant, temporarily contractor workforce shelters among others. The guidelines advocate for waste management planning where waste should be characterized according to composition, source, types, and generation rates. These guidelines call for implementation of a waste management hierarchy that comprises prevention, recycling/reuse, treatment, and disposal. The guidelines require segregation of *conventional waste* from *hazardous waste* streams. Examples of hazardous construction waste are waste oil from vehicles and machinery paint waste, thinners, and concrete wash water (e.g., from cleaning concrete mixers).

4.5.3.2 IMPLICATION FOR THIS PROJECT

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.

4.5.4 WBG EHS GUIDELINES: HAZARDOUS MATERIALS MANAGEMENT

4.5.4.1 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.

4.5.4.2 GENERAL HAZARDOUS MATERIALS MANAGEMENT

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

4.5.5 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) below.

1) Environment:

- **Noise and Vibration:** During construction and decommissioning activities, noise and vibration may be caused by the operation of material haulage fleet, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials, and people.
- **Air Quality:** Project will involve excavations and handling of construction materials such as aggregates, sand, cement among others and this could generate fugitive dust affecting adjacent environs. A secondary source of emissions may include exhaust from diesel engines of earth moving equipment, as well as from open burning of construction waste.
- **Solid Waste:** During project implementation, non-hazardous solid waste generated at construction sites including domestic waste and other wastes such as wood and metals.
- **Hazardous Materials:** Fuel, lubricating oils and other forms of hazardous waste may be encountered.

2) Occupational Health and Safety

Likely OHS risks during the proposed project include over-exertion, slips, and falls, work at heights, hot works (welding), and electrocution, being struck by objects, injury by moving machinery and dust from demolition and construction activities.

3) Community Health and Safety

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

4) Traffic Safety

Project activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment increasing the risk of traffic-related accidents and injuries to workers, local communities and road users.

4.6 INSTITUTIONAL FRAMEWORK

4.6.1 MINISTRY OF WATER AND ENVIRONMENT

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

4.6.1.1 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. DWRM issued the water abstraction permits for the project and will monitor compliance to the conditions of the permits throughout the project's lifetime.

4.6.1.2 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. WMD will issue wetland use permits for activities to be carried out in wetlands and monitor compliance to the conditions of the permit, so as to ensure sustainable utilisation of wetland resources.

4.6.2 NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

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

4.6.3 UGANDA WILDLIFE AUTHORITY

Uganda Wildlife Authority (UWA) is mandated to ensure sustainable management of wildlife resources and supervise wildlife activities in Uganda both within and outside the protected areas. UWA will provide guidance for instances where wildlife is encountered during project implementation and undertake any wildlife capture and relocation activities.

4.6.4 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, provided guidance on land acquisition and property valuation while undertaking the Resettlement Action Plan. MoLHUD will also issue certificates of titles for land purchased by and registered to the Government under this project..

4.6.5 UGANDA NATIONAL ROADS AUTHORITY

The mandate of UNRA is to develop and maintain the national roads network, advise Government on general roads policy and contribute to addressing of transport concerns, among others. Some of UNRA responsibilities include: management of the National Roads Network; maintenance and development of the national roads network; and establishing and maintaining road reserves among others. UNRA is a key stakeholder under the project because the distribution lines run along the road reserve of Bweyale-Gaspa-Kawiti road while transmission line crosses it at Gaspa trading centre. UNRA will authorise construction of project components in the road reserve as well as provide guidance and supervision for the project contractor in constructing service ducts for the pipe crossing on roads..

4.6.6 MINISTRY OF GENDER, LABOUR AND SOCIAL DEVELOPMENT

Ministry of Gender Labour and Social Development is mandated to empower communities to harness their potential through skills development, labour productivity and cultural growth. This ministry sets policy direction and monitoring functions related to labour, gender and general social development. Its OHS Department in the ministry is responsible for inspection and monitoring occupational safety in workplaces and this could be during project construction and operation of the laboratory facilities. It is responsible for work place registration and certification of equipment.

The OHS Department in this Ministry will be responsible for undertaking inspections of construction sites to ensure safe working conditions; issue certification of equipment in compliance with the OHS act and registration of work places.

4.6.7 OFFICE OF THE PRIME MINISTER

The office of the Prime Minister, under the Refugee Management Department is mandated to implement the Comprehensive Refugee Response Framework adapted from the principles and objectives set out in Annex 1 of the New York Declaration of Refugees and Migrants that focusses on humanitarian and development needs of both refugees and host communities. The department is mandated to lead and enhance National Response Capacity to Refugee Emergency Management through:

- 1) Receiving and granting asylum to refugees in accordance with both international and national legal frameworks;
- 2) Settling refugees granted asylum, developing and implementing humanitarian interventions;
- 3) Government and other stakeholders on refugee matters;
- 4) Providing physical protection to refugees;
- 5) Improving the physical infrastructure of the Refugee settlements, ranging from roads; staff accommodation, offices, reception centres among others; and
- 6) Enhancing the Refugee livelihoods through provision of Income Generating Activities (IGAs)

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

4.6.8 KIRYANDONGO DISTRICT LOCAL GOVERNMENT

The 1997 Local Government Act provides for decentralization and devolution of government functions, powers and services from the central to Local Governments and sets up the political and administrative functions of local governments. The Local Governments are responsible for the protection of the environment in their respective areas of jurisdiction. Local Governments were consulted on projects to be located within their jurisdiction and on matters that affect their environment. Local government structures are important for mobilising support for the project as well as monitoring its social-environmental impacts both during construction and operation phases. At the District Level, the District Environmental Officers, District Water Officer, District Engineer and Community Development Officers in the respective areas of project implementation will participate in monitoring the projects to ensure that mitigation measures are adequate and advise or point out additional compliance requirements following their inspections. The District Land Boards and Lands Officers will provide support on matters of compensation or land acquisition.

5 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.

5.1 ADMINISTRATIVE SET UP AND DESCRIPTION OF KEY PROJECT SITES

The service areas for the project are well within the boundaries of Kiryandongo district in Kiryandongo sub county, Kiryandongo Refugee Settlement and Bweyale Town Council (**Figure 5-1**).

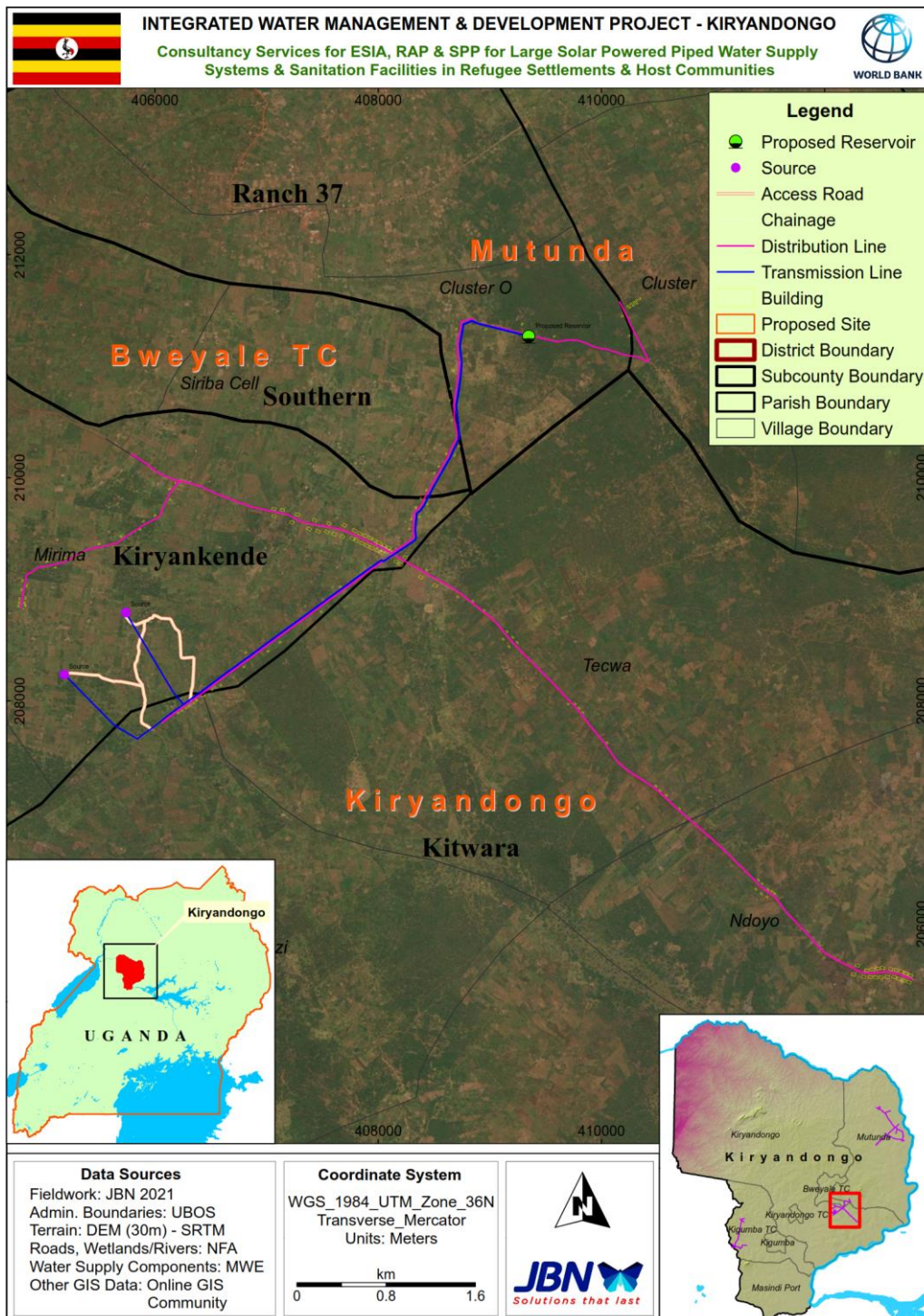


Figure 5-1: Map of layout of the proposed infrastructure system for Gaspá RGC

5.1.1 BOREHOLES (WATER SOURCES)

5.1.1.1 BOREHOLE DWD 77380 (30M³/HR YIELD)

Source DWD 77380 is located in Mirima village, Kiryankende Parish and Kiryandongo Subcounty, about 1km off Gaspa – Kitongozi Primary School Murram Road (**Figure 5-2**). The borehole pumping main will deliver water from the borehole to the water Reservoir with an independent transmission main. There is no immediate site access road as its only possible through a small narrow road 0.5km and the rest are gardens and bushland, hence a need to open and access during implementation. There is no special habitation onsite since the first nearby home is 120m from the borehole. The site surrounding is characterized by gardens, open bushland and short grasses, currently used as a grazing land (**Figure 5-3**). It is in a lowland (a flood prone) and infiltration of surface run-off may occur during heavy rains hence contamination.

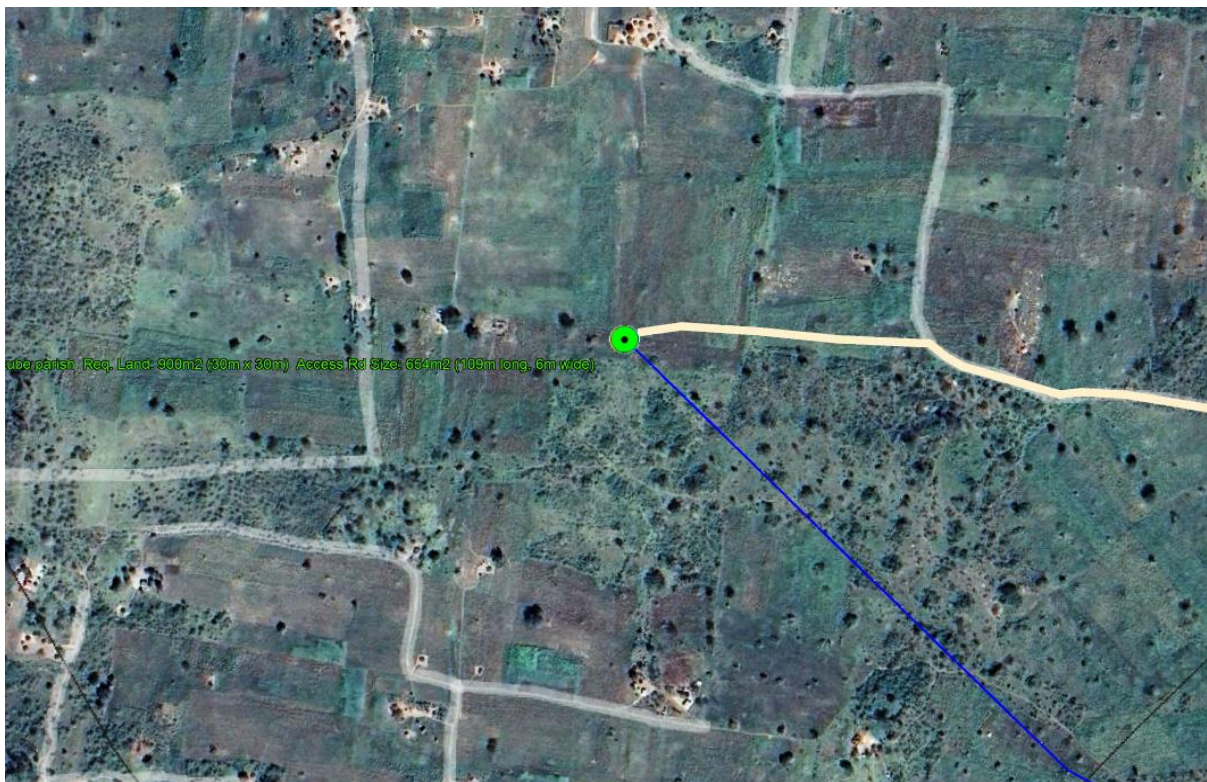


Figure 5-2: Location of Borehole DWD 77380 and its environs

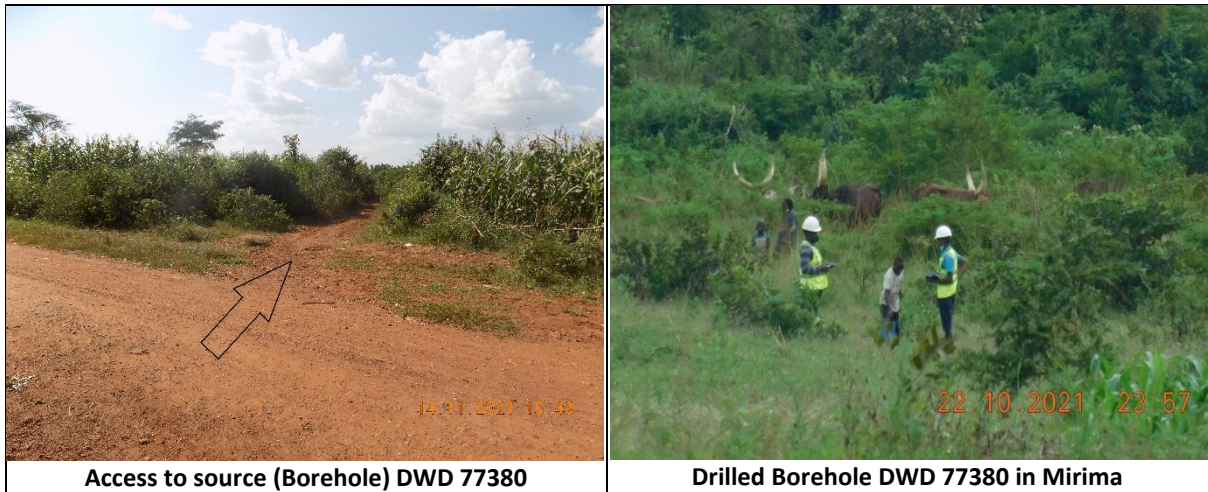


Figure 5-3: Location, surrounding and access of water source (Borehole) DWD 77380

5.1.1.2 BOREHOLE DWD 77381 (50.5M³/HR)

Source DWD 77381 is located in Mirima village, Kiryankende Parish and Kiryandongo Subcounty, also about 1.5km off Gaspa – Kitongozi Primary School Murram Road (**Figure 5-4**). The borehole pumping main will deliver water from the borehole to the water Reservoir with an independent transmission main. There is no immediate site access road as its only possible through a small narrow road 1km and the rest are gardens and bushland, hence a need to open and access during implementation. There is no special habitation onsite since the first nearby home is 150m from the borehole. The site surrounding is characterized by gardens and open bushland (**Figure 5-5**). It is in a lowland (a flood prone) and infiltration of surface run-off may occur during heavy rains hence contamination.



Figure 5-4: Location of Borehole DWD 77381 and its environs

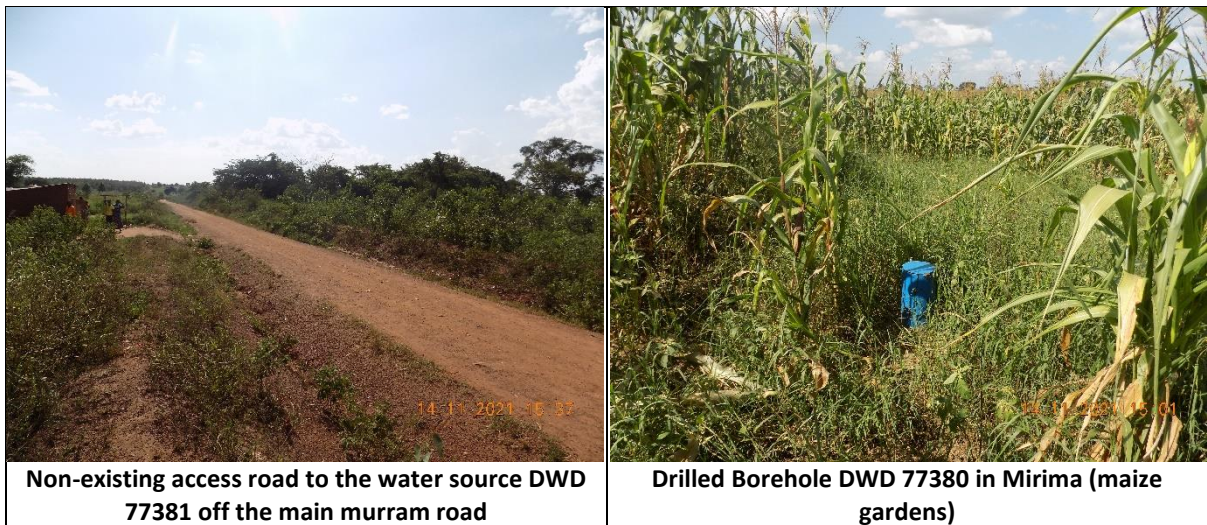


Figure 5-5: Existing environment and access of the water source (Borehole) DWD 77381

5.1.2 GASPA RESERVOIR TANK

Gaspa RGC will have one reservoir tank located in Siriba Cell, Southern ward, Bweyale town council.

The chosen tank site is located on a flat land on top of a hill about 3km from Gaspa trading centre at 1114 m.a.s.l on a privately owned land (**Figure 5-6**). The access to the site is possible through a narrow road. Therefore, there is a need to rehabilitate the existing access road to the site during implementation. The site is used as a cultivation ground for food crops (currently maize garden) neighboured by three homesteads and bush (**Figure 5-7**). 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 15m steel tower. The area has neither sensitive ecosystems nor endangered species.



Figure 5-6: Location of Gaspas reservoir tank and its environs



Figure 5-7: Existing environment and access of Gaspas reservoir tank

5.1.3 TRANSMISSION SYSTEM

5.1.3.1 TRANSMISSION MAIN FROM WATER SOURCES TO THE MAIN TANK

The two borehole pumping mains in Mirima - Kikube will deliver water from the drilled boreholes to the water storage reservoir in Siriba Cell -, through independent transmission mains (**Table 5-1** and **Figure 5-8**). The Transmission pipes from both Borehole DWD 773780 and Borehole DWD 773780 will cross 3 villages, originating from Mirima through Siriba Cell . The pipes will traverse the bushland with scattered tall trees for about 1 km (there is a need to open both accesses to the boreholes) before reaching the main road (Gaspas – Kitongozi access road) (**Figure 5-9**). The transmission system will maintain the left side of the road reserve for about 2.7km before crossing

the road to the right side towards Gaspa trading centre (**Figure 5-10**). In Gaspa trading Centre, the pipes will make a second major access road crossing (**Figure 5-11**) and move on the right about 3km to reach the reservoir tank. The pipelines don't cross any sensitive ecosystems from the borehole to the reservoir tank.

Table 5-1: Proposed transmission Network for Gaspa RGC

Source	Destination		Pipe Details	Length (km)
Source DWD 77380	Gaspa Tank	Reservoir	OD 160 uPVC PN10	6.617
Source DWD 77381	Gaspa Tank	Reservoir	OD 160 uPVC PN16	6.552

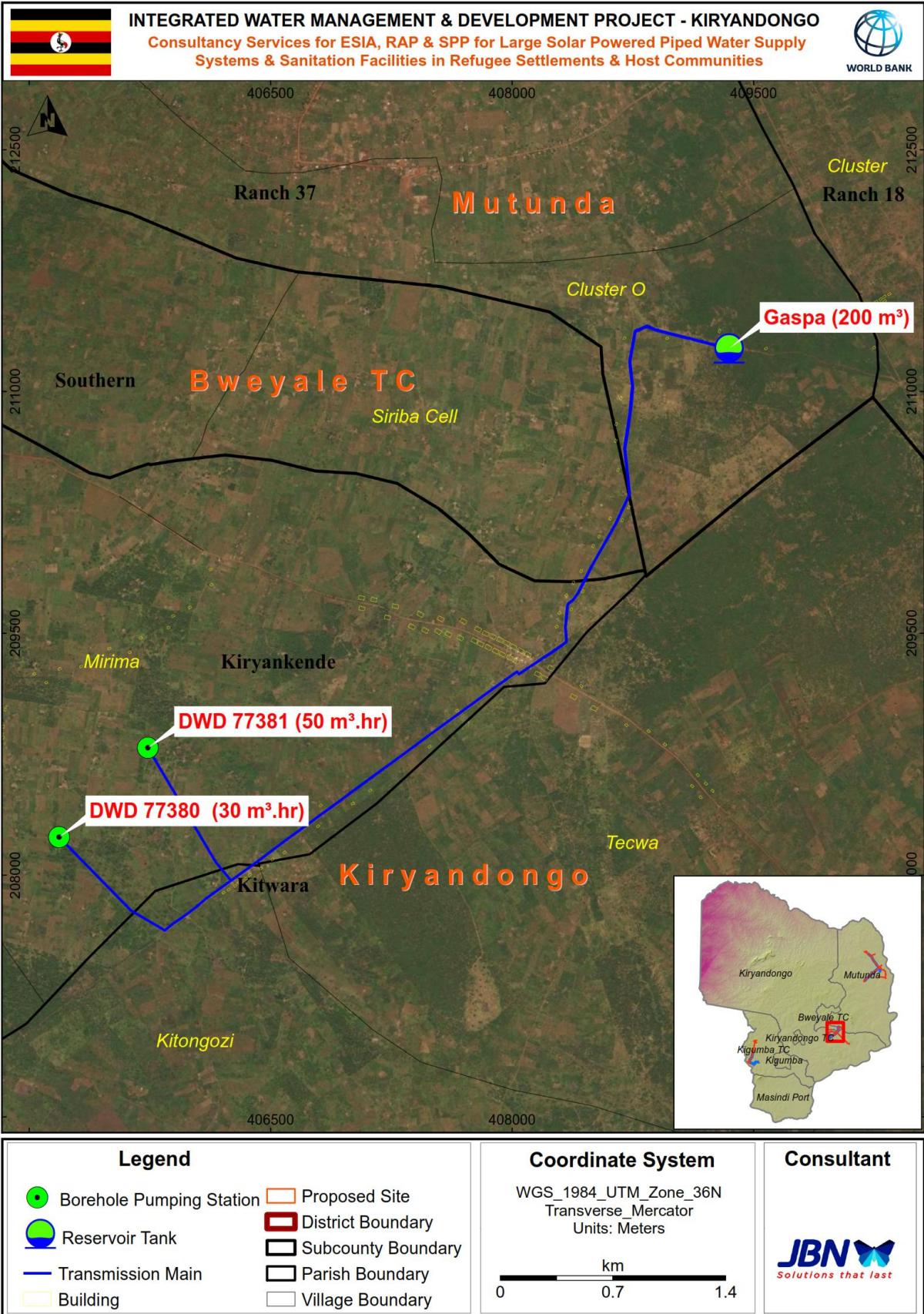


Figure 5-8 Transmission network layout for Gaspa RGC

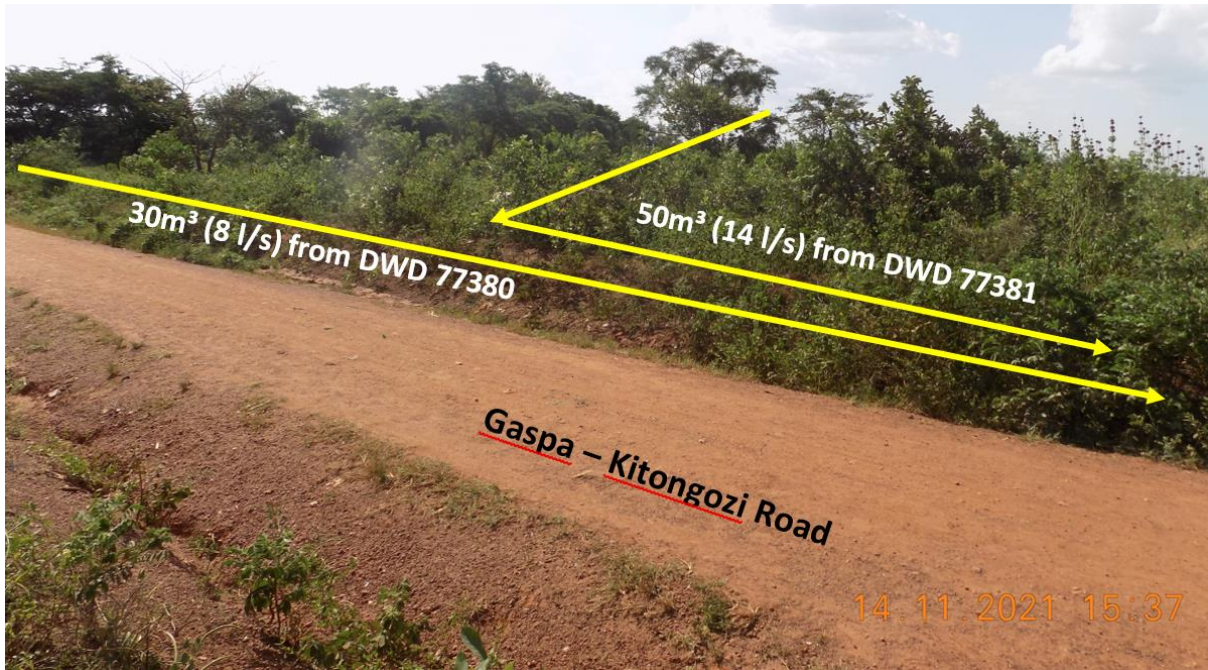


Figure 5-9: Transmission mains from both boreholes along the road reserve at Line Moja trading centre

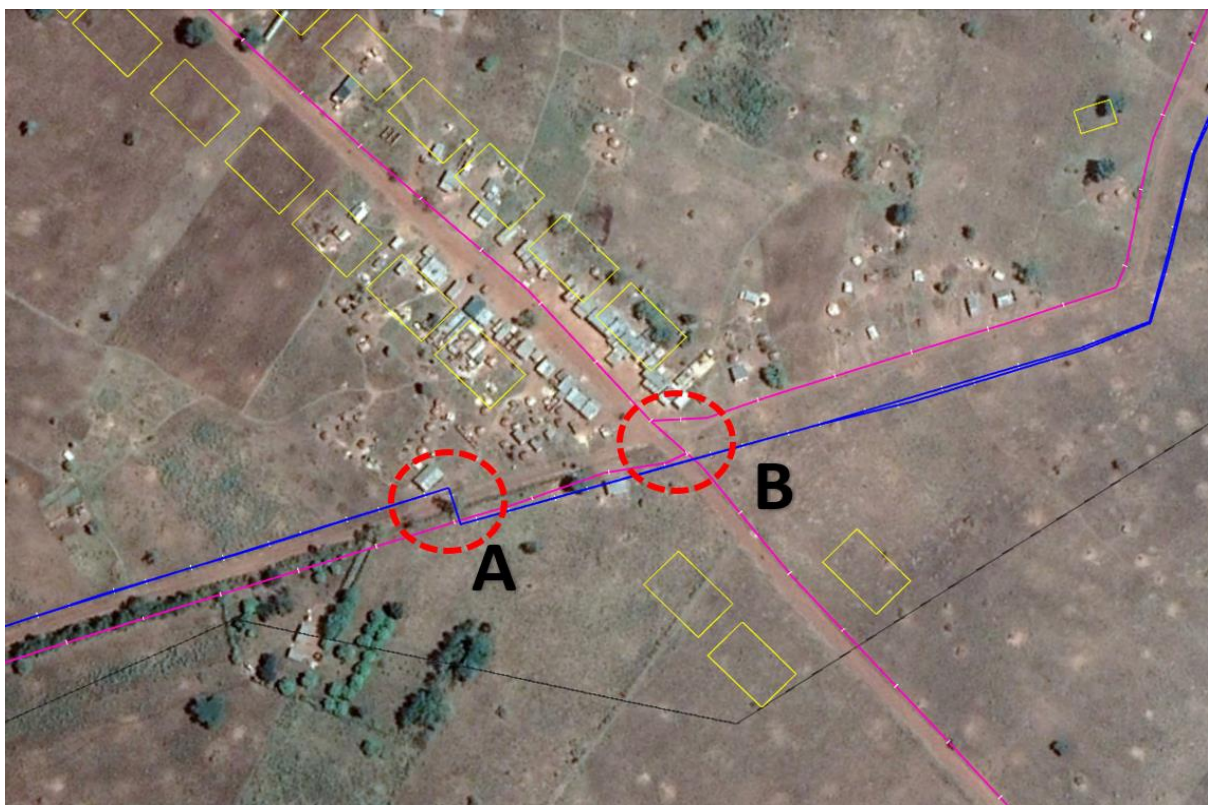


Figure 5-10: Key road crossing points along the transmission mains from Sources DWD 77380 and DWD 77381 towards Gaspa Reservoir



Figure 5-11: Transmission lines crossing the access road crossing at E408034, N209256

5.1.4 DISTRIBUTION NETWORK

The pipeline to Siriba Cell, will move on the left side of the access road from the tank to area of interest. The pipe intended for Gaspa trading centre and environs will move on the right side of the road from the tank up to Gaspa trading centre where it will form two T junctions (Figure 5-12). Junction one will distribute to Gaspa town and area around Goshen P/S and junction two will supply the areas of Line Moja trading centre and towards the Victoria Nile. The areas of distribution and where distribution network pass have neither sensitive ecosystems nor endangered species and will distribute to different villages and trading centres (Figure 5-13).



Figure 5-12: Road junction in Gaspa town where pipes will cross road at E40813, N209317



Gaspa trading centre in (E408072, N209342)



Aerial view of Gaspa trading centre



Ndoyo trading centre (E412903, N205455)



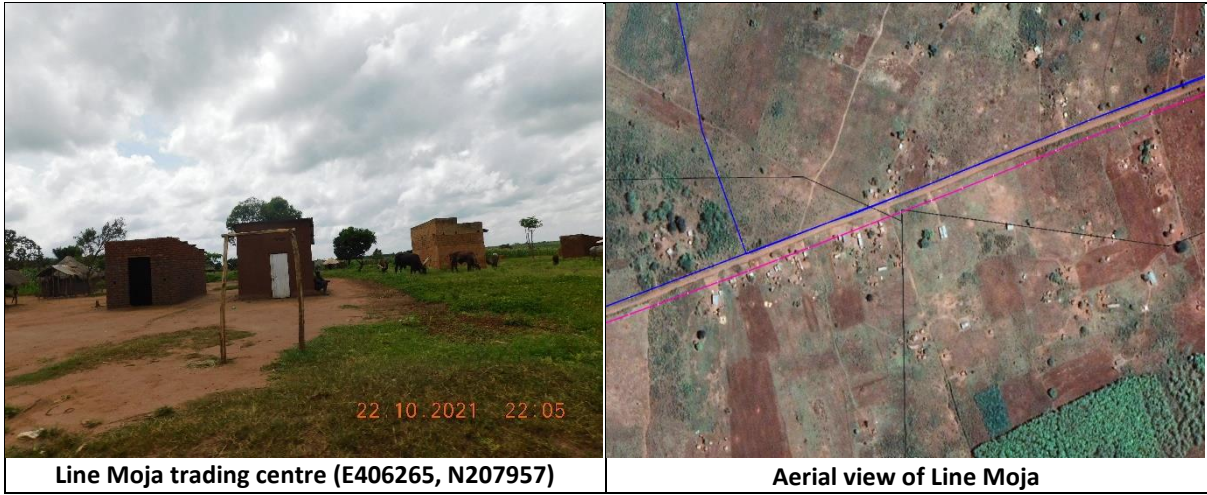
Aerial view of Ndoyo area



Goshen P/S and environs (E406218, N209977)



Aerial view of Goshen P/S and environs



Line Moja trading centre (E406265, N207957)

Aerial view of Line Moja

Figure 5-13: Areas to be supplied under Gaspa RGC

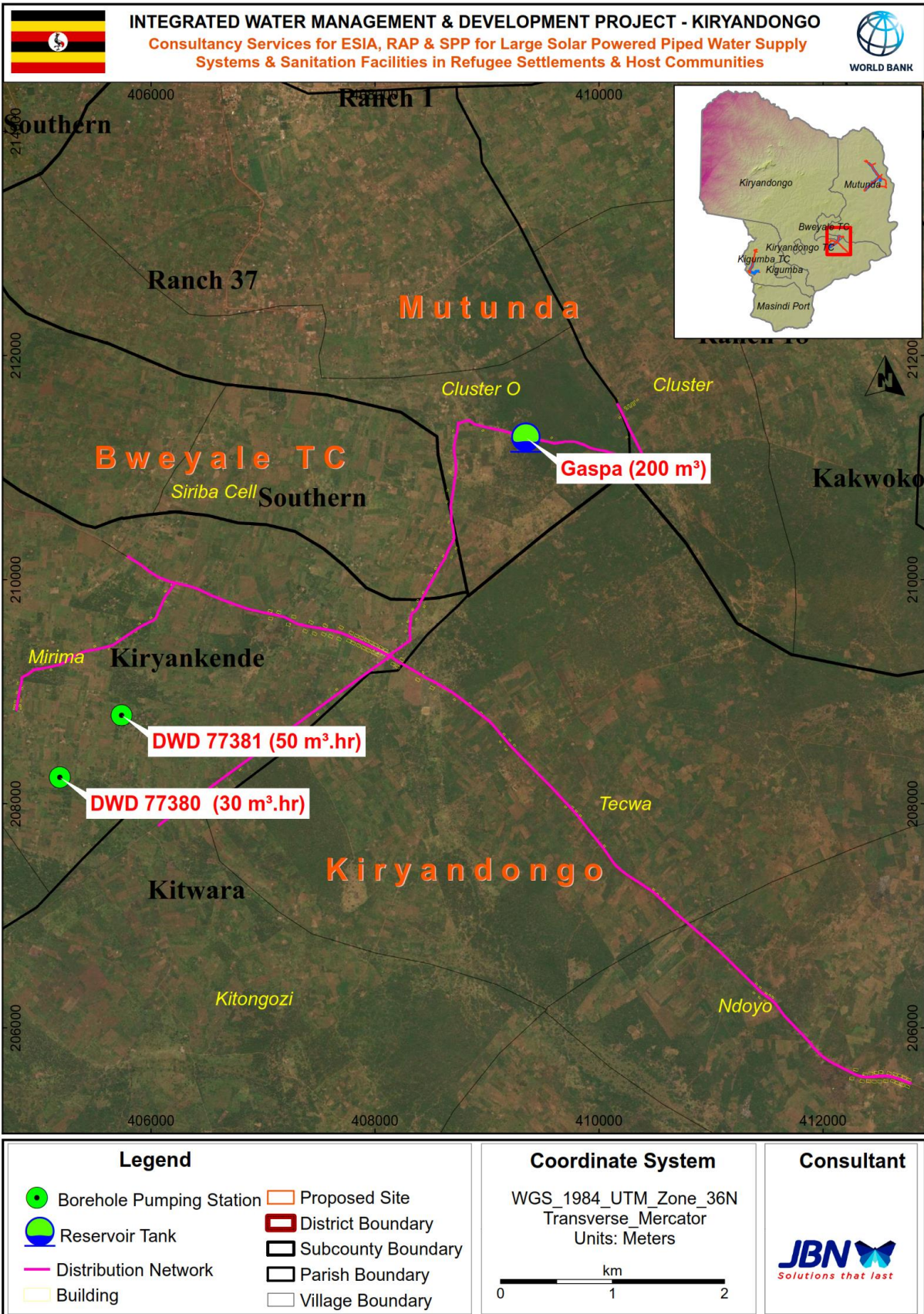


Figure 5-14: Distribution network layout for Gaspa RGC

5.2 PHYSICAL ENVIRONMENT

5.2.1 CLIMATE AND WEATHER

Kiryandongo District (project area) is located in climatic zone I with a reported annual average rainfall of 1340mm. The nearest operational weather station close to the project area is Masindi port station (MWE, Feasibility Study and Design Report, 2021). The rainfall distribution in the project area is bimodal characterized by one rainfall season with two peaks from March - May and a long one from August - November. Based on the amount of rainfall received, the district can be divided into three (3) major climatic zones.

- a) High rainfall zones: These are areas which receive more than 1000 mm of rainfall per annum. No Sub County receives this rainfall amount in Kiryandongo District.
- b) Medium rainfall zones: These are areas with total amount of rainfall ranging between 800mm – 1000mm per annum. Areas which fall under this zone include Kigumba and Kiryandongo sub counties as well as part of Mutunda Sub County.
- c) Lower rainfall zones: These are areas which receive less than 800mm of rainfall per annum. Localities in Masindi Port Sub County receive this rainfall amount.

The dry season is experienced from December - February. The annual rainfall averages about 1372 mm during the which is quite favourable. The **Figure 5-15** below shows the distribution of the average monthly rainfall, temperature and evapotranspiration in the project area. The hot season lasts for 2.0 months, from January to March, with an average daily high temperature above 32°C and the hottest month of the year is February, with an average high of 34°C and low of 20°C. The cool season lasts for about six (6) months, from April to November 20, with an average daily high temperature below 28°C whereas the coldest month of the year is July, with an average low of 20°C and high of 28°C. The annual average evapotranspiration in the project area based on FAOCLIM database is about 1435 mm and exceeds rainfall especially in the dry season. Using Thornthwaite Climate Classification System (1948), the climate is classified as “moist sub-humid” and is characterized by “a large water surplus during the rainy seasons and only moderate water deficiencies during the dry season”. Hence, the climate is generally favourable. Daily minimum temperatures are in the range of 18 – 19 °C. Maximum temperatures range between 28 – 32 °C with the highest temperatures experienced in February. Average temperatures range between 23 – 26 °C.

Relation of baseline to the project: Kiryandongo experiences a favourable 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 favourable in moderate rainy days and sunny days/ months to reduce on the impact of soil erosion, and dust and air quality nuisance from the sites.

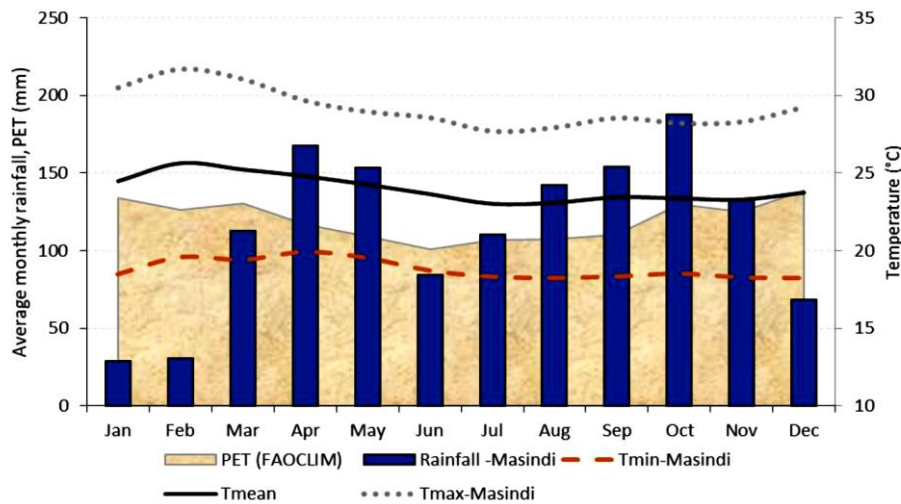


Figure 5-15: Monthly distribution of climatic variables

5.2.2 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). Kiryandongo district has both surface and ground water resources. According to the data for existing boreholes in the Kiryandongo, borehole yields in the project area is very good ranging between 3 – 48 m³/hr with an average of 8.65 m³/hr. The district (project area) is located in the Albert WMZ and Victoria Nile Basin. Victoria Nile is a section of the River Nile that connects Lake Victoria, Lake Kyoga and Lake Albert as it flows downstream from Lake Victoria. Kiryandongo district is also gifted with several wetlands in numerous locations. The most outstanding wetlands are Nanda wetland in Mutunda, Titti wetland in Kigumba (the longest) and Nyakabale/Nyama wetland in Masindi port sub-county (**Figure 5-17**). However, due to the flat nature of the area i.e., a raised plateau with a relatively uniform elevation indicating devoid of water reserves during the dry season, these wetlands are largely seasonal. Wetlands are also facing degradation from agriculture and settlements.

The biggest part of the district including the RGCs and the above-mentioned wetlands drain eastwards towards Victoria Nile which is the largest surface water source in the district. The section between Lake Kyoga to Lake Albert is commonly called the Kyoga Nile located about 7 km from Gaspa RGC. The main surface water body in the project area is Victoria Nile. The river flows along the eastern boundary of the district. Victoria Nile is about 25 Km south east of Nyakabare RGC, 13 Km south of Gaspa RGC and 5 Km east of Mutunda RGC.



Seasonal stream about 0.5km from Gaspa town i.e., the lowland has been heavily degraded with rice growing activity



Ground water (borehole) in Tecwa (E408535, N209055)



Seasonal stream along Bweyale – Gaspa access road at E407206, N209650

Figure 5-16: Surface and ground water resources in Gaspa RGC project area



Figure 5-17: Water resources and drainage network of Gaspa RGC project area

5.2.3 TOPOGRAPHY

Kiryandongo district is generally a plateau land with an average elevation of 1,295 meters above sea level. The district has undulating hills with high points in some localities. In Gaspa RGC, the topography is generally gently sloping with only modest variations in elevation. The lowest and highest elevations are 1043m and 1264m above the sea level. The area has a maximum elevation change of 221m and an average elevation above sea level of 1150m (Figure 5-18).

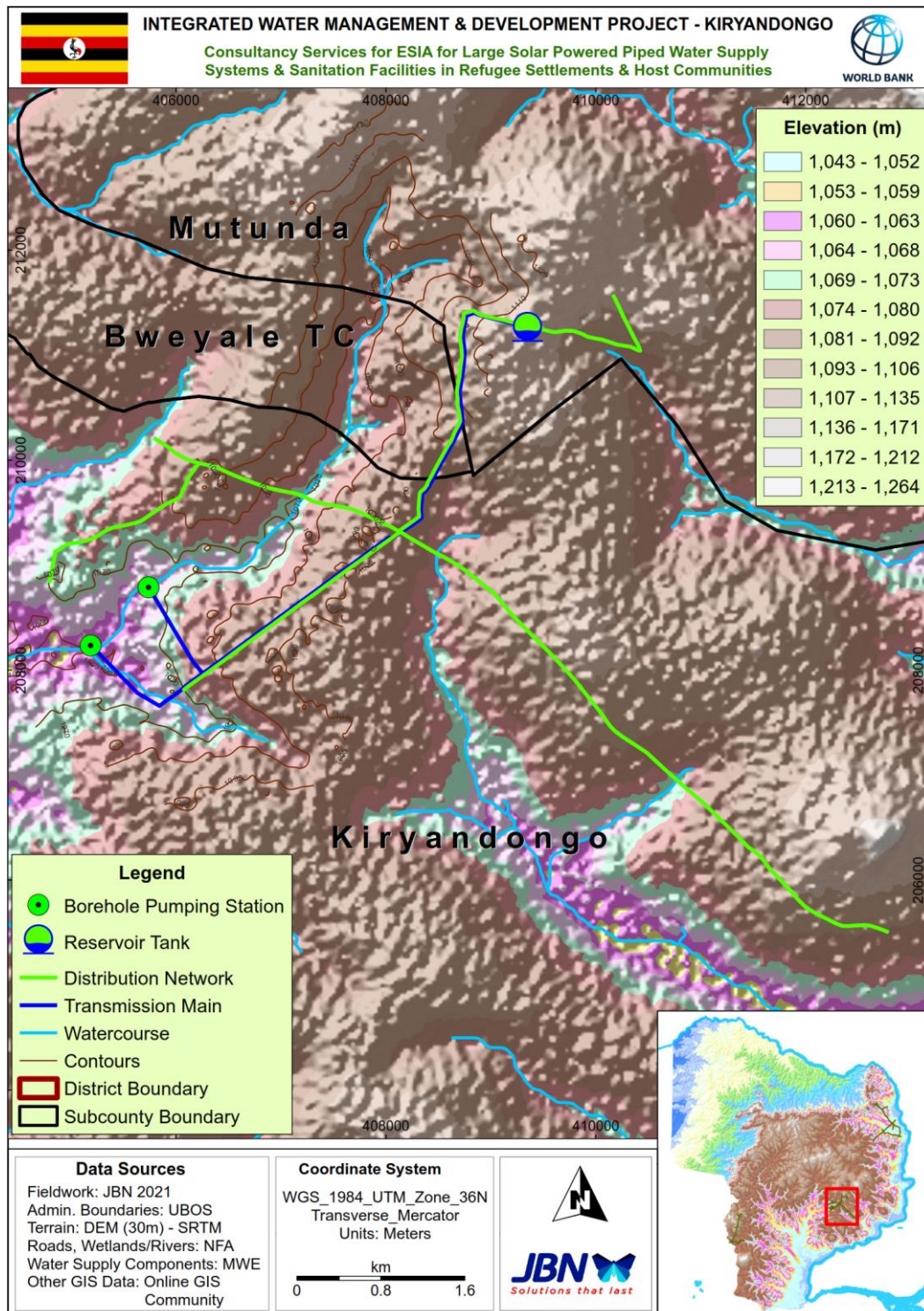


Figure 5-18: Elevation map of Gaspa RGC

The gradient of the distribution main increases with distance from the Gaspa Reservoir **Table 5-2** and **Figure 5-19**. Gaspa and Ndoyo trading centres have maximum and minimum head difference of 23m and 26m with distance of 3km and 9.2km from the reservoir respectively thus providing enough pressure for water flow.

Table 5-2: Distance, elevation and head differences from Reservoir

Location	Distance from Reservoir (km)	Elevation (m) amsl	Difference from Reservoir (m)
Gaspa Reservoir	0	1114	0.0
Gaspa trading Centre	3.0	1091	23
Ndoyo Trading Centre	9.2	1089	25
Mirima	7.5	1071	43
Cluster	1.71	1114	0.0



Figure 5-19: Elevation profile of the Water pipe line for distribution lines of Gaspa RGC

The changes in meters with distance from reservoir are reflected in the elevation profile in **Figure 5-19**. From the profile, it was observed that the elevation of the reservoir tank and the distribution lines are at a higher altitude than the proposed locations of distribution; namely Gaspa trading centre and Ndoyo trading centre. All trading centres will be served well by gravity from the reservoir tank.

5.2.4 TECTONICS AND SEISMOLOGY

The site is largely located on an unfairly stable geological unit with high seismic hazard (risk levels) above the Albertine environment (western rift valley). Although, numerous faults exist within the country and tremors due to earthquakes that do occur, the site area is located within the shield area, but only approximately 30 – 70 km from the western rift and about 80 km south of the Aswa Fault Zone. It is therefore susceptible to the potential effect of major tectonic features of regional scale. The site is in the main, located in Zone 1 of the Seismic Zoning of Uganda, implying a high risk (**Figure 5-20**). According to US 319:2003 Uganda Standard for Seismic code of practice for structural designs, the seismic zoning factor of Zone 1 is 1.0 (Zmax). Therefore, appropriate design of seismic acceleration values consistent with Contract Technical Specifications and National

standards should be adopted during structural foundation designs due to the high likelihood of earthquake occurrence in the area.

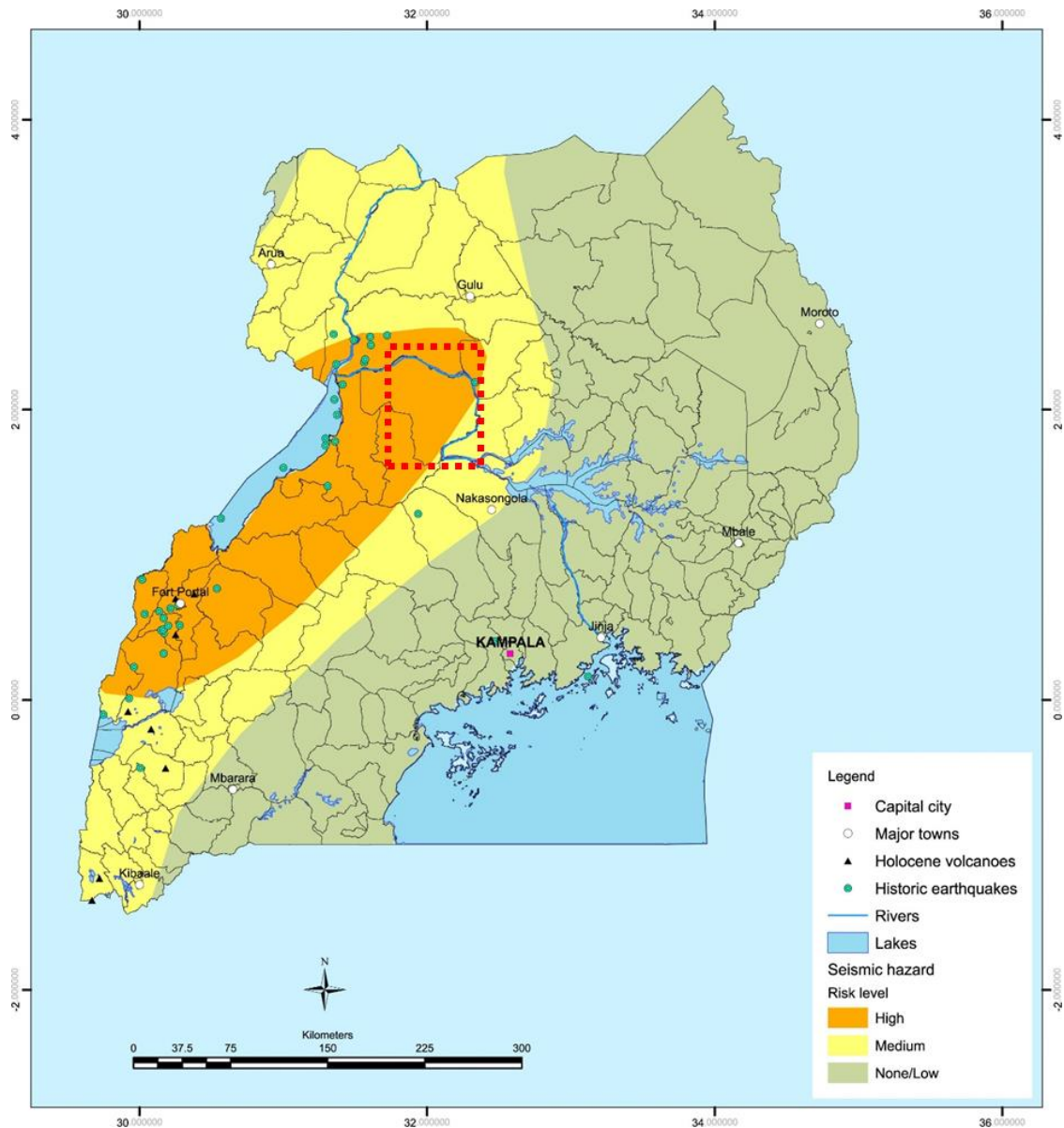


Figure 5-20: Seismic hazard zonation map of Uganda:

Source: Office of the Prime minister (OPM)

5.2.5 GEOLOGY AND GEOMORPHOLOGY

Geology of Uganda is composed predominantly of Archaean basement rocks formed mainly between >3.08 Ga and 2.55 Ga³. Kiryandongo district lies in the North Uganda Terrane (NUT) of Uganda's geology which comprises of both the Mesoarchaean and Neoproterozoic rocks which are further divided into two (2) building blocks; the Karuma Complex (a Mesoarchaean phase of crust formation, mainly composed of granulitegrade metasediments) and Neoproterozoic Complex

³ Geology and Geodynamic Development of Uganda with Explanation of the 1:1,000,000 -Scale Geological Map.

(further divided into five (5) supracrustal rock units of the Amuru Group and into 22 rock units of deformed granitoids, gneisses and migmatites of igneous or uncertain origin). The southern part of Kiryandongo is covered by the Mesoproterozoic rocks. The general project area is composed of Bunyoro Group (shale, slate, phyllite, sandstone and quartzite) of Neoproterozoic rocks (541 – 1000 Ma) towards Kyoga; Igisi Group (mica schist, quartzite and ironstone) of Mesoproterozoic rocks (1000 – 1600 Ma); Metagabbro, Amuru Group (gneiss and amphibolite) and Variable gneissic granitoid (2591±27 Ma and 2652±8 Ma) of Neoarchaean rocks (2500 – 2800 Ma) and Karuma Group (felsic and mafic granulite) of Mesoarchaean rocks (2800 – 3200 Ma) (**Figure 5-21**).

The geology of Gaspa RGC project area is mainly underlain by the Variable gneissic granitoid (2591±27 Ma and 2652±8 Ma) which are comprised of the undifferentiated gneisses and granulites facies rocks in the north (Basement Complex) (**Figure 5-22**). The geomorphology of area is majorly formed of areas of infill and rock formation and types that form the remnants of the low surfaces and scarps related to rift sediments of the western rift valley (warped basin lake) (**Figure 5-23**).

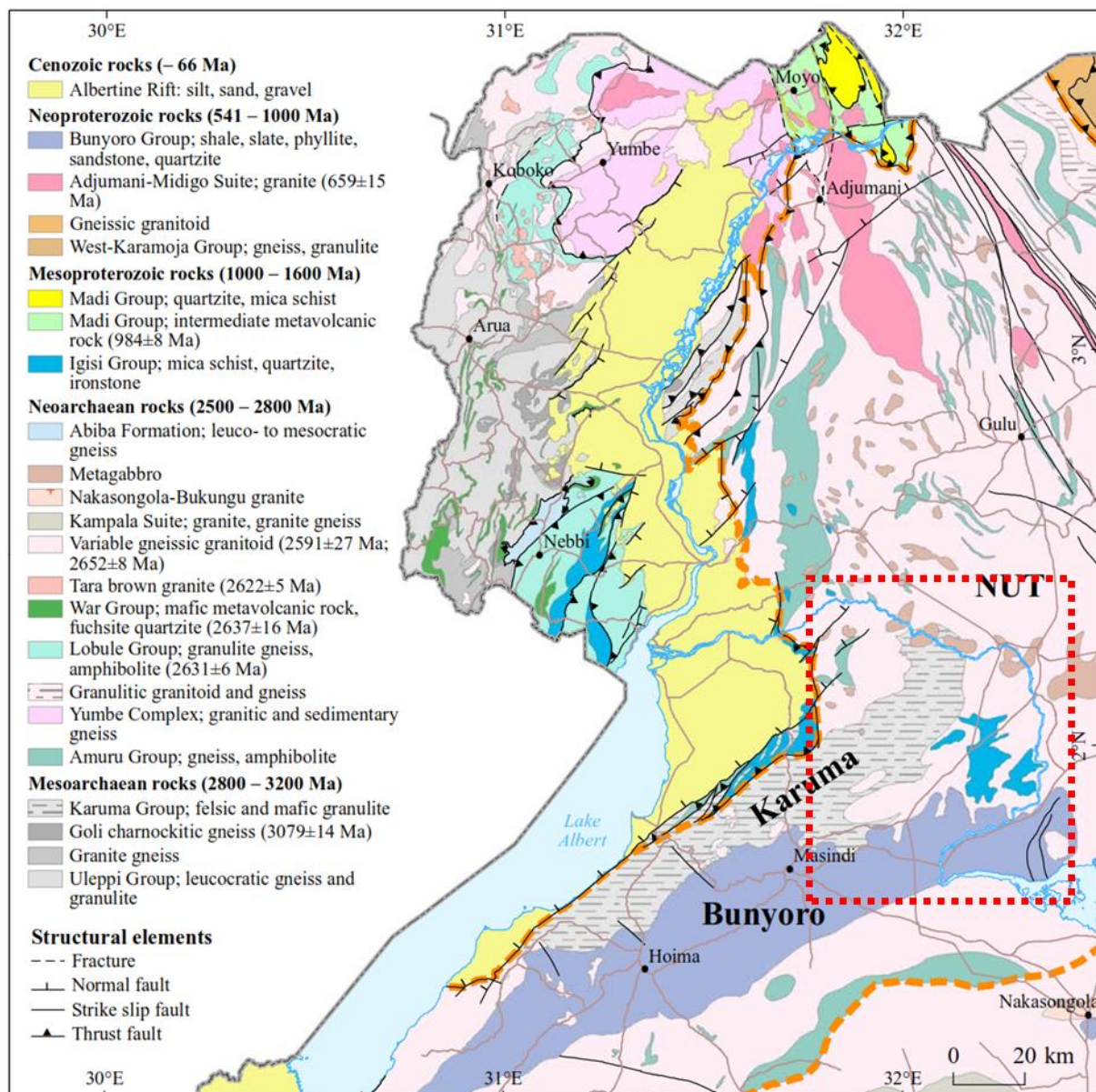


Figure 5-21: Geological outline of the western part of the North Uganda Terrane (NUT)

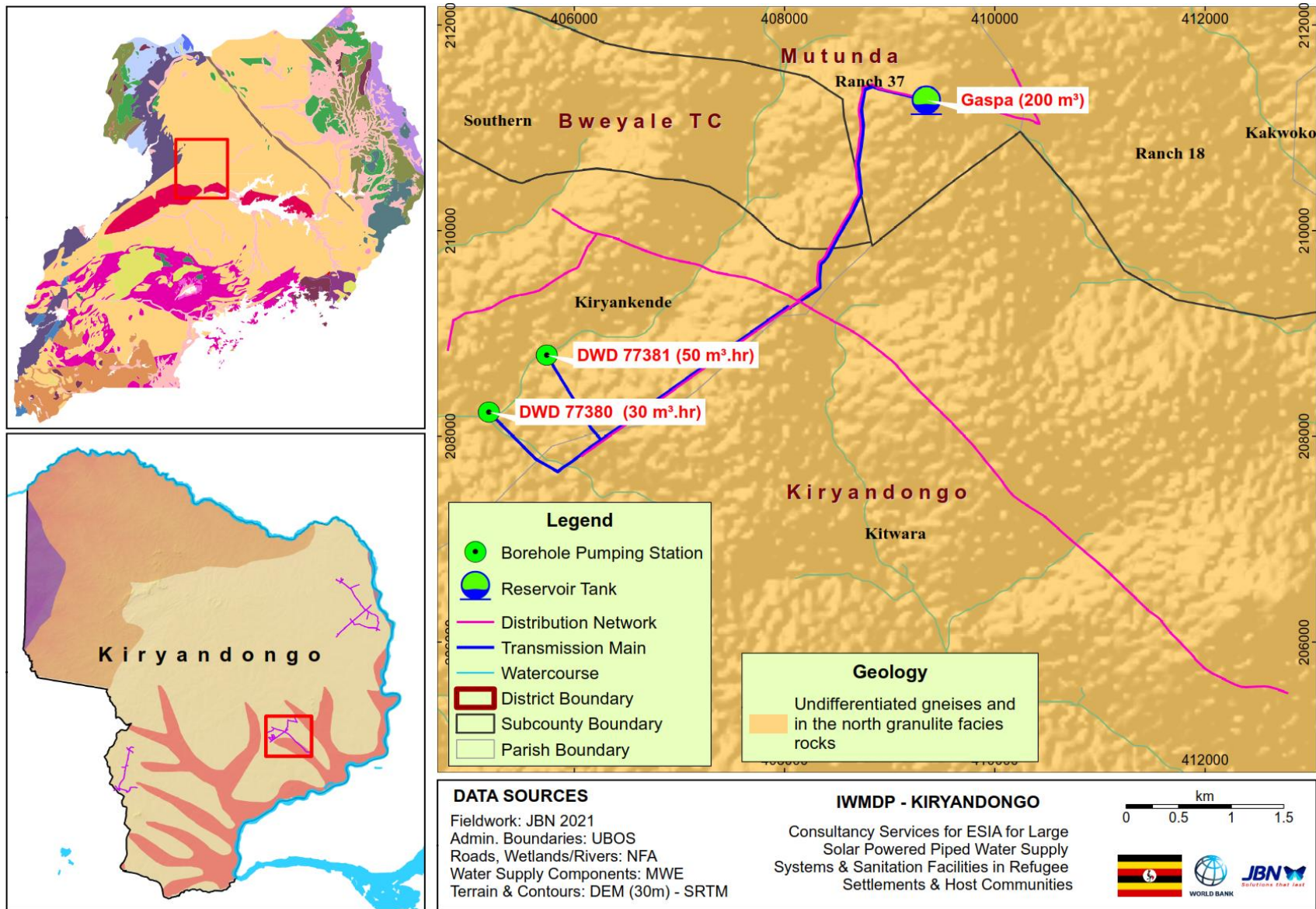


Figure 5-22: Geology of Gaspa project area

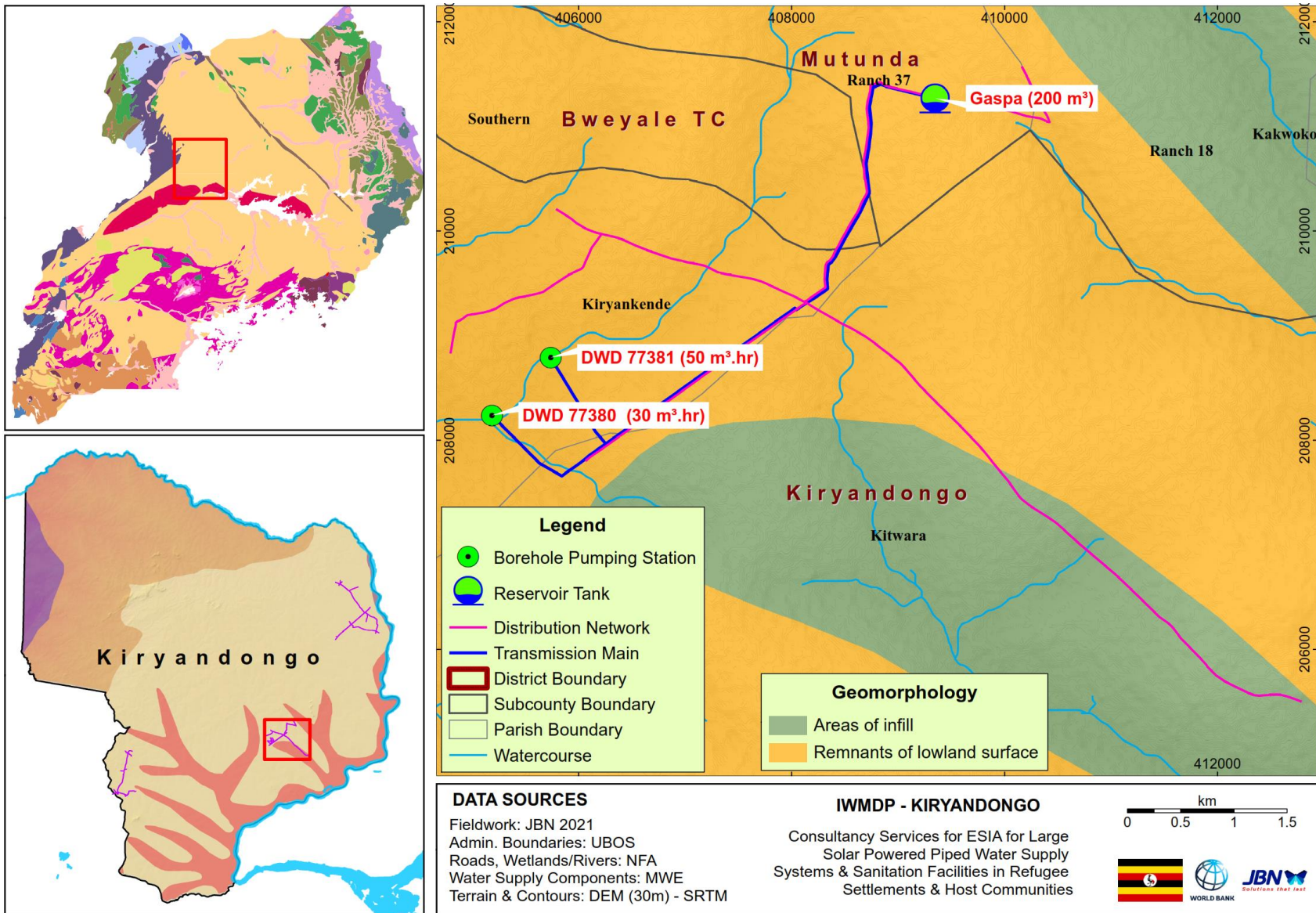


Figure 5-23: Geomorphology of Gaspa project area

5.2.6 SOILS

According to Langlands (1974) classifications, the soil consists of ferruginous soil (rocks changed into clay soil (kaolinite) and sesquioxides. In some areas, the soils have a high percentage of sandy and sandy loam soils and therefore susceptible to erosion while in others they are heavily textured ranging from clay loam to clay. Due to its sandy nature, the soil has low water retention capacity and high rate of water infiltration. The soils are usually deep with little differentiation into clearly defined zones and possess fine granular structure, others moulded into large, weak coherent clods that are very porous. Kiryandongo district is also endowed with vast fertile soils which can support quite a number of both cash/food crops. The soils in the project area are mainly ferrosols and are characterized with a reddish colour. The soils are moderately productive in terms of agriculture. Such soils are also susceptible to runoff and logging. The district is predominantly covered by the Acric Ferralsols (54%), Leptosols (19%), Petric Plinthosols (Acric) (16%), Gleysols (7%), Leptosols (2%), Arenosols (1.3%), Histosols (1.1%) and water or lake (0.2%) (**Figure 5-24**).

Acric Ferralsols: Dark red clay loams occasionally lateritized and Red sandy clay loams over laterite and granite formed from Karagwe - Ankolean Phyllites and granite e.g. the Kitonya Catena and Kigumba Catena soil mapping units. Reddish and reddish brown gritty clay loams and shallow brown sandy loams over rock or laterite formed from basement complex granites, gneisses and schists e.g. the Rukiri Complex and Anaka Complex soil mapping units. Shallow dark brown or black sandy loams often very stony formed from granites, gneisses, schists, amphibolites eg the Bugangari Series soil mapping unit. These soils are Vulnerable to erosion.

Gleysols: Dark brown sandy loams over dark grey clays and Black and grey clays often calcareous formed from recent river alluvium. Examples are soils in the Bukora Series and Undifferentiated Alluvium mapping units respectively. This soil is non-vulnerable to erosion.

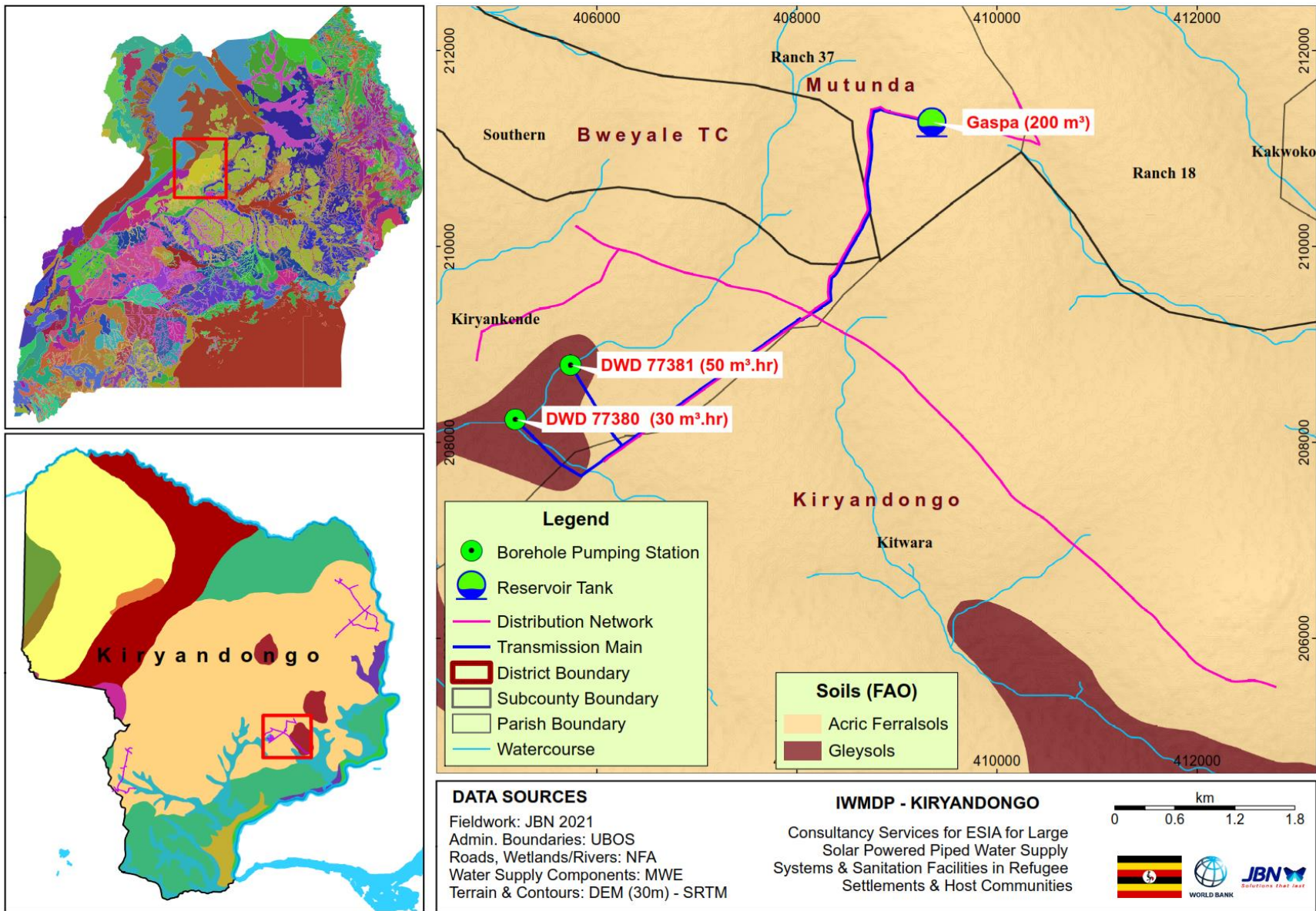


Figure 5-24: Soils of the Gaspas project area

5.2.7 HYDROGEOLOGY

The hydrogeology of Uganda and a large part of the east African region in the tropics is characterized by crystalline bedrocks of the Precambrian era (gneiss granitoids). These rocks usually contain water in fractures and fissures in rocks and are able to sustain groundwater supply especially in rural areas. The wells yields are usually less than 1 l/s (3.6 m³/hr). The weathered regolith overlying the crystalline bedrock is also an important source of aquifer that provides water for rural communities and has been shown to have better yields than the fractured aquifers. Groundwater accessed from deep fractured or fissured zones can however provide higher yields for large scale water supply.

Groundwater data obtained from the National groundwater database in Entebbe was used to reconstruct the hydrogeology of the project area (**Figure 5-25** and **Figure 5-26**). The data indicated that:

- The depth to the bedrock varies from 38 mbgl in the Kitwara parish to 31 mbgl in Ranch 37 in Kiryandongo refugee settlement with an average of 36.5 m. Therefore the weathered zone thickens from south to north towards Kiryandongo refugee settlement.
- The overlying layer above the rock is a weathered regolith consisting of mainly laterite and grey and red sandy clays.
- The depth of the first water strike varies from 51 mbgl in Kitwara parish to 39 mbgl in Ranch 18 with an average of 46m. This implies that groundwater in Gaspa mainly occurs within the upper fissured or fractured bedrock zone. Hence, most aquifers in the project area are bedrock aquifers.
- The depth to static water level varies from 4.8 mbgl in Kitwara parish to 1.8 mbgl in the north in Ranch 18 with an average of 3.1 m, so that most static water levels in the drilled wells occur with the weathered zone.
- The hard/fresh basement rock is about 80 m deep (**Figure 5-25**).
- The constant discharge varies from 13 m³/hr in Kikube parish to 1.5 m³/hr in the north in Ranch 18. The average constant discharge is about 8 m³/hr which is very good for both rural and motorized boreholes.
- The average thickness of the overburden regolith (static water level – depth of weathered bedrock) is about 30 m.

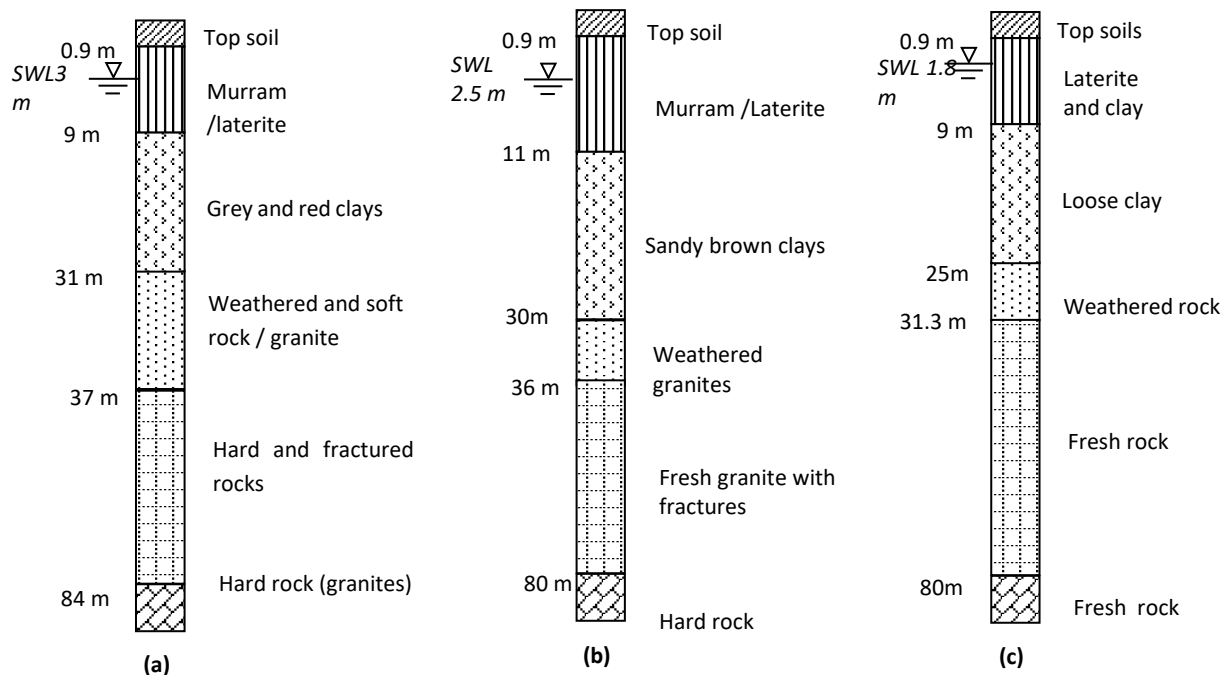


Figure 5-25: Representative lithology of the project areas a) Kikube parish (b) Kitwala parish and (c) Ranch 37 in Kiryandongo refugee settlement

Source: MWE, Feasibility Study and Design Report, 2021

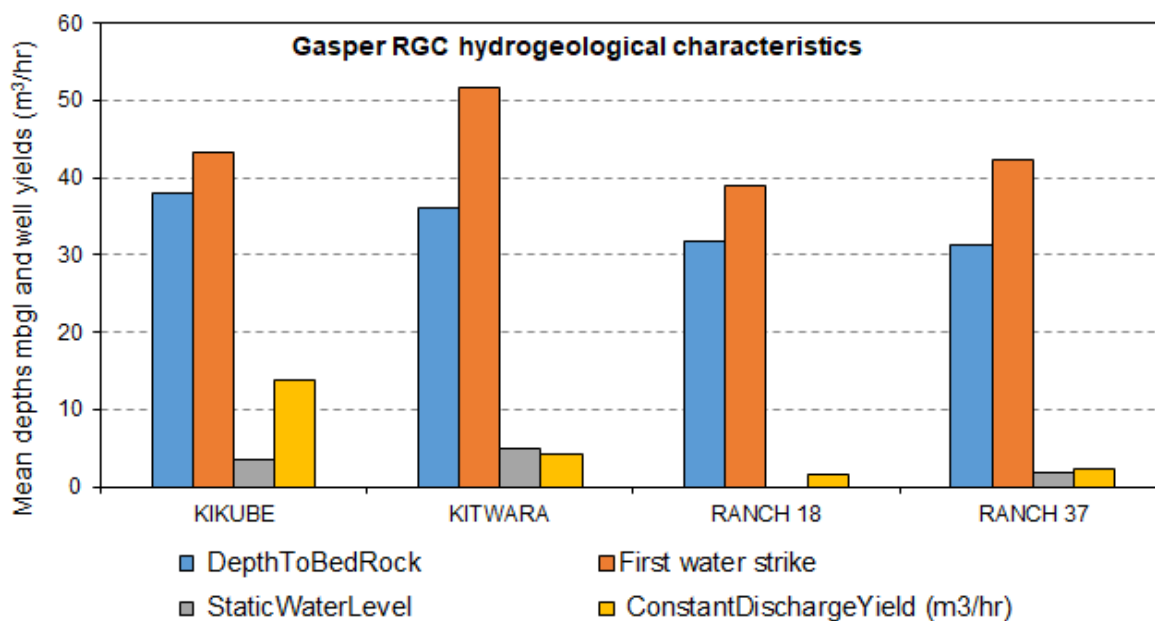


Figure 5-26: Summary of hydrogeological characteristics in the Project area

Figure 5-27 show the geo-statistical analysis of well yields in the entire district with respect to their geological formations. The average well yield in the district is 5.9 m³/hr. The best formation to exploit appears to be the granite-gneiss formation with yields as a high as 70 m³/hr possible (Figure 5-27). The formation with the least yields recorded was Mica schists.

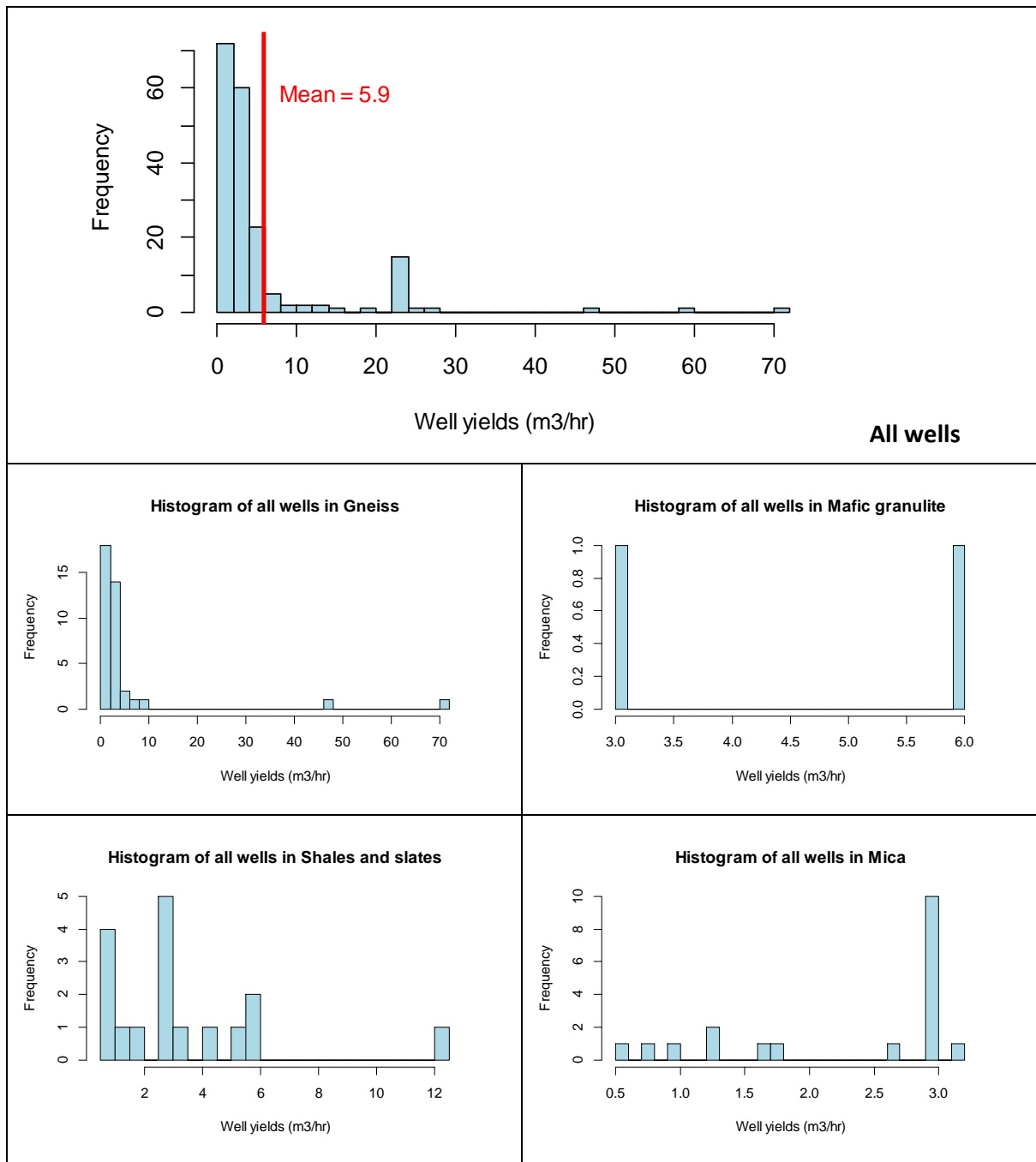


Figure 5-27: Statistical distribution of well yields in Kiryandongo district

Source: MWE, Feasibility Study and Design Report, 2021

Two boreholes were drilled and constructed to supply water for the project with their summary of attributes indicated in **Table 5-3**. The recommended long term operation submersible pump installation depth for DWD 77378 is 56.0mbgl when pumping at 60.0m³/hr and that for DWD 77379 is 90.0mbgl when pumped at 5.0m³/hr. All in due consideration of a pumping regime of 7 hours for a Solar Powered and 16 hours for electricity powered water supply system.

Table 5-3: Hydrogeological attributes of Project Boreholes

Borehole	GPS Coordinates	Depth (m)	Regolith Depth (m)	1st Water Strike (m)	Main Water Strike (m)	Driller's yield (m ³ /hr)
DWD 77380	E417770, N227513	115.04	17.34	29	29-33	37.0
DWD 77381	E419057, N236812	115.04	17.34	29	12-33, 64 - 70, 95	37.0

The feasibility assessment report (MWE, Feasibility Study and Design Report, 2021) asserts that groundwater flows towards Victoria Nile. For a large part of Mutunda sub-county, groundwater flows westerly towards Victoria Nile near Mutunda. For the southern parts, groundwater flows south towards Gaspa and then to Victoria Nile. Groundwater flows from a higher position to lower position by gravity in the same manner as surface water.

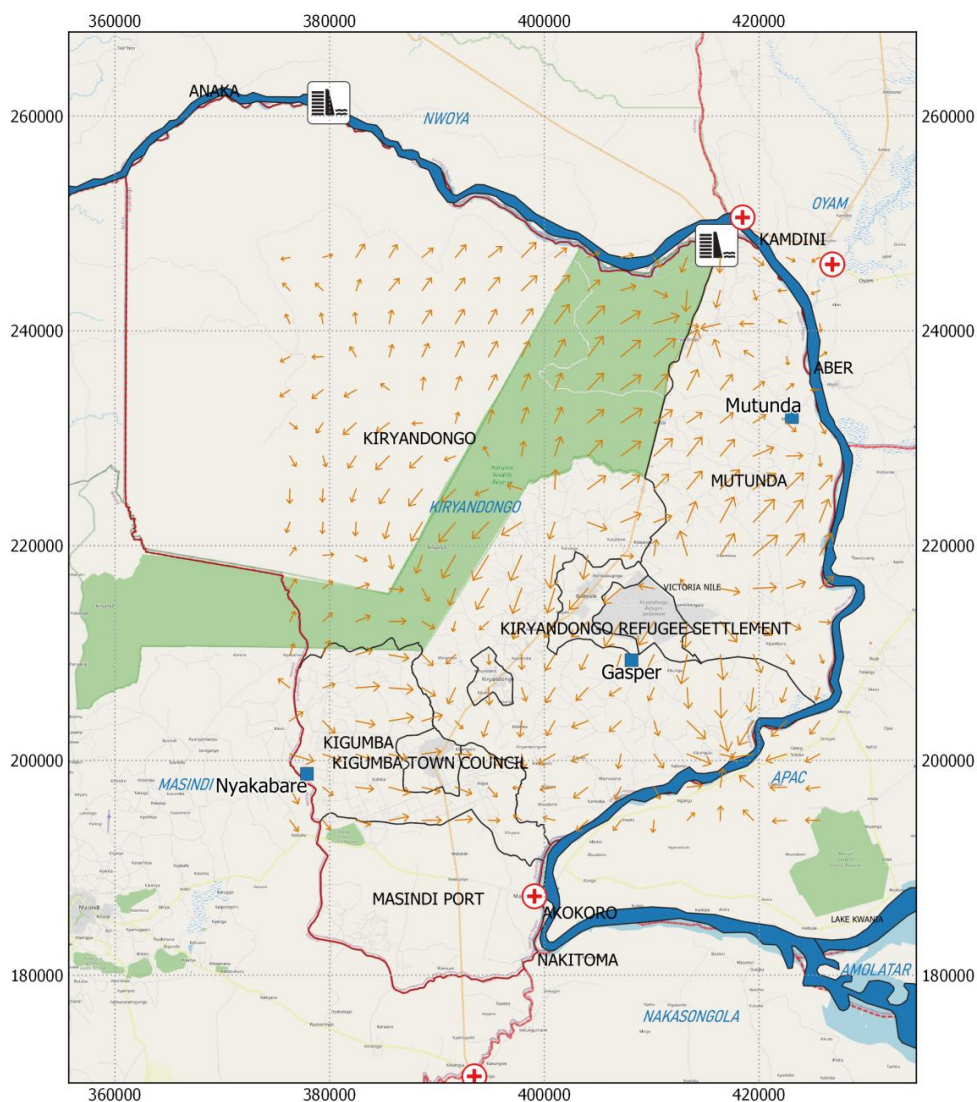


Figure 5-28: Groundwater flow direction in the project area.

Source: MWE, Feasibility Study and Design Report, 2021

Test pumping was conducted on the two boreholes DWD 77380 and DWD 77381 to ascertain the depth at which the submersible pumps will be installed and sustainable abstraction rates.

The borehole at Mirima DWD 77380 was first subjected to step-drawdown tests of 25.00, 35.00, 45.00 and 55.00 m³ /hr. All steps were carried out at 90 minutes. The borehole was then allowed to recover to 94.0% of the created drawdown in 0.5 hour. It was then pumped at a Constant discharge rate of 40.00 m³ /hr for 52 hours and recovery monitored up to 82.0% of the created drawdown in 6 hours.

The borehole DWD 77381 also located in Mirima village was first subjected to step-drawdown tests of 60.00, 75.00 and 90.00 m³ /hr. All steps were carried out at 90 minutes. The borehole was then allowed to recover to 96.0% of the created drawdown in 0.67 hour. It was then pumped at a Constant discharge rate of 90.00 m³ /hr for 36 hours and recovery monitored up to 92.3% of the created drawdown in 6 hours.

Table 5-4: Test Pumping Results of the Drilled Boreholes

Borehole	Draw Down (m)	Time for Recovery (hr)	Level of Recovery (%)
DWD 77380	24.67	6.0	82.0%
DWD 77381	21.67	6.0	92.3%

The duration of the test pumping of the two boreholes was longer than the planned duration of abstraction by the proposed water supply project. This means that if the boreholes DWD 77380 and DWD 77381 are pumped at the planned abstraction rates of 40.0 m³/hr and 90.0 m³/hr respectively, they will be able to sustainably supply the Mutunda water supply system.

The boreholes feeding the water supply systems of Mutunda and Nyakabale are located in different micro catchments situated 25 Km and 30 Km away respectively from Gaspa micro catchment (**Figure 5-29**) Based on the location of the boreholes, there will be no cumulative impacts related to abstraction of groundwater. This is based on the fact that in crystalline / fractured situations, the aquifer boundary mimics the (micro) catchment area of surface water.

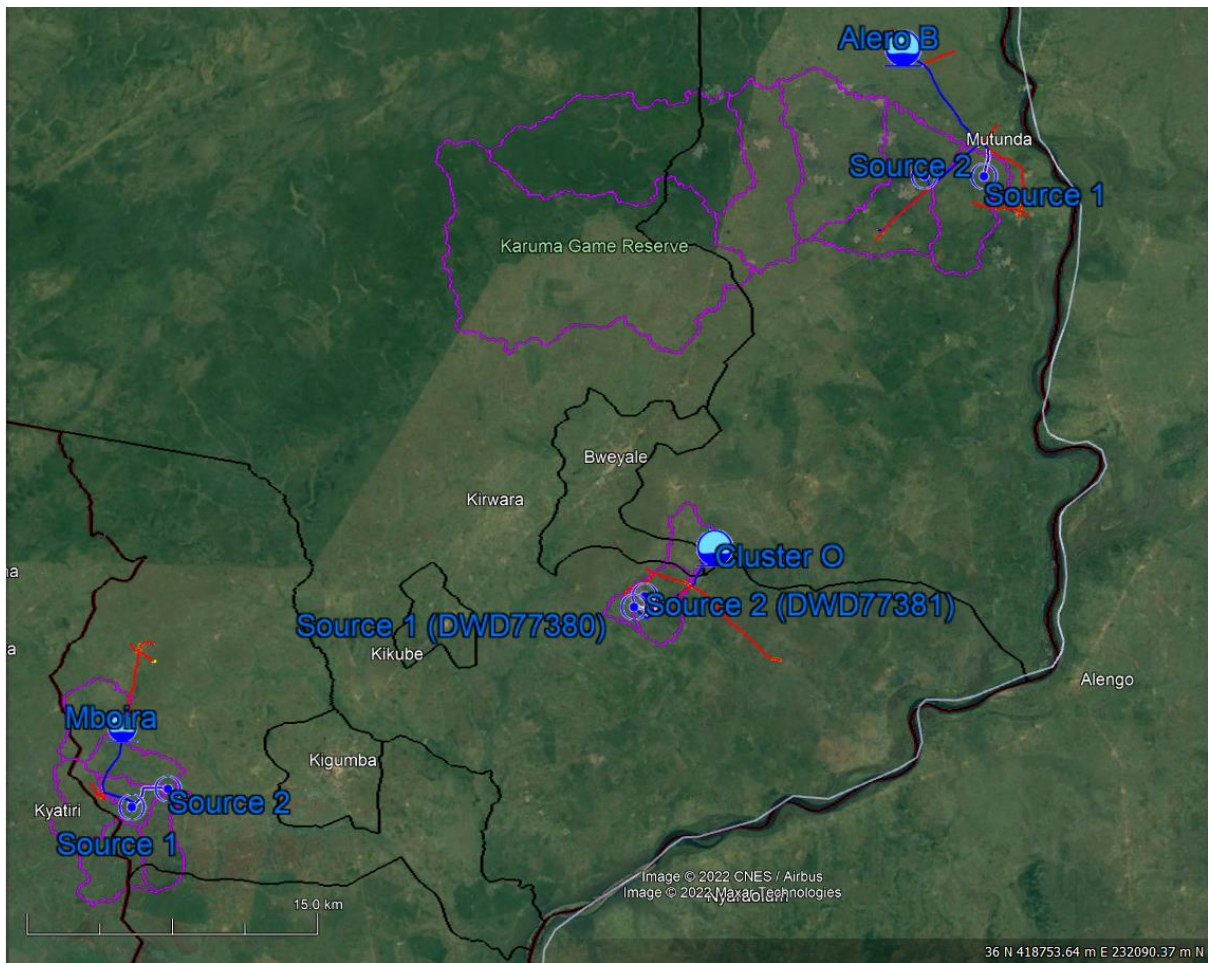


Figure 5-29: Water source micro catchments of Nyakabale, Gaspa and Mutunda water supply systems

5.2.8 WATER QUALITY

In water quality assessment, both the identified surface water and groundwater sources were considered based on its proximity to the Gaspa RGC borehole location. Water quality sampling was conducted on 14th and 15th November 2021 for laboratory analysis. The sampling followed recognized and conventionally acceptable protocols. For groundwater, one (1) sample was collected from a nearest existing borehole to the drilled borehole in the project area. For surface water sampling, a sample was picked from both the upstream and downstream of each identified stream nearby the drilled borehole. Samples for laboratory analysis were collected in 1 litre sterilized plastic bottles and kept in a cool box at 4 °C until analysis (Figure 5-30 and Table 5-5).

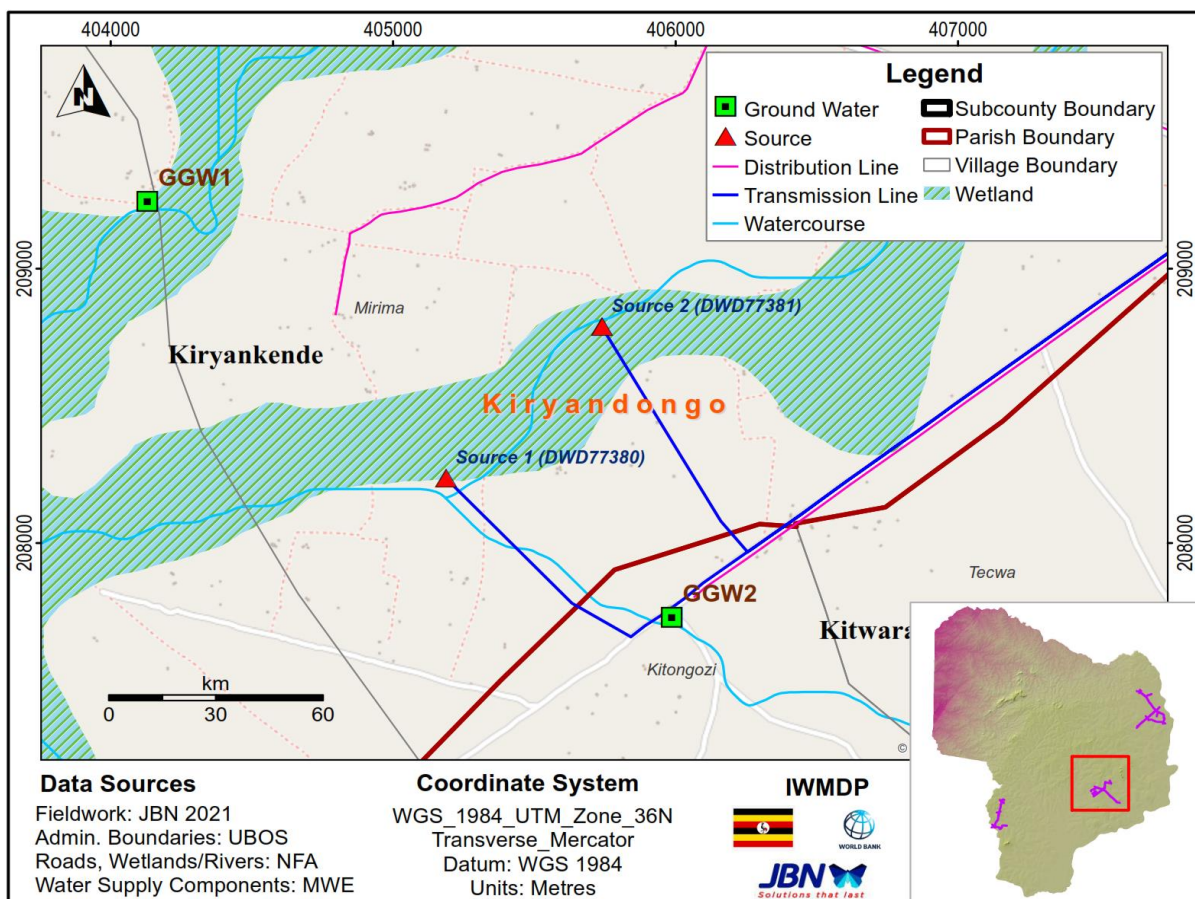


Figure 5-30: Map of water quality sampling sites in Gaspa RGC

These parameters were analysed at the National Water Quality Reference Laboratory (NWQRL) of the Water Quality Management Department (WQMD) in the Directorate of Water Resources Management (DWRM), Ministry of Water and Environment (MWE) in Entebbe. Water samples were analysed for physical, chemical and micro-biological parameters. These included E.coli, pH, Turbidity, TDS – Total Dissolved Solids, Nitrite (NO₂), Nitrate (NO₃), Sulphate, Fluoride (Fe), Chloride (Cl), Manganese (Mn), Iron total (Fe), Hardness (CaCo₃) and E.Conductivity. The water quality analysis of the proposed water sources was done in accordance with both the Ugandan drinking water standards (US EAS 12: 2014)⁴.

Table 5-5: Surface and ground water quality sampling sites and their respective Gaspa RGC boreholes

ID	Sample	Village	Parish	Sub county	Location UTM	RGC Borehole
1	GGW1 - Existing Borehole	Mirima/Kalwala	Kikuube	Kiryandongo	E404129, N209247	Both DWD 77380 and 77381
2	GGW2 - Existing Borehole	Kitongozi	Kitwara		E405972, N207728	

* GGW – Gaspa Ground Water

⁴ Framework and Guidelines for Water Source Protection (MWE, 2013), Volume 3: Guidelines for Protecting Water Sources for Point Water Supply Systems: Rural Drinking Water Standards for Uganda.



Figure 5-31: Community borehole DWD 33768 (MGW1) in Mirima/Kalwala village, Kiryandongo sub-county



Figure 5-32: Community borehole (GGW2) in Kitongozi village - Kiryandongo sub-county

According to the laboratory analysis results for the samples collected by the ESIA team (Table 5-6), all parameters for sample GGW1 were within national standard limits for drinking. However, total iron and E.coli for sample GGW2 collected from an existing Borehole in Kitongozi – Line Moja were above the limit. The potential causes of relatively high E.coli and iron from a sample collected from the Borehole in Kitongozi – Line Moja (GGW2) could be associated with poor borehole management practices that result in contamination and high iron content in the aquifer bedrock or rusting of iron casing, respectively. Details are provided in the water quality certificate in Annex 5.

Table 5-6: Water Quality Analysis Results

Parameter	Units	Sample Source		Drinking Water Standards (DEAS 12:2018 Maximum Permissible for Natural Portable Water)
		Ground Water		
		GGW1 - Existing Borehole (Mirima/Kalwala)	GGW2 - Existing Borehole (Kitongozi – Line Moja)	

Turbidity	NTU	0.3	6.7	25
pH	Units	8.24	8.35	5.5-9.5
Electrical Conductivity	µS/cm	1130	988	2500
Total Dissolved Solids	mg/L	723	632	1500
Total Hardness as CaCO ₃	mg/L	450	345	600
Flouride	mg/L	0.36	0.32	1.5
Sulphates	mg/L	26	22	400
Chlorides	mg/L	85	75	250
Nitrates – N	mg/L	0.32	0.24	10
Nitrites – N	mg/L	<0.002	<0.002	0.003
Manganese	mg/L	<0.01	<0.01	<0.01
Total Iron	mg/L	0.21	0.58	<0.5
E.Coli	CFU/100ml	<1	2	<1

Results of the water quality tests that were carried out for the 2 water sources during the feasibility study were also explored to examine their fitness to supply water for domestic use (Table 5-7). The results of the analysis of the water samples from the boreholes indicated all the parameters were within the limits. Details are provided in the water quality certificate in Annex 5.

Table 5-7: Borehole Water Quality Analysis Results

Parameters	Units	Source 1 DWD 77380	Source 2 DWD 77381	National Potable water standards
Alkalinity: Total	mg/L	56	56	500
Bi-Carbonate	mg/L	98	92	500
Calcium Ca ²⁺	mg/L	12.6	85.0	150
Chloride	mg/L	5	4	250
Colour (True)	TCU	16	21	50
Electrical Conductivity (EC)	uS/cm	288	286	2500
Fluoride	mg/L	0.3	0.4	1.5
Hardness: Total	mg/L	60	62	600
Iron: Total	mg/L	0.095	0.069	0.3
Magnesium Mg ²⁺	mg/L	5.8	5.4	100
Manganese	mg/L	0	0	0.1
Nitrate-N	mg/L	4	0	45
pH	-	6.62	6.68	5.5 – 9.5
Sulphate	mg/L	0	0	400
Total Dissolved Solids (TDS)	mg/L	267	232	1500
Total Suspended Solids (TSS)	mg/L	0	0	0
Turbidity	NTU	2.3	2.4	25

Source: MWE, Feasibility Study and Design Report, 2021

Overall, the ESIA has established that water samples from the proposed production wells for the project were within the National drinking water quality standards for Uganda.

5.2.9 AIR QUALITY BASELINE

5.2.9.1 PARTICULATE MATTER

The ambient average levels of PM 2.5 ranged from 0.006mg/m³ to 0.012mg/m³ whilst the average levels of PM10 ranged from 0.013mg/m³ to 0.023mg/m³. All the values recorded at the five different sites were within the WHO air quality limits for particulate matter. This can be attributed to the location of the sites being in rural area away from busy marrum roads with less vehicular movements. Therefore, less dust is resuspended into the surrounding environment. Also, during the assessment, most of the schools were closed with no activities that can generate dust and other particles to increase PM in the surrounding atmosphere. Weather also influenced the readings recorded, for instance the prevailing winds and humidity of the day. Gaspa, a busy Trading Centre recorded low values of PM due to the fact that it rained on the day of assessment, thus reducing the amount of dust particles resuspended in the surrounding air.

Table 5-8: Summary of Baseline Particulate Matter Readings for Gaspa RGC

Location	Date and Time	Coordinates	PM10 (mg/m ³)				PM2.5 (mg/m ³)			
			Min	Max	Aver	WHO AQG	Min	Max	Aver	WHO (AQG)
Gaspa Trading Centre	8/11/2021 4:15pm-6:25pm	E 408057 N 209364	0.007	0.031	0.014	0.05	0.005	0.026	0.009	0.025
Goshen Primary School	9/11/2021 9:29am-11:30am	E 406204 N 210019	0.007	0.021	0.013	0.05	0.005	0.011	0.006	0.025
Tecwa Primary School	12/11/2021 9:35am-11:35am	E 0409264 N 0208158	0.015	0.034	0.023	0.05	0.008	0.016	0.012	0.025
Panyadoli HC III	12/11/2021 3:13pm-3:15pm	E 0407767 N 0214513	0.010	0.783	0.041	0.05	0.006	0.075	0.010	0.025
Canrom Primary School	12/11/2021 4:57pm-6:59	E 0407434 N 0212361	0.010	0.783	0.041	0.05	0.005	0.104	0.009	0.025

WHO AQG: PM2.5: 0.025 mg/m³(24hr averaging), PM10: 0.050 mg/m³ (24hr averaging)

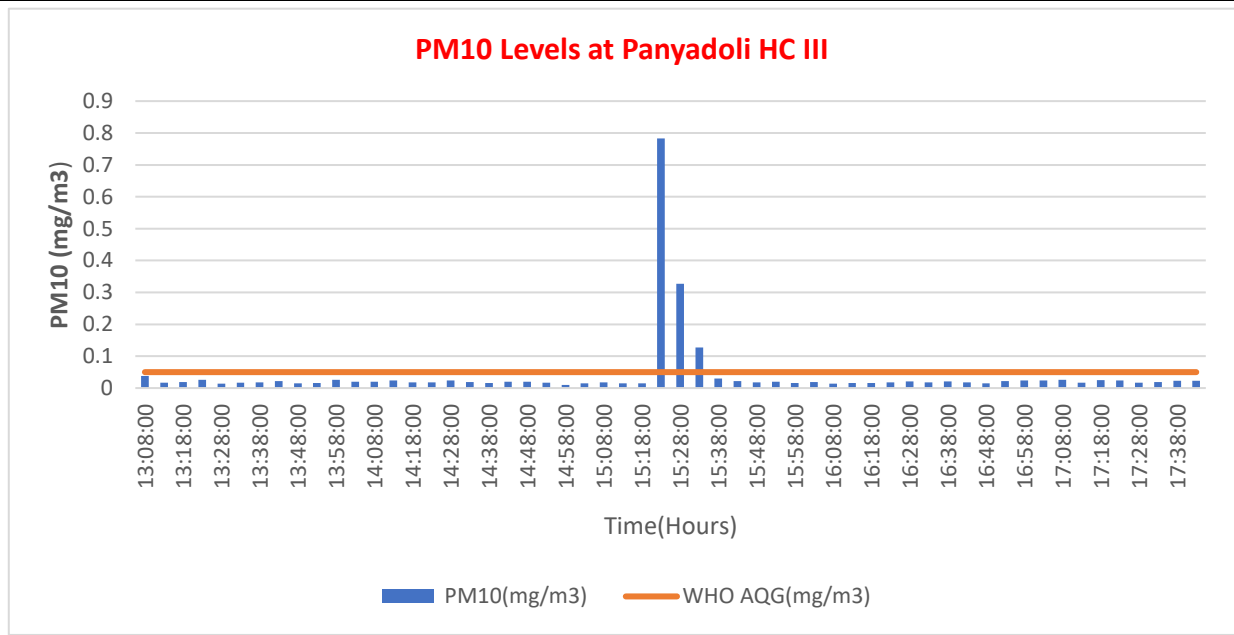
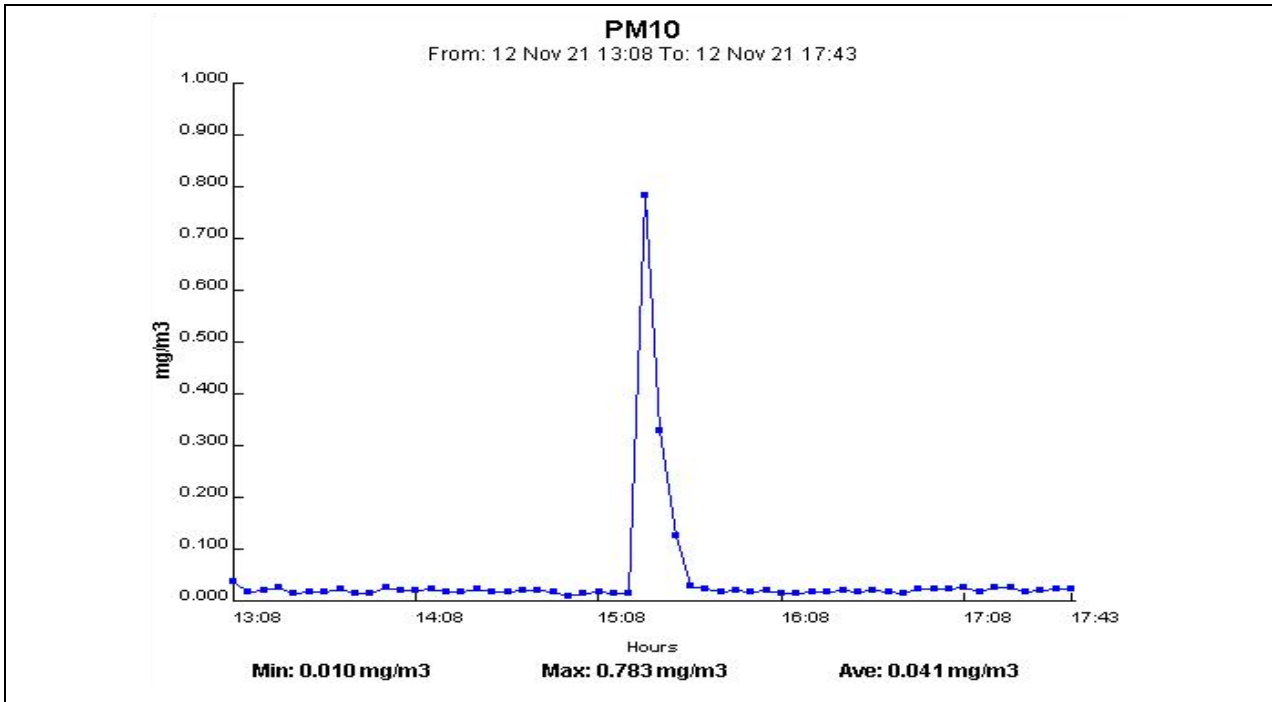


Figure 5-33: Variation of PM10 with Time of the day at Panyadoli Health Centre III

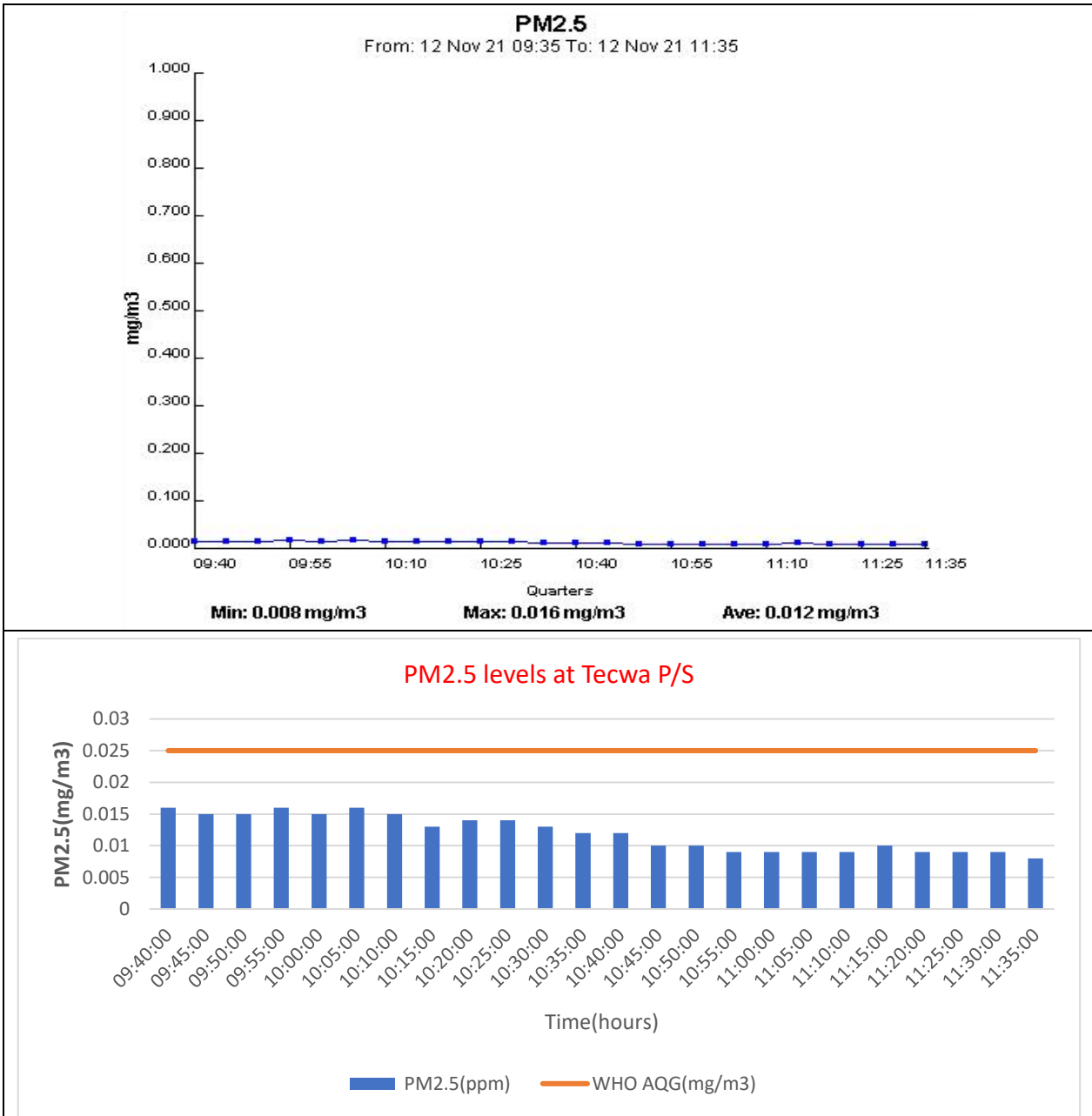


Figure 5-34: Variation of PM2.5 levels with Time of the day at Tecwa Primary School

5.2.9.2 GAS EMISSIONS BASELINE

The four, most common gas emissions considered during the assessment included NO₂, SO₂, CO and VOC. By volume, ambient air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.04% CO₂ plus a host of other gases in small amounts (SO_x, CO_x & VOC).

At all the five (5) sites monitored, Nitrogen Dioxide (NO₂) average values ranged from 0.07ppm to 0.108ppm, Sulphur Dioxide (SO₂) average values ranged between 0.033ppm – 0.150ppm, Carbon Monoxide (CO) average values ranged from 0.029ppm to 3.284ppm and VOCs average values ranged from 0.020ppm to 0.03ppm.

Average values for all gases across the different sites monitored did not vary significantly and were very low compared, conforming to the WHO Ambient Air Quality standards at the time of

the survey although there are no standards for VOCs yet. The low levels of gases can be attributed to limited activities at the sites monitored as these are located in rural areas with little traffic with exception of trading centres.

VOCs are products of combustion of fossil fuels (coal, gas, wood, kerosene, tobacco products and oil) especially fuel used in cars. VOCs can also come from personal care products such as perfume and hair spray, cleaning agents, dry cleaning fluid, paints, lacquers, varnishes, hobby supplies and from copying and printing machines.

Table 5-9: Summary of Baseline Gas Emissions Readings for Gaspa RGC

Location & Details (e.g., school, hospital, residence, etc.)	Date & Run time	Readings			
		NO ₂ (ppm)	SO ₂ (ppm)	CO (ppm)	VOCs (ppm)
Site 1: Gaspa Trading Centre	8/11/2021	Min: 0.068	Min: 0.040	Min: 0.00	Min: 0.03
	4:15pm-6:25pm	Ave: 0.077	Ave: 0.066	Ave: 0.29	Ave: 0.02
		Max: 0.089	Max: 0.150	Max: 2.97	Max: 0.05
Site 2: Goshen Primary School	9/11/2021	Min: 0.052	Min: 0.01	Min: 0.00	Min: 0.00
	9:29am-11:30am	Ave: 0.089	Ave: 0.13	Ave: 3.284	Ave: 0.00
		Max: 0.111	Max: 0.37	Max: 12.24	Max: 0.00
Site 3: Tecwa Primary School	12/11/2021	Min: 0.056	Min: 0.09	Min: 0.00	Min: 0.02
	9:35am-11:35am	Ave: 0.098	Ave: 0.15	Ave: 0.00	Ave: 0.03
		Max: 0.126	Max: 0.22	Max: 0.00	Max: 0.07
Site 4: Panyadoli HC III	12/11/2021	Min: 0.064	Min: 0.000	Min: 0.000	Min: 0.00
	3:13pm-3:15pm	Ave: 0.087	Ave: 0.033	Ave: 1.090	Ave: 0.03
		Max: 0.108	Max: 0.120	Max: 12.040	Max: 0.07
Site 5: Canrom Primary School	12/11/2021	Min: 0.085	Min: 0.01	Min: 0.00	Min: 0.00
	3:31pm-4:40pm	Ave: 0.108	Ave: 0.130	Ave: 0.00	Ave: 0.00
		Max: 0.129	Max: 0.370	Max: 0.00	Max: 0.00
WHO AQG: NO₂: 0.2mg/m³ or 0.106ppm (1-hour averaging) WHO AQG: SO₂: 0.5mg/m³ or 0.2ppm (10-minute averaging) WHO, 1999: CO: 10mg/m³ or 9ppm (8-hr averaging)					

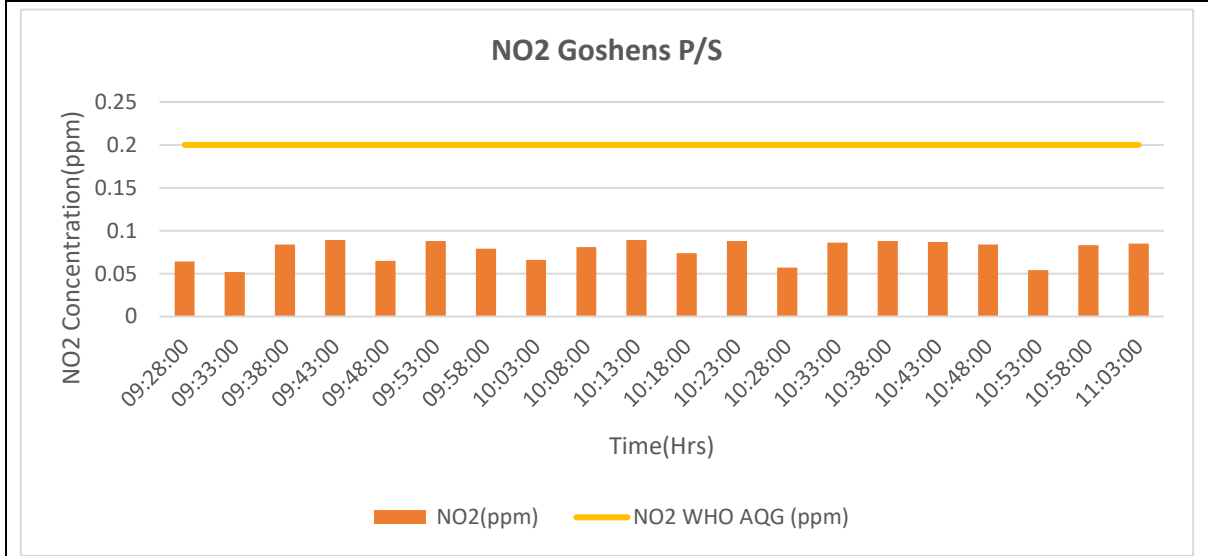
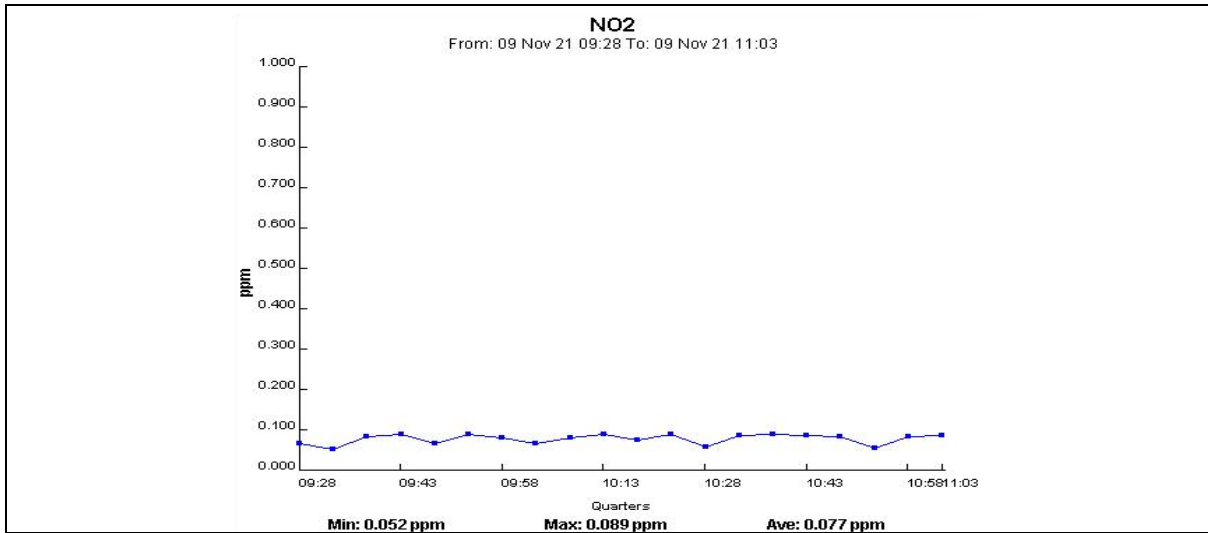


Figure 5-35: Variation of NO2 with time of the day at Goshen Primary School

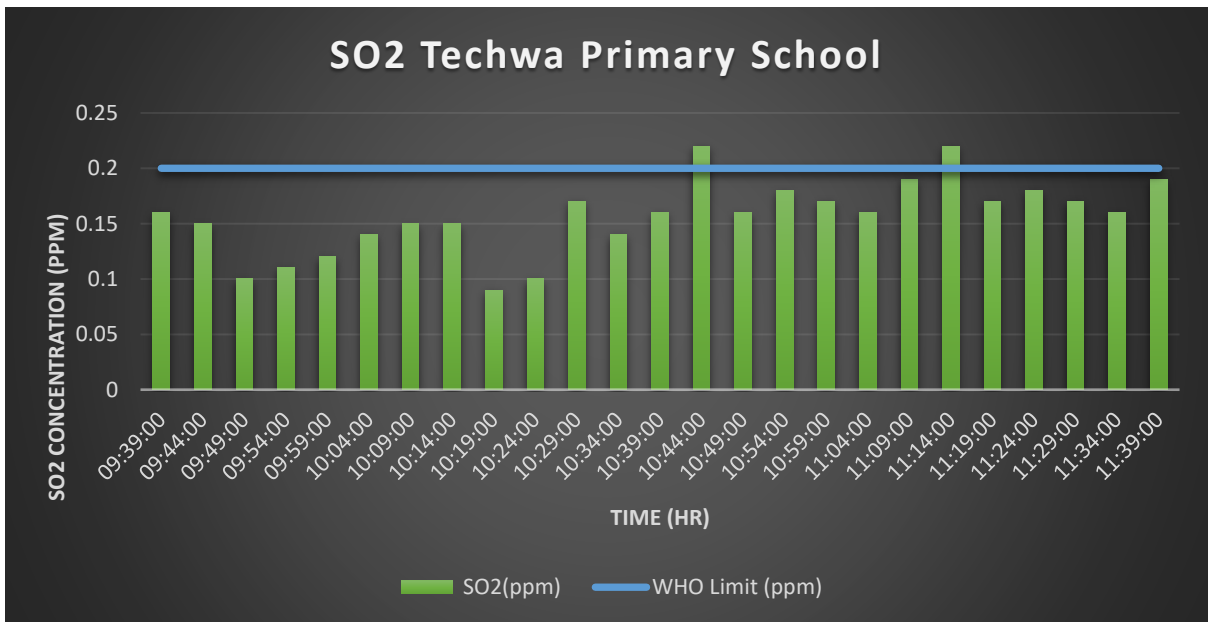


Figure 5-36: Variation of SO2 levels with time of the day at Tecwa Primary School

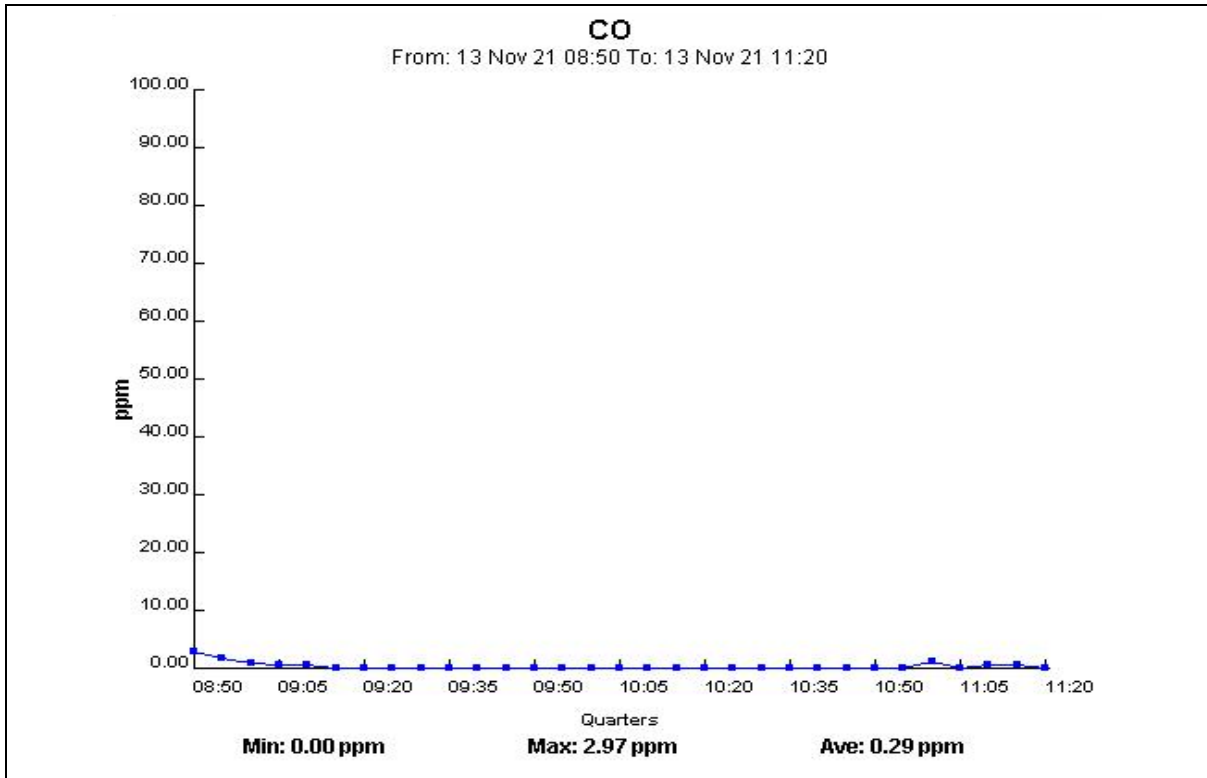


Figure 5-37: Variation of CO levels with time of the day at Gaspa Trading Centre

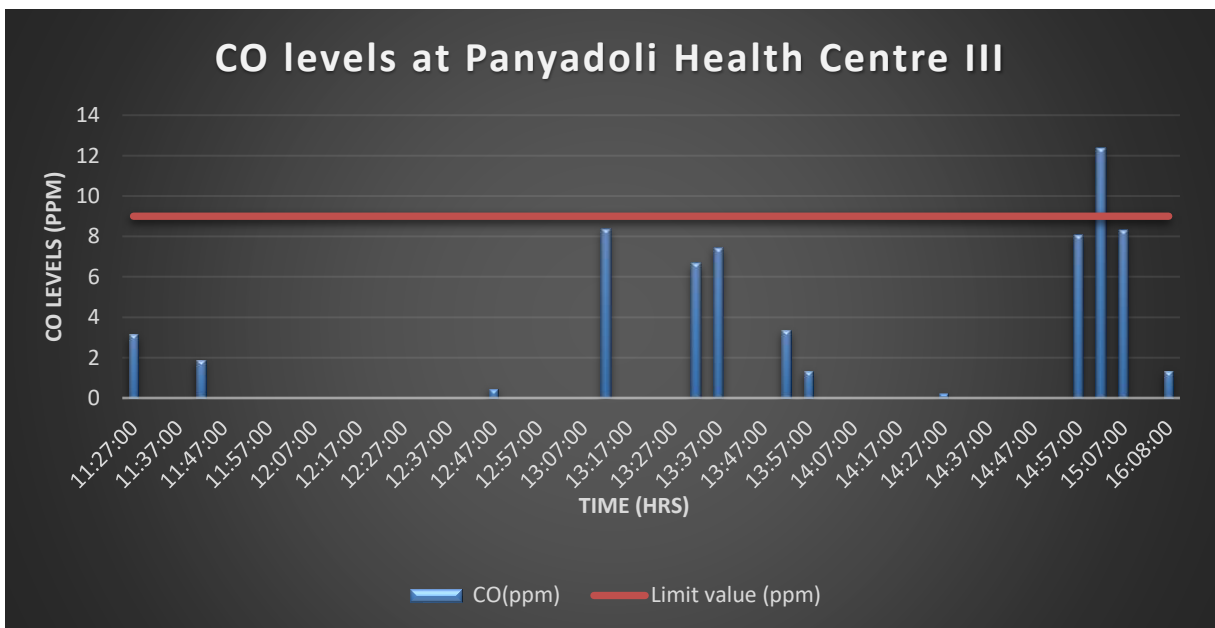


Figure 5-38: Variation of CO levels at Panyadoli Health Centre III

5.2.10 NOISE MEASUREMENTS

5.2.10.1 NOISE MEASUREMENT RESULTS

The noise levels recorded at these different sampled receptors varied depending on the noise sources at a specific monitoring time of the day. These noise levels (LAeq) for the monitored sites ranged from 47.2dBA (Site 5: Canrom P/S in a residential setup) to 64.2dBA (Site 1: Gaspa Trading Centre, Commercial area) which is a busy with several noise emitting sources. The baseline noise

levels measured were slightly above the recommended noise limits for such locations. This can be attributed to a range of activities for example trading centres like Gaspa have been developed into residential and business areas with several noise emission sources including high volume music from bars and shops, running generators, speeding vehicular traffic (heavy trucks and boda bodas) as well as noise generated by trading centre dwellers. For institutions like schools, during the time of assessment most of them had village children utilizing the school field to play soccer thereby emitting a sizeable amount of noise as indicated in **Table 5-10** below.

Table 5-10: Summary of noise results at measured receptors

Location & Details (e.g., school, hospital, residence, etc.)	GPS Coordinates	LAFmin (dB)	LAFmax (dB)	LAeq (dB)	Maximum Permissible Noise Limits Day (dBA)
Site 1: Gaspa Trading Centre	E 408057 N 209364	51.3	89.4	64.2	55
Site 2: Goshen Primary School	E 406204 N 210019	31.8	75.3	46.9	45
Site 3: Tecwa Primary School	E 0409264 N 0208158	32.9	71.7	47.3	45
Site 4: Panyadoli Health Centre III	E 0407767 N 0214513	43.5	76.5	49.8	45
Site 5: Canrom Primary School	E 0407434 N 0212361	34.9	72.7	47.2	45

5.3 BIOLOGICAL ENVIRONMENT

5.3.1 LANDUSE/LAND COVER

There were various land uses encountered within the project footprint for the water transmission and distribution (T&D), water sources, and reservoir in Gaspa area. The proposed project for Gaspa water system is located within a district well known for monoculture system with few areas with subsistence farming and also, as resettlements, therefore the district has been severely degraded due to extensive farming of maize and recently sugarcane growing.

The spatial analysis of the landuse brings out at the following characteristic elements landuse/cover types. The dominant land cover/use type as shown in **Table 5-11**, **Figure 5-39** and **Figure 5-40** below is grassland followed closely by crop land/agriculture and Forests at 23.8%, 23.6% and 23.3% respectively. The landuse of the project area is divided into six broad subdivisions: Bushland, Crop land, Forest, Grassland, Other land (settlement), wetland and woodland.

Table 5-11: Land use/cover of Gaspa

Land use/cover	Area (ha)	% Cover
Bushland	51328.2	14.1
Cropland	85578.85	23.6
Forests	84793.59	23.3
Grassland	86443.41	23.8
Otherland	483.75	0.1
Settlement	875.7	0.2
Water Body	3120.3	0.9
Wetland	3532.59	1.0
Woodland	47052.72	13.0
Total	363209.11	100.0

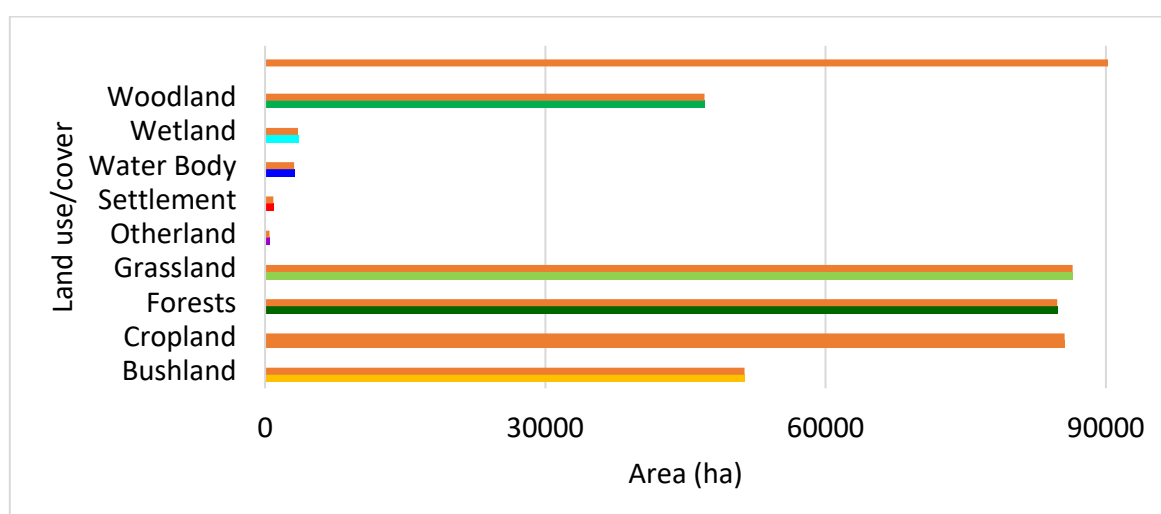


Figure 5-39: Land use/cover of Gaspa

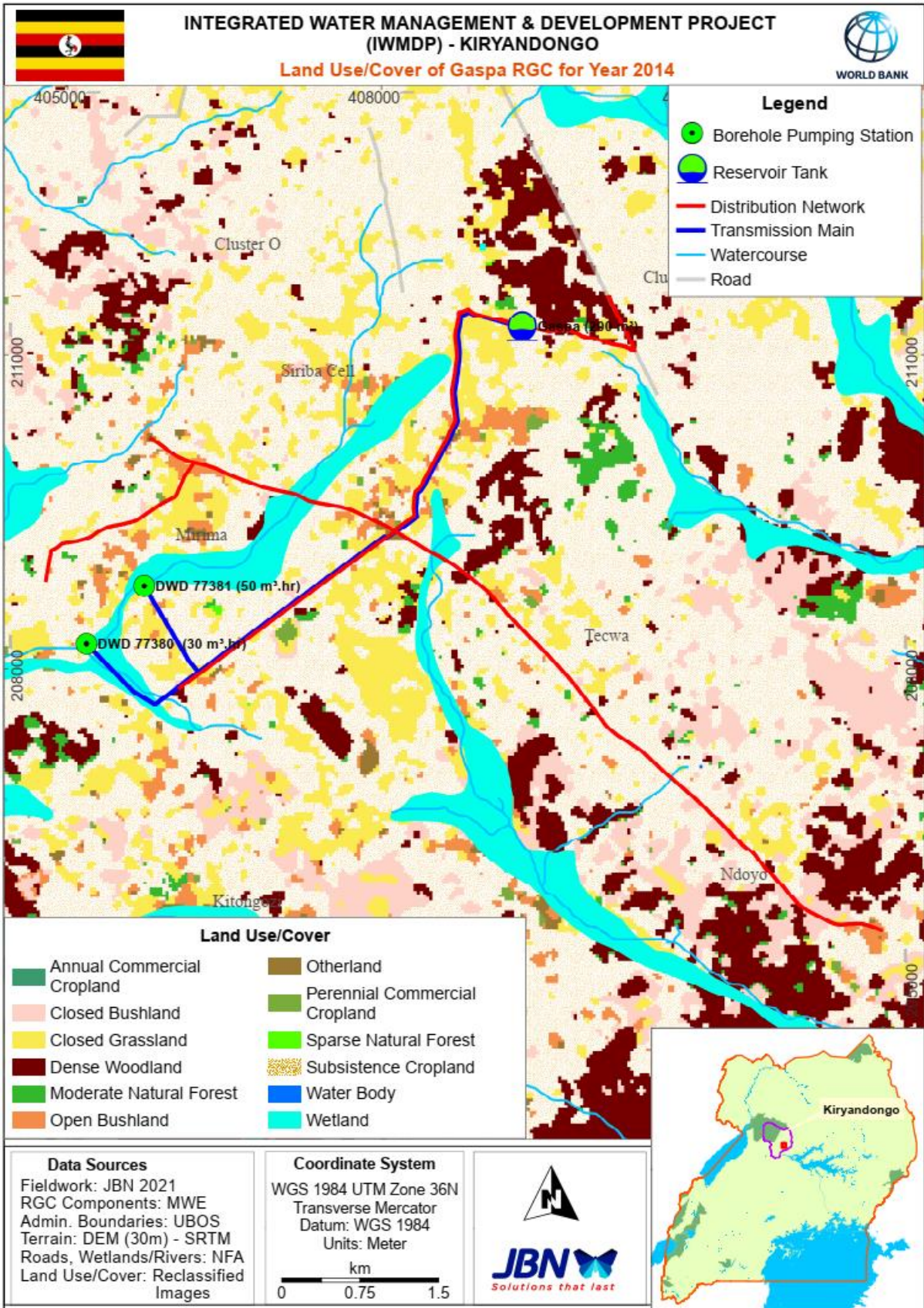


Figure 5-40: Land use/land cover of Gaspa RGC

Sugarcane (*Saccharum officinarum*) is fairly grown on large blocks of land, followed by exotic tree plantations such as *Tectona grandis*. Other land use includes livestock keeping, and subsistence crop growing which are fairly cultivated on small scale plots. Some of the commonly encountered crops were; - Cassava tuber gardens, banana (matooke) *musa ssp*, cowpea, groundnuts, sorghum, bean seed, pigeon pea, rice, sweet potatoes, pineapple, millet, sugar cane, soya bean, tomato, okra, simsim and leafy vegetables. Shifting cultivation or land rotation practices are under its diverse forms of slash and burn system as a traditional method of cultivating in most tropical plain woodlands of the region. Because of the extensive farming system, the entire district land cover has been severely degraded, and natural habitats have reduced to 5%, causing a huge shortage of fuelwood in the district due to maize and sugarcane which requires total land clearance..

<p>Due to the extensive growth of maize and settlements, natural habitats were cleared which results into lack of fuelwood</p>	 <p>A photograph showing two children walking on a dirt path, each carrying a large, heavy bundle of sticks or branches balanced on their heads. The child on the left is wearing a yellow shirt and a patterned skirt, while the child on the right is wearing a light-colored shirt and blue shorts. The background shows a rural landscape with green vegetation and a dirt road.</p>
<p>After maize growing, livestock keeping is common in some parts of Gaspa area. Photograph taken from Ranch 18 area.</p>	 <p>A photograph showing a herd of cattle, including several large brown and white oxen, walking along a dirt road. The oxen have prominent horns. In the background, there are green fields and a cloudy sky. A white van is parked on the right side of the road, with a person standing next to it.</p>

Figure 5-41: Land use and practices in Gaspa area

5.3.1.1 ECOLOGICALLY SENSITIVE AREAS

Karuma wildlife reserve is one of the ecologically sensitive areas in the district. It is located to the north of the project area at approximately 14 km from the nearest village (Cluster O) where water supply will be implemented – see **Figure 5-29**. Therefore, there is no likely hood of project impact on the Karuma wildlife reserve.

5.3.2 FLORA

5.3.2.1 HABITAT DESCRIPTION

In general, the entire project footprint is largely covered by modified habitats (accounting for about 98% of the land cover), with the remaining 2% attributed to natural habitat that include wetland vegetation that is threatened by clearing land for agriculture. This is reflective of the significant human activities in the project area. Land use/habitat coverage present within the project area are; - Monoculture (Maize fields covering almost 80%), settlement and trading centre infrastructures, agro-pastoral farmland. These are described below in more details; -

- (i) **Monoculture:** the proposed sites for the water reservoir, and the two boreholes are characterized by monoculture practices as observed throughout the district. About four (4) common species of annual and perennial crops were located within the project area including; - *Zea mays* (maize contributing about 85%), *Saccharum officinarum* (Sugarcane for Kiryandongo sugar) as observed in Ndoyo, cassava (Manhot) equally distributed on small plots, and Rice (*Oryza sativa*) which was only observed in a seasonal swamp after Gaspa trading centre towards Ndoyo: other monoculture species include:- exotic tree plantations of *Tectona grandis* as was observed in Tecwaa.
- (ii) **Settlements:** A significant proportion of the project footprint lies within areas that have undergone several vegetation transformations and currently these places are considered as secondary with degraded habitats due to several types of infrastructures. The area holds sparsely populated trading centres like Gaspa, Ndoyo, Mirima, and Bududa resettlements with minimal natural habitats in vicinity in the form of bushes or fallows especially along the roads. The entire project area is devoid of natural habitats, however small fragments of modified habitats (i.e. open falls with remnant trees vegetation verges, mixed crop gardens, degraded swamps with crumps of shrubs) provide refuge points for the few remaining wildlife mainly the birds and small mammals.
- (iii) **Agro-pastoral:** The second dominant modified habitat types within the project footprint are agro-pastoral and fallow land which are generally located near settlements, degraded swamps due to the extensive growing of maize and account for approximately 10% of land cover within the project areas. About fourteen (14) common species of annual and perennial crops were located within the Project Areas and these includes; - *Zea mays* (maize), *Manihot esculenta*, *Musa spp.*, *Sorghum bicolar*, *Arachis hypogaea*, *Oryza sativa*, *Phaseolus vulgaris*, Soya beans, *Solanum lycopersicum*, *Solanum melongena*, *Citrullus lanatus*, *Cucurbita pepo*, *Vigna subterranean*, and *Sesamum indicum*.

5.3.2.2 VEGETATION DESCRIPTION

The vegetation in the project area is described from the species available which is sometimes influenced by the prevailing environmental conditions such as; -land form, soils, microclimate and anthropogenic factors such as fire, logging, mining, settlements, agriculture and farming methods etc. The proposed project lies within areas that have undergone several land transformations from primary vegetation settings to Extensive maize and sugarcane blocks with few remnant woodlots or plantations. Open fallows are used as livestock grazing areas which are sometimes enclosed with *Euphorbia tirucalii* or left open; The vegetation of the entire project area is Uniform and can be classified as secondary:

- Extensive maize fields mixed with small gardens of beans and cassava.
- **Open fallow and bushes** which are at times used as livestock grazing corridors with some shrubs such as; - *Combretum molle*, *C. collinum*, *Terminalia schimperiana*, *Acacia polyacantha* and *Lantana camara*.
- **Wood lot** or small-scale exotic tree plantations of *Tectona grandis* and *Eucalyptus ssp.*
- **Swamp habitat**; - about three degraded swamps were observed in the project area. (i) Gaspa and Tecwaa currently used for Rice growing on side and grazing, (ii) Gaspa and Goshen primary school, and (iii) borehole 1 & 2 are situated. These seasonally impended swamps are characterized by seasonally flowing water column and area dominated by species herbaceous such as *Leersia hexandri* contributing 35%, *Cynodon dactylon* 30%, *Sporobolus pyramidalis* 15% and *Imperata cylindrical*, associated with some shrubs such as; *Acacia polyacantha*, *Piliostigma thonningii*, *combretum collinum* and clumps of *Grewia mollis*.



Figure 5-42: Extensive maize growing in the Ranch 18 area (E-410408, N-211061)

5.3.2.3 STRUCTURES AND PHYSIOGNOMY

The description of the vegetation structure and physiognomy of Gaspa area, can be labelled as secondary. The vegetation, formerly typically savannah woodland, wooded grass with wetlands and swamps with remnant tall trees. The natural habitats have been depleted in their current status and replaced by farmlands characterized by extensive crop growing and open fallows, exotic tree plantations, and commercial centres and settlements. No natural forests were in the vicinity of the proposed project alignment. Remnant trees were very rare, therefore about 95% of land are maize fields and sugarcane in some places. The physiognomic structure is composed of both native and exotic tree species. Trees and shrubs were present, partially distributed along the routes of the project footprint and the physiognomic classification of an area depends more on the woody plant species. As observed, large trees of $\geq 50\text{cm}$ of diameter at breast height (Dbh) were very few. Tree Dbh ranged from 5-110cm. Large trees observed included: *Tamarandus indica*, *Acacia sieberiana*, *Ficus sycomorus*, and *Ficus natalensis*. The herbaceous plants were at a height of about 30cm – 3.0 meters tall. The common garden weeds considered to be the shortest were; *-Brachiaria documbens*, *Cynodon dactylon*, *Parthenium hysterophorus* and *Panicum maximum* with maximum height of 70cm. *Saccharum officinarum* (sugarcane), was considered to be the tallest ranging between 1.7 and 3 meters.

The Vertical structure

In terms of the vertical structure, the savanna of the Gaspa RGC, is a less complex type of vegetation dominated by crop fields, while natural habitats remain in clumps of bushes or fallows. The profile shows a tree stratum of 2.3-25m high for the natural trees and in plantations. Canopy cover was 95% open and closed in plantations with about 75% of the canopy closed. The proposed sites recorded only two large trees, which were *Tamarindus indica* at Tecwa, opposite the plantation of *Tectona grandis* with an average height of about 8 meters for the exotics and 25m for *Tamarindus indica*.



Figure 5-43: *Tamarindus indica* (E-409329 N-208383)

5.3.2.4 FLORISTIC COMPOSITION, DISTRIBUTION, DENSITY AND DIVERSITY OF GASPA WATER SYSTEM

From all the surveyed three sites, a total of one hundred, fifty-four (150) individual species were recorded from thirty-seven (36) families. Herbaceous species recorded the highest individuals with eighty-one (81) contributing 54%, followed by trees/shrubs with fifty-seven (57) representing 36%, and lastly liana with only twelve (12) species contributing only 8% of the species composition. The number of species recorded in any geographical location depends more on the time factors and sample size before other factors such as; ecological and anthropogenic activities. All the proposed areas differed in an area covered, a factor that determined the number of sampling units. Gaspa registered the highest number of individual species because the entire area possesses some patches of grazing land in comparison to the other two sites where maize the field covered the entire blocks.

Transmission and Distribution lines from Mirima, Gaspa, Siriba Cell (reservoir area) to Bududa settlements recorded the highest number of individual species with eighty-five (85), followed by Mirima, Gaspa to Ndoyo settlements with eighty-four (84), and lastly water source 1 & 2 areas recorded the lowest number of plant species with only fifty (50) individuals.

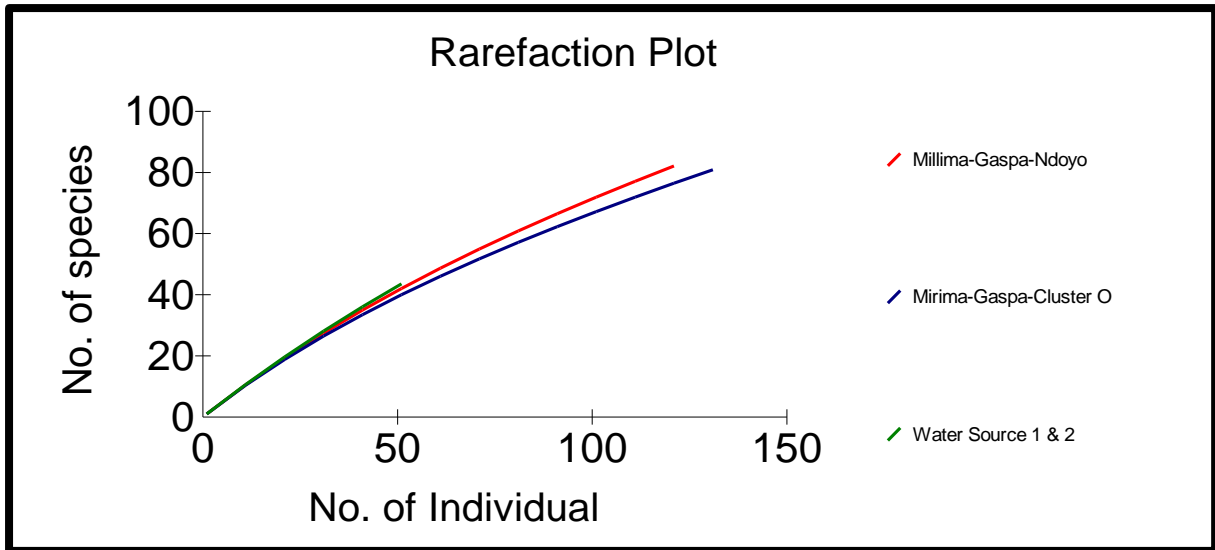


Figure 5-44: Rarefaction curve

The Figure 5-44 above, shows sampling intensity and species richness in plots from all the study routes and sites. The figure reveals low species richness accumulatively from the sampled routes. All the sites and routes for the distribution and Transmission of water had been modified and replaced with maize fields and that affected the species diversity of the flora.

Table 5-12: Shannon-Wiener and Alpha diversity values for plants from Gaspa water system

Index	Millima-Gaspa-Ndoyo	Mirima-Gaspa-Siriba Cell	Water Source 1 & 2 Cell
Shannon H' Log Base 10.	1.861	1.827	1.67
Shannon Hmax Log Base 10	1.929	1.919	1.699
Alpha	112.453	90.405	141.115

Diversity of an area is considered to the number of different species. From the field survey conducted in Gaspa water system project area, diversity was considered to be low according to the log series. The Poaceae (Graminae) family registered the highest number of species with 31, followed by Fabaceae 26, Asteraceae (Compositae) 14 Euphorbiaceae 10, Malvaceae 7, Lamiaceae 6, Combretaceae, Moraceae, and Verbenaceae registered 5 respectively, the rest registered 4 or less (Annex 6).

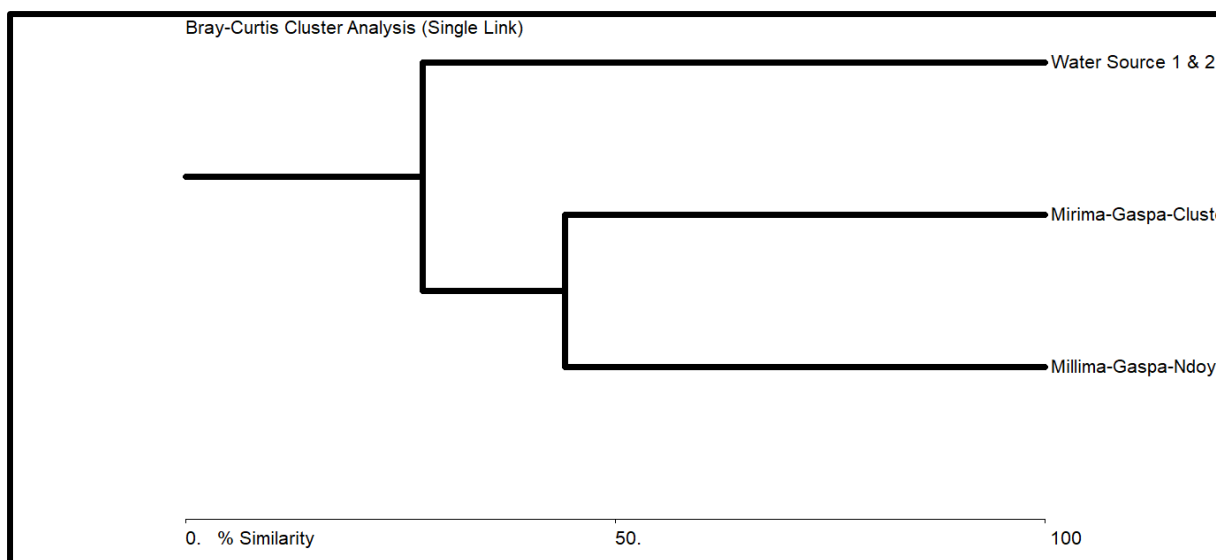


Figure 5-45: Similarities in species composition from different the study areas for plants

All areas were dissimilar at only 30%. Mirima, Gaspa, Siriba Cell (Reservoir) to Bududa settlement area was similar to Mirima, Gaspa to Ndoyo area in terms of plant communities and species composition. The water source (Borehole areas) was the most dissimilar in terms species composition.

5.3.2.5 CONSERVATION STATUS OF THE SPECIES

Out of the one hundred and fifty (150) plant species encountered in the study area, one species, *Mondia whitei* is listed as vulnerable on the IUCN Redlist of Uganda 2016. While not evaluated globally, the species is nationally classified as Vulnerable, observed to have experienced a population reduction of $\geq 30\%$ over the last three generations. The species is of conservation concern in the country.

5.3.2.6 ECONOMIC PLANTS

The economic importance of these plants varies and they include their uses as; income generating, fuelwood, timber, vegetable, edible fruits, seed bank, medicinal and religious believes. A list of the common economic plants encountered within the study areas is presented in the **Table 5-13 & Table 5-14** below reflecting the densities for each species. The density of the economic plants in all the study areas was not calculated and no actual density was given. The economic plants registered from Gaspa including; - *Saccharum officinarum* (sugarcane) poaceae, and *Tectona grandis* (Verbenaceae). the rest are economic plants in terms of fruit production, or ornamental such as; *Artocarpus heterophyllus* (Jackie fruit tree), *Mangifera indica* (mango tree) and *Persea americana* (ovacado).

Table 5-13: List of economic trees encountered along the water transmission and distribution routes in Gaspa (Nov, 2021)

S/N	Family	Scientific Name	Size	Size
1	Moraceae	<i>Artocarpus heterophylla</i>	Fruits	Small scale
2	Anacardiaceae	<i>Mangifera indica</i>	Fruits	Small scale

3	Lauraceae	<i>Persea americana</i>	Fruits	Small scale
4	Myrtaceae	<i>Eucalyptus grandis</i>	Wood	50 x 70m
5	Verbenaceae	<i>Tectona grandis</i>	Commercial	Small scale 50 x 50 m
6	Poaceae	<i>Saccharum officinarum</i>	Commercial	Large scale



Figure 5-46: *Tectona grandis* wood lot (50 x 70M), Dbh range 4-18cm (E-409329, N-208383)

Table 5-14: List of Crops encountered Gaspa water transmission area (Nov, 2021)

S/N	Scientific Name	Common Name	Importance	Range of farm size	Gaspa
1	<i>Zea mays</i>	Maize	Commercial	Extensively	✓
2	<i>Manihot esculenta</i>	Cassava	Food	Small scale	✓
3	<i>Ipomoea batatas</i>	Sweet potatoes	Food	Small scale	✓
4	<i>Phaseolus vulgaris</i>	Beans	Food	Small gardens	✓
5	<i>Eleusine coracana</i>	Millet	Food	rare	✓
6	<i>Cucurbita ssp</i>	Pumpkin	Food	rare	✓
7	<i>Arachis hypogaea</i>	Groundnuts	Food	Small scale	✓
8	<i>Sesamum indicum</i>	Simsim	Food	Small scale	✓
9	<i>Cajanus cajan</i>	Pigeon pea	Food	Small scale	✓
10	<i>Sorghum bicolor</i>	Sorghum	Food	Small scale	✓
11	<i>Oryza sativa</i>	Rice	Food	Small scale	✓
12	<i>Musa ssp</i>	Banana	Food	Small scale	✓
13	<i>Glycine max</i>	Soyabean	Food	Small scale	✓
14	<i>Saccharum officinarum</i>	Sugarcane	Commercial	Extensive	✓

5.3.2.7 INVASIVE 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. According to the definitions of Mosango, Cronk and Fuller, several species registered from Gaspa (**Figure 5-47**) can be considered as invasive in the region and globally, but in Uganda only seven (7) are known to be the major cause to loss of habitat quality and species diversity. These included; - *Chromolaena odorata*, *Parthenium hysterophorus*, *Xanthium strumarium*, all in Asteraceae family, *Cuscuta kilimanjari* (Convolvulaceae), *Mimosa pigra* (Fabaceae), *Hyptis suaveolens* (Lamiaceae) and *Sida acuta* (Malvaceae).



Figure 5-47: *Parthenium hysterophorus* (1) & *Lantana camara* (2), were some of the frequently encountered invasive plants (E-410408 N-211061)

Table 5-15: A list of invasive species encountered in Gaspa water distribution areas

S/N	Family	Species	Status	Impact	Uses
1	Asteraceae	<i>Chromolaena odorata</i>	Introduced	One of the world's worst weeds. highly competitive that can great colonizes an entire area where it occurs hence reducing grazing space for animals	Can be used in mulching of degraded agriculture land
2		<i>Parthenium hysterophorus</i>	Introduced	It affects the production of crops, human, animal health, reduced pasture quality and adverse effects on meat and milk quality, and biodiversity	Medicinal
3		<i>Xanthium strumarium</i>	Introduced	Major weed of row crops	
4	Convolvulaceae	<i>Cuscuta kilimanjari</i>	Introduced	Parasatic, Reduced native biodiversity	
5	Fabaceae	<i>Mimosa pigra</i>	Native	Infests wetlands, alters open grasslands into dense thorny thickets and negatively impacts on native biodiversity, affects large mammal distribution and their health	
6	Lamiaceae	<i>Hyptis suaveolens</i>	Native	Reduced native biodiversity	
7	Malvaceae	<i>Sida acuta</i>	Introduced	infests various habitats, becomes most problematic in pastures and rangelands	

5.3.2.8 PROJECT AFFECTED TREES

The project alignment will affect 2 tree species at 5 locations as indicated in **Table 5-16** and **Figure 5-48**.

Table 5-16: Project affected trees

Location	Coordinates	Family	Species	Conservation status	Use in community	Lifeform	2,5-10cm	10-30cm	30-50cm	50+
Transmission Line 2 From the Reservoir	407101E, 208573N	Asclepiadaceae	<i>Mondia whitei</i>	Globally NE Nationally VU A2acd Threatened by over-exploitation, climate change and unsustainable land use management	Medicinal	Liana				
Transmission Line 2 From the Reservoir	406282E, 207976N	Caesalpiniaceae	<i>Tamarindus indica</i>	Globally NE Nationally VU A2acd		Tree		1		
Distribution Line from Gaspa TC to Ndoyo	409329E, 208383N	Fabaceae	<i>Tamarindus indica</i>	Threatened by over-exploitation, climate change and unsustainable land use management	Medicinal	Tree				2
Distribution Line from Gaspa TC to Ndoyo	409683E, 208023N	Fabaceae	<i>Tamarindus indica</i>			Tree		1		
Distribution Line Gasper to Milima	407189E, 209648N	Asclepiadaceae	<i>Mondia whitei</i>	Globally NE Nationally VU A2acd	Medicinal	Liana				

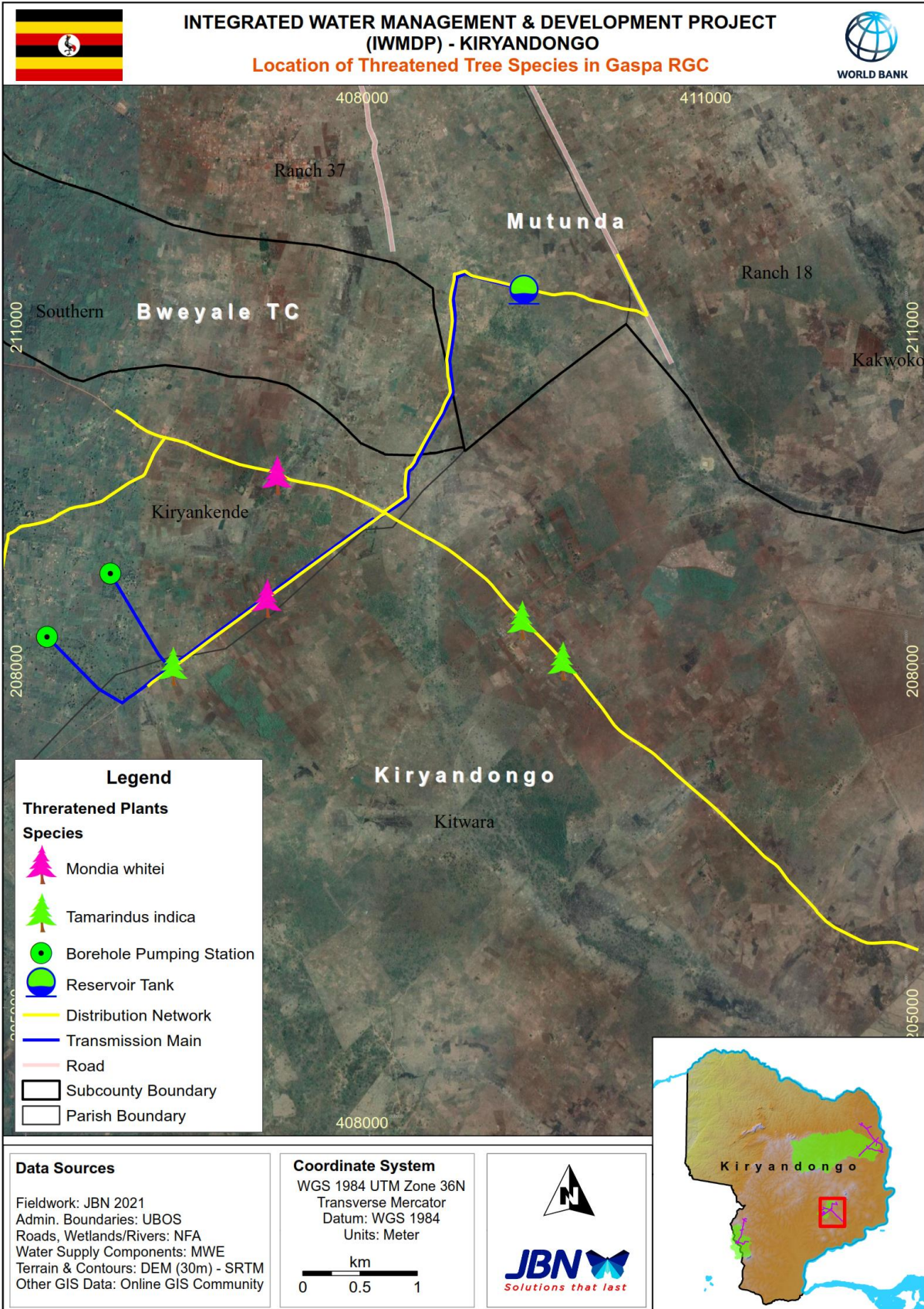


Figure 5-48: Location of project affected trees

5.3.3 INSECTS

A total of 44 sampling points established at the different infrastructure sites and along the supply and distribution network were surveyed for Butterflies and Dragonflies.

5.3.3.1 BUTTERFLIES

Eleven (11) species of butterflies were registered in the project area at different locations (**Table 5-17**). Four families were represented by the registered butterflies including family Lycaenidae which registered two species, Nymphalidae which registered five species, Papilionidae which registered one species and Pieridae which registered three species. The butterfly species fall into nine (9) genera. Two main factors dictate the number of species that can be registered in an area during the survey. The time spent in an area and the season of the survey. The more the time one spends in an area, the more species one is able to encounter. More butterflies appear during the rainy season because there is abundant flowers from which they get their nutrition but also abundant forage on which caterpillars can feed. In terms of ecological characterization, three of the species recorded are migratory (**Table 5-18**). Four species are widespread and occur in a wide range of habitats. Two species are Forest edge/woodland species and are more often encountered in a variety of forest edge, degraded forest and woodland habitats. One species is a forest generalist and one is an open habitat species. Black and Orange *Vanessula milca* occurs in forest and woodland areas. African Migrant *Catopsilia florella* is a fast-flying butterfly that moves swiftly between flowers. It often engages in mud-piddling and is at times seen migrating in numbers.

Table 5-17: Butterflies encountered during the survey

Family	Species recorded	No. Counted	IUCN Red List Status
Lycaenidae	<i>Euchrysops Osiris</i> African Cupid - W	2	Least Concern
Lycaenidae	<i>Tarucus rosaceus</i> Pierrots - O	4	Least Concern
Nymphalidae	<i>Acraea sotikensis</i> Sotik Acraea - F	2	Least Concern
Nymphalidae	<i>Junonia oenone</i> Blue Pansy - W	1	Least Concern
Nymphalidae	<i>Junonia stygia</i> Brown Pansy – f	2	Least Concern
Nymphalidae	<i>Junonia terea</i> Soldier Commodore - W	2	Least Concern
Nymphalidae	<i>Vanessula milca</i> Black and Orange - f	1	Least Concern
Papilionidae	<i>Papilio demodocus</i> Citrus Swallowtail – M	2	Least Concern
Pieridae	<i>Belenois aurota</i> Brown Veined White – M	4	Least Concern
Pieridae	<i>Catopsilia florella</i> African Migrant – M	3	Least Concern
Pieridae	<i>Eurema desjaridinsi</i> Angled Grass Yellow – W	17	Least Concern

Table 5-18: Butterflies and their ecological types

Ecological Type	No. of species	Species names
Widespread species (W)	4	<i>Euchrysops</i> Osiris African Cupid, <i>Junonia oenone</i> Blue Pansy – W, <i>Junonia terea</i> Soldier Commodore – W and <i>Eurema desjaridinsi</i> Angled Grass Yellow – W
Open habitat species (O)	1	<i>Tarucus rosaceus</i> Pierrots - O
Forest generalist's species (F)	1	<i>Acraea sotikensis</i> Sotik Acraea – F,
Forest edge/woodland species (f)	2	<i>Junonia stygia</i> Brown Pansy – f and <i>Vanessula milca</i> Black and Orange - f
Migratory species (M)	3	<i>Papilio demodocus</i> Citrus Swallowtail – M, <i>Belenois aurota</i> Brown Veined White – M and <i>Catopsilia florella</i> African Migrant – M

Family Nymphalidae was the most represented with five species, while genus *Junonia* was the most represented with five species registered. During field sampling, the Angled Grass Yellow *Eurema desjaridinsi* was the most common. Seventeen individuals of the butterfly were registered. The Blue Pansy *Junonia oenone* and Black and Orange *Vanessula milca* were the least common with one individual each registered during the field survey.

No butterfly species of conservation significance were registered during the study. IUCN Red List of Threatened species categorizes all the encountered butterflies as Least Concern. The national red list for Uganda also categorizes the registered butterflies as Least Concern.

5.3.3.2 DRAGONFLIES

No dragonflies were registered in the project area during the time of the survey.

5.3.4 HERPETOFAUNA

A total of 44 sampling points established at the different infrastructure sites and along the supply and distribution network were surveyed for Amphibians and Reptiles.

5.3.4.1 AMPHIBIANS

Five amphibian species were registered during the survey (**Table 5-19**). Two of them were toads and three were frogs. Three families were represented Bufonidae, Dicroglossidae and Ptychadidae. The registered species are very adaptable to modified environment and they do not suffer much from habitat loss. Two of the species registered Steindachner's Toad *Sclerophrys steindachneri* and Eastern Groove-crowned Bullfrog *Hoplobatrachus occipitalis* were registered near water sources. Steindachner's Toad *Sclerophrys steindachneri* and the Mascarene Rocket Frog *Ptychadena mascareniensis* were the most common relative to the rest of amphibian species recorded during the survey. Five and four individuals were recorded respectively.

Table 5-19: List of amphibian species encountered in the project area

Family	Species and Common Name	No. Recorded	IUCN Red List Status
Bufonidae	<i>Sclerophrys gutturalis</i> Guttural Toad	1	Least Concern
Bufonidae	<i>Sclerophrys steindachneri</i> Steindachner's Toad	5	Least Concern
Dicroglossidae	<i>Hoplobatrachus occipitalis</i> Eastern Groove-crowned Bullfrog	1	Least Concern
Ptychadaniidae	<i>Ptychadena anchietae</i> Anchieta's Rocket Frog	2	Least Concern
Ptychadaniidae	<i>Ptychadena mascareniensis</i> Mascarene Rocket Frog	4	Least Concern / Data deficient

Amphibians are secretive creatures and it takes time to compile a complete species list for the project area. The longer you stay in an area the more species you encounter. A complete species list would benefit from a longer-term survey. Based on the IUCN Red List 2020, none of the species recorded is of conservation concern. All species are listed as Least Concern (LC). One species, the Mascarene Ridged Frog *Ptychadena mascareniensis*, is listed as Data Deficient (DD) by the National Red List for Uganda (WCS, 2016).

5.3.4.2 REPTILES

Seven reptile species were recorded during the survey (Table 5-20). The reptiles included three lizards and four snakes. The reptiles represent five families and seven genera. All the lizards recorded were encountered, while the snakes were reported by the residents found in the field. The Blue-Headed Tree Agama *Acanthocercus atricolis* was the commonest relative to the rest of the lizards.

Table 5-20: List of reptile species encountered during the survey

Family	Species and Common Name	No. Recorded	IUCN Red List Status
Agamidae	<i>Acanthocercus atricolis</i> Blue Headed Tree Agama	3	Least Concern
Agamidae	<i>Agama agama</i> Red-Headed Rock Agama	2	Least Concern
Colubridae	<i>Lamprophis fuliginosus</i> Brown House Snake	reported	Not Evaluated (Data Deficient)
Elapidae	<i>Dendroaspis polylepis</i> Black Mamba	reported	Least Concern
Elapidae	<i>Naja nigricollis</i> Black-Necked Spitting Cobra	reported	Least Concern
Lacertidae	<i>Heliobolus spekii</i> Speke's Sand Lizard	2	Least Concern
Pythonidae	<i>Python sebae</i> Central Africa Rock Python	reported	Least Concern

No species of conservation significance was recorded. Also, none of the reptiles encountered and those reported by the community members is of conservation concern. All the species are listed as least concern by IUCN 2020 Red List of threatened species. The Central Africa Rock Python *Python sebae* is listed under the Endangered Species Decree of 1985, which means that international trade of the species is prohibited. The Species is listed under CITES Appendix II (Branch 1998). However, in Uganda the Central Africa Rock Python *Python sebae* was down listed from Appendix II because the species is still abundant and wide spread in the Country. However, the species still suffer from habitat destruction and from hunting for its skin, meat and are frequently used in traditional medicines by local people.

5.3.5 AVIFAUNA

Thirty-four (34) species of birds were positively identified and recorded (**Table 5-21**). The project area generally has a high bird diversity as almost each species belongs to its own genera. Twenty (20) families and Thirty-One (31) genera were represented (**Table 5-22**). The high diversity may be attributed to the different habitats represented in the project area or its proximity to Karuma Wildlife Reserve (KWR). Unfortunately, the habitats are being modified by human activity.

Table 5-21: Bird species encountered Gaspa water and sanitation Project area

Family	Species Recorded	No. of Individuals Encountered	Species Red List Status
ACCIPITRIDAE	73 - <i>Elanus caeruleus</i> Black-Shouldered Kite - G	1	Least Concern
ALAUDIDAE	489 - <i>Mirafra rufocinnamomea</i> Flappet Lark - G	1	Least Concern
ALCEDINIDAE	375 - <i>Halcyon senegalensis</i> Woodland Kingfisher – O	1	Least Concern
APODIDAE	358 - <i>Cypsiurus parvus</i> African Palm Swift - O	17	Least Concern
CISTICOLIDAE	650 - <i>Cisticola natalensis</i> Croaking Cisticola - G	17	Least Concern
CISTICOLIDAE	677 - <i>Camaroptera brachyura</i> Grey-Backed Camaroptera - f	1	Least Concern
COLUMBIDAE	270 - <i>Turtur tympanistria</i> Tambourine Dove - F	10	Least Concern
COLUMBIDAE	281 - <i>Columba guinea</i> Speckled Pigeon - O	1	Least Concern
COLUMBIDAE	283 - <i>Streptopelia semitorquata</i> Red-Eyed Dove – f	2	Least Concern
COLUMBIDAE	289 - <i>Streptopelia senegalensis</i> Laughing Dove - O	6	Least Concern
CUCULIDAE	323 - <i>Centropus superciliosus</i> White-Browed Coucal - O	2	Least Concern

Family	Species Recorded	No. of Individuals Encountered	Species Red List Status
ESTRILIDIDAE	974 - <i>Uraeginthus bengalus</i> Red-Cheeked Cordon-Bleu - O	4	Least Concern
ESTRILIDIDAE	980 - <i>Spermestes cucullata</i> Bronze Mannikin - Widespread	30	Least Concern
HIRUNDINIDAE	499 - <i>Riparia paludicola</i> Plain Martin - O	38	Least Concern
HIRUNDINIDAE	513 - <i>Hirundo rustica</i> Barn Swallow - Pw	95	Least Concern & Palearctic Migrant
LANIIDAE	816 - <i>Lanius minor</i> Lesser Grey Grey Shrike - OM	1	PM Open habitat migrant
MACROSPHENIDAE	621 - <i>Melocichla mentalis</i> Moustached Grass Warbler - O	1	Least Concern
MALACONOTIDAE	824 - <i>Malaconotus blanchoti</i> Grey-Headed Bush-Shrike - O	1	Least Concern
MALACONOTIDAE	831 - <i>Tchagra australis</i> Brown-Crowned Tchagra - O	1	Least Concern
MALACONOTIDAE	843 - <i>Laniarius erythrogaster</i> Black-Headed Gonolek - f	2	Least Concern
MUSCIPIDAE	576 - <i>Cossypha heuglini</i> White-Browed Robin-Chat - f	1	Least Concern
NECTARINIIDAE	784 - <i>Cyanomitra olivacea</i> Olive Sunbird - FF	1	Least Concern
NECTARINIIDAE	787 - <i>Chalcomitra senegalensis</i> Scarlet-Chested Sunbird - f	2	Least Concern
NECTARINIIDAE	808 - <i>Cinnyris venustus</i> Variable Sunbird - f	1	Least Concern
ORIOOLIDAE	850 - <i>Oriolus larvatus</i> Eastern Black-Headed Oriole - f	1	Least Concern
PASSERIDAE	880 - <i>Passer cordofanicus</i> Rufous Sparrow - O	2	R-RR
PASSERIDAE	881 - <i>Passer griseus</i> Northern Grey-Headed Sparrow - O	1	Least Concern
PLOCEIDAE	908 - <i>Ploceus cucullatus</i> Black-Headed Weaver - O	1	Least Concern
PLOCEIDAE	928 - <i>Euplectes hordeaceus</i> Black-Winged Bishop - O	8	Least Concern
PLOCEIDAE	930 - <i>Euplectes franciscanus</i> Northern Red Bishop - G	5	Least Concern
PYCNONOTIDAE	547 - <i>Atimastillas flavicollis</i> Yellow-Throated Greenbul - f	1	Least Concern
PYCNONOTIDAE	562 - <i>Pycnonotus barbatus</i> Common Bulbul - f	20	Least Concern

Family	Species Recorded	No. of Individuals Encountered	Species Red List Status
SCOPIDAE	28 - <i>Scopus umbrette</i> Hamerkop - w	1	Least Concern
STENOSTIRIDAE	732 - <i>Elminia longicauda</i> African Blue-Flycatcher - f	1	Least Concern

Table 5-22: Numbers of bird species recorded in the project area

No. of families	No. of genera	No. of species
20	31	34

Ecological characterization of the encountered species shows that one species (Olive Sunbird *Cyanomitra olivacea*) was a forest specialist and one species (Tambourine Dove *Turtur tympanistris*) was a forest generalist (**Table 5-23**). Ten species were forest visitors. These three categories of birds prefer trees as an ecological feature. Two wetland visitors were recorded. Nineteen (19) species were categorized as open habitat or grassland habitat species. One species is categorized as widespread and can be encountered in a wide range of habitats. Two of the species recorded are categorized as Palearctic migrants. The two include the Barn Swallow *Hirundo rustica* and Lesser Grey Shrike *Lanius minor*. The Palearctic migrants come from European countries during winter to Uganda. However, the Barn Swallow *Hirundo rustica* populations in Uganda are residents.

Table 5-23: Birds and their ecological types

Ecological Type	No. of species
Forest specialists (FF)	1
Forest generalists (F)	1
Forest visitors (f)	10
Wetland/Aquatic/swamp Visitors (a)	2
Open habitat or Grassland species (O)	19
Widespread species (W)	1

Three species were common at the time of the survey. The three include *Hirundo rustica* Barn Swallow, *Riparia paludicola* Plain Martin and *Spermestes cucullata* Bronze Mannikin. Ninety-Five (95), Thirty-Eight (38) and Thirty (30) individuals respectively were recorded during the survey. Others which were relatively common include the *Pycnonotus barbatus* Common Bulbul, *Cypsiurus parvus* African Palm Swift and *Cisticola natalensis* Croaking Cisticola. Twenty (20), Seventeen (17) and Seventeen (17) individuals were registered respectively. The least common relative to others were 18 species in total and one individual each was registered during the survey of the project area.

According to IUCN 2020 red list of threatened species no species of conservation significance was recorded during the survey. It is only the Rufous Sparrow *Passer cordofanicus* whose conservation has been assessed as a regional responsibility (R-RR). The rest of the species are categorized as Least Concern. The IUCN Red List of Threatened Species 2020 considers the Barn Swallow a Least Concern species due to its extremely large range and global population size of 290–487 million individuals. Barn swallows are gregarious birds and in the absence of suitable roost sites, they sometimes roost on wires and many of them were recorded roosting on wires during the survey. The Barn Swallow *Hirundo rustica* are long-distance migrants and individual birds tend to return to the same wintering locality each year. However, the Ugandan populations are resident.

5.3.6 MAMMALS

Five mammal species were registered for their presence in the project area (**Table 5-24**). One was seen and the four species were reported by the local residence as occurring. Four families were represented and four genera. Family Sciuridae had two species recorded. Mammals have been affected by the modification of the habitats in the study area. No species of conservation significance has been recorded. All those registered are categorized as Least Concern (LC). Being in close proximity with Karuma Wildlife Reserve (KWR) a number of mammals could have roamed the area.

Table 5-24: List of Mammals registered during the survey.

Habitat type	Fauna species recorded in and around the area	No. Counted	IUCN Red List Status
Muridae	<i>Rattus rattus</i> Black Rat	1	Least Concern
Sciuridae	<i>Xerus rutilus</i> Unstriped Ground Squirrel	reported	Least Concern
Sciuridae	<i>Xerus erythropus</i> Striped ground squirrel	reported	Least Concern
Bovidae	<i>Tragelaphus scriptus</i> Bushbuck	reported	Least Concern
Nesomyidae	<i>Cricetomys gambianus</i> Gambian Giant Pouched Rat	reported	Least Concern

5.4 SOCIO-ECONOMIC BASELINE

5.4.1 POPULATION & DEMOGRAPHICS

5.4.1.1 PROJECT AREA

The core project area has a population of 19,538 people (8,206 male; 11,332 female) and 3,230 households living in 4 parishes (namely Ranch 37, Southern Ward, Kikube and Kitwara). In comparison, the immediate non-beneficiary area (villages within the core parishes stated above) has a population of 9,318 households as shown in **Table 5-25** and **Figure 5-49** below. In terms of beneficiary villages, the most populated villages are Cluster O (5,670 people; 961 HHs) and Ndoyo village (3,630 people; 825 HHs) as detailed in **Annex 9**.

Table 5-25: Household Population within Project Area (4 parishes)

Household Population within Project Area (4 parishes - Ranch 37, Southern Ward, Kikube and Kitwara)						
Sub County	Parishes	4 Beneficiary parishes		Non- Beneficiary		Overall
		Number	%	Number	%	
Bweyale Town Council	Southern Ward	48	3.2%	1,451	96.8%	1,499
Kiryandongo Refugee Settlement	Ranch 37	1,378	28.5%	3,464	71.5%	4,842
Kiryandongo Sub County	Kikube	843	20.5%	3,268	79.5%	4,111
KiryandongoSub County	Kitwara	961	45.8%	1,135	54.2%	2,096
	Total	3,230	25.7%	9,318	74.3%	12,548

Source: Kiryandongo DLG, 2022

Beneficiary Parish Population

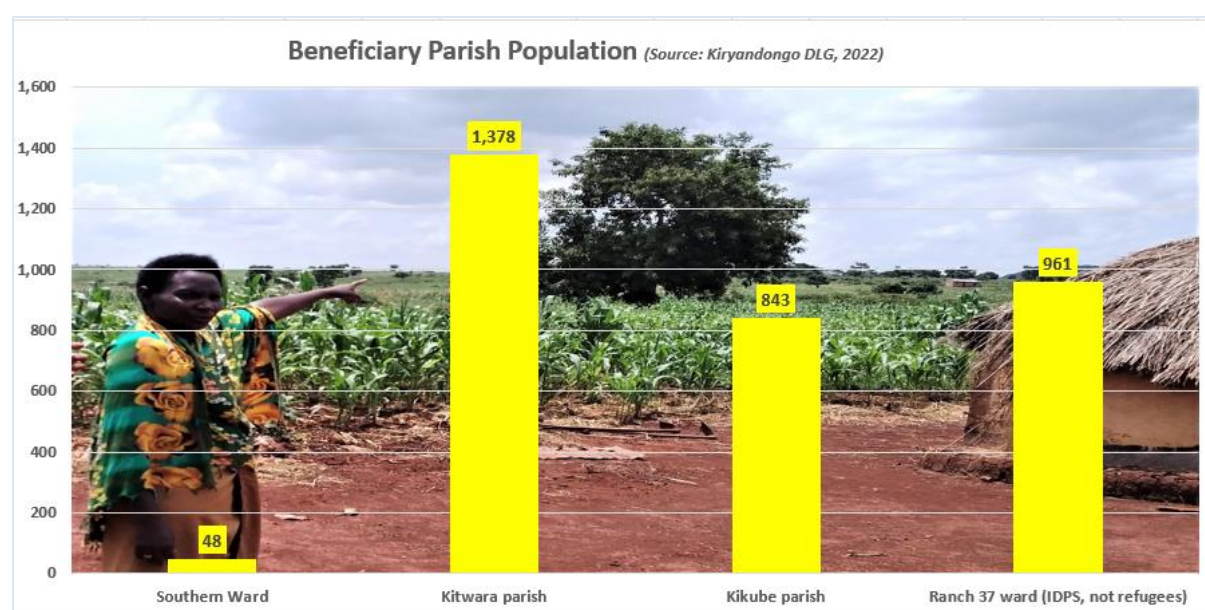


Figure 5-49: Figure 55: Beneficiary Parish Population

5.4.1.2 DURATION OF SETTLEMENT

Survey findings indicated that 94.9% (281 out of 296) of the respondents regard themselves as local residents (born in the area). Of these, 53.7% (151 out of 281) have stayed in the area for more than 5 years. In comparison, 2.7% (8 out of 296) were self-settlers (Ugandans who migrated from other parts of the country), and 2.4% (7 out of 296) were internally displaced persons (IDPs) who moved from Bududa district after being displaced by landslides as shown in Table 5-26 and Figure 5-50 below.

Table 5-26: Category of residents by years of settlement

Category of Respondents	Kibeka		Kikube		Ranch 37		Southern Ward		Overall	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Host / local Resident	104	96.3	169	97.7	0	0.0	8	100.0	281	94.9
1 year	22	21.2	26	15.4	0	0.0	0	0.0	48	17.1
1-5 years	38	36.5	32	18.9	0	0.0	0	0.0	70	24.9
1-6 months	1	1.0	11	6.5	0	0.0	0	0.0	12	4.3
More than 5 years	43	41.3	100	59.2	0	0.0	8	100.0	151	53.7
IDPs (Not Refugee)	0	0	0	0	7	100	0	0	7	2.4
1-5 years	0	0	0	0	7	100	0	0	7	100
Self-Settlers	4	3.7	4	2.3	0	0.0	0	0.0	8	2.7
6-12 months	4	100	4	100	0	0.0	0	0.0	8	100
Grand Total	108	100	173	100	7	100	8	100	296	100

Duration of Settlement in Years in Gaspa RGC

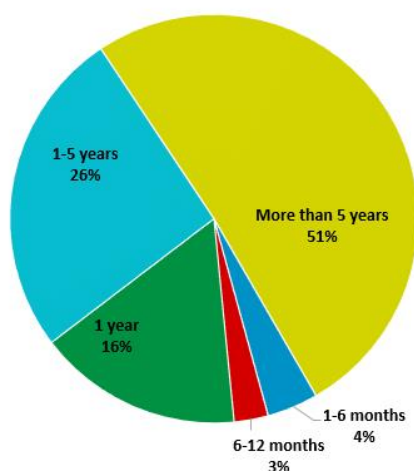


Figure 5-50: Duration of settlement in Kitwara parish - Gaspa RGC

5.4.1.3 ETHNIC COMPOSITION

Basing on findings of obtained through Key Informant Interview with Kiryandongo Sub County team, the major ethnic groups that are living within the area include the Banyoro (who are the indigenous community); Bagisu, Basoga, Alur, Kebu, Lugbara, Kenyans, Acholi, Langi, Baganda, Banyankore, Banyarwanda, Sabiny, Bakiga, Bafumbira, Baluri, Bachope, Kakwa, and Batoro. The major factors that attract human settlement include availability of casual labour opportunities offered at large scale farms and sugar plantations; involuntary resettlement and displacement by sugar plantations; cheap land; fishing and hospitality of the local communities.

Implication on ESIA:

- The project will directly benefit 20.8%% (2,447 out of 11,765) of the total households within the 4 parishes that make up Gaspa RGC.
- 961 households of IDPs (5,670 people - 2,381 male and 3,289 female) will benefit within beneficiary village called Cluster O, Ranch 37 in Kiryandongo Refugee Settlement.
- There is increasing rapid expansion of human settlements and mushrooming urban agglomerations evidenced majorly through expansion of hamlets and villages into trading centres with significant trade activities and congested settlements. One clear example is the Ndoyo trading centre that s rapidly growing. It lies between Gaspa and Kiryandongo Sugar Plantation, where the population of migrant plantation workers is bigger than the indigenous one.
- Due to the high demand for clean and safe water, households within the immediate influence zone of the project will likely to access and utilize the same piped water facilities. In the same, it's also likely that the intensification phase will cover additional villages.
- There is need to extend domestic connection to villages between Ndoyo and River Nile.
- The improved access to safe and clean water will contribute to local economic development as an effective strategy for poverty eradication in Gaspa RGC.
- According to the design report, adjustments on the supply system is planned to be expanded in the ultimate year 2040 in consideration of an increasing population within the area.

5.4.2 HUMAN SETTLEMENT & HOUSING

Human settlement patterns: The major human settlement patterns as shown in Fig. Below include; a) Compact or Nucleated settlements - this is common in trading centres where large number of dwellings are constructed very close to each other (**Figure 5-51**); b) Dispersed / dotted Settlements - here dwellings are located far apart and often scattered / dotted within a given landscape and/or village; c) Linear settlements - this is commonly seen along roads. Its common throughout the project area; d) Informal settlements - these are illegal dwellings often in restricted and/or prohibited areas such as wetlands, river banks, forest reserves.

Population density: The highest population density (people /km²) is 852 found in Bweyale TC (part of Siriba Cell);405 in Kiryandongo refugee settlement (part of Cluster O cell); 43 in Kiryandongo SC (part of Kikube and Kitwara parishes)



Figure 5-51: Settlement pattern of Mirima Village Gaspa RGC

Housing: Survey findings indicate that 36.5% (108 out of 296) live in temporary dwelling of mud, wattle and grass; 32.4% (96 out of 296) live in permanent dwellings of cement, brick, plastered and iron roofed; 31.1% (92 out of 296) live in semi-permanent dwellings made of bricks, not cemented, plastered and with iron sheets as shown in **Table 5-27** below. The housing characteristics will influence the demand for domestic connections. It's likely that the need for yard taps may outstrip that for household connections given the nature of human settlement, population density and housing characteristics as described above.

Table 5-27: Type of dwelling

Type of house / shelter	Kibeka		Kikube		Ranch 37		Southern Ward		Overall	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Bricks, Not cemented & plastered with Iron sheets	35	32.4	52	30.1	3	42.9	2	25	92	31.1
Cement & brick, plastered & Iron roofed	27	25	63	36.4	1	14.3	5	62.5	96	32.4
Mud & wattle / grass	46	42.6	58	33.5	3	42.9	1	12.5	108	36.5
Grand Total	108	100	173	100	7	100	8	100	296	100

5.4.3 EMPLOYMENT AND OCCUPATIONS

5.4.3.1 EMPLOYMENT STATUS

The employment status is categorized as employed, under-employed and unemployed among the working age group (14-65 years). In reference to the International Labour Organization (ILO, 2019), unemployment among the working age group (14-64 years) is categorized as: 1) those without work, not in paid employment or self-employment; 2) those currently available for work (paid employment or self-employment); and 3) those seeking work and have taken specific steps in a specified recent period to seek paid employment or self-employment.

Survey findings indicated that 44.6% (132 out of 2967) of the respondents considered themselves as under-employed; 28.4% (84 out of 296) as self-employed; 24.3% (72 out of 296) as unemployed and 2.7% (8 out of 296) as employed as shown in **Table 5-28**. In addition, during community meeting with local leaders at Mirima A village, it was noted that unemployment mostly affects the youth and their major coping mechanism is resort to sports betting, gambling, under-paying casual labour, alcoholism, among others. The participants requested that as a counter measure, there is need to provide jobs during construction works.

Table 5-28: Employment status by sex / gender

Employment Status	Kibeka		Kikube		Ranch 37		Southern Ward		Overall	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Employed	1	0.9	7	4.0	0	0	0	0	8	2.7
<i>Female</i>	0	0	4	2.3	0	0	0	0	4	1.4
<i>Male</i>	1	0.9	3	1.7	0	0	0	0	4	1.4
Self Employed	32	29.6	49	28.3	1	14.3	2	25	84	28.4
<i>Female</i>	15	13.9	28	16.2	1	14.3		0	44	14.9
<i>Male</i>	17	15.7	21	12.1	0	0	2	25	40	13.5
Under Employed	39	36.1	81	46.8	6	85.7	6	75	132	44.6
<i>Female</i>	10	9.3	29	16.8	4	57.1	1	12.5	44	14.9
<i>Male</i>	29	26.9	52	30.1	2	28.6	5	62.5	88	29.7
Unemployed	36	33.3	36	20.8	0	0	0	0	72	24.3
<i>Female</i>	33	30.6	31	17.9	0	0	0	0	64	21.6
<i>Male</i>	3	2.8	5	2.9	0	0	0	0	8	2.7
Grand Total	108	100	173	100	7	100	8	100	296	100

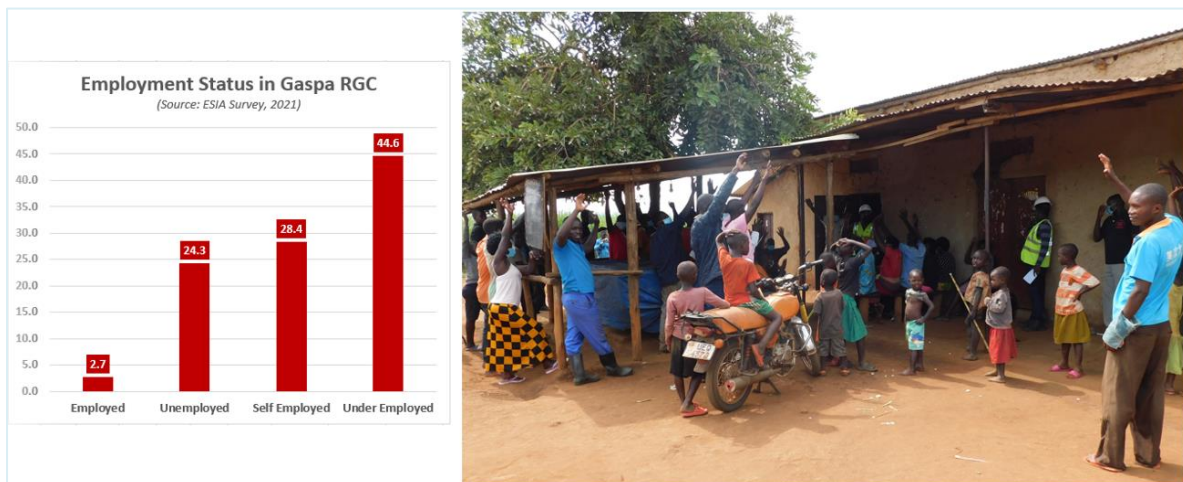


Figure 5-52: An Infographic showing employment trends and consultation meeting with youth at Ndoyo trading centre

5.4.3.2 OCCUPATIONS

Subsistence farming - Survey findings indicated that the 46.6% (138 out of 296) of the respondent households are engaged in subsistence farming (crop and animal husbandry) as shown in **Table**

5-29 and Figure 5-53 below. The dominate crops grown for income include root tubers (cassava, sweet potatoes), cereals (maize, rice, sorghum), tobacco, coffee and plantains (bananas). The animals reared for income majorly include local poultry (local breed chicken), livestock (cattle, goats, sheep, piggery), rabbits and apiary. There are also other agricultural value chain based activities such bulking and grain milling.

Petty business & services – Survey findings indicated that 27.7% (82 out of 296) of the households are engaged in petty business and services such as commuter motorcycles (a.k.a bodaboda), shop keeping, market vendors, selling food stuffs, stone quarrying, water vending, etc. During KII with local leaders in Mirima village, it was noted that t there are only 7 water vendors who serve Gaspa trading center located.

Other occupations - 23.6% (70 out of 296) are engaged on other source of livelihoods such as casual labour such as on large scale farmers (e.g. AGILLIS Farm in Tecwa village) and 2% (6 out 296) have salaried jobs.

Table 5-29: major occupations in Gaspa RGC

Major Occupations	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Casual labour	20	18.5	48	27.7	1	14.3	1	12.5	70	23.6
Farming	58	53.7	71	41.0	4	57.1	5	62.5	138	46.6
Petty business & services	29	26.9	49	28.3	2	28.6	2	25	82	27.7
Salaried employee	1	0.9	5	2.9	0	0	0	0	6	2.0
Grand Total	108	100	173	100	7	100	8	100	296	100

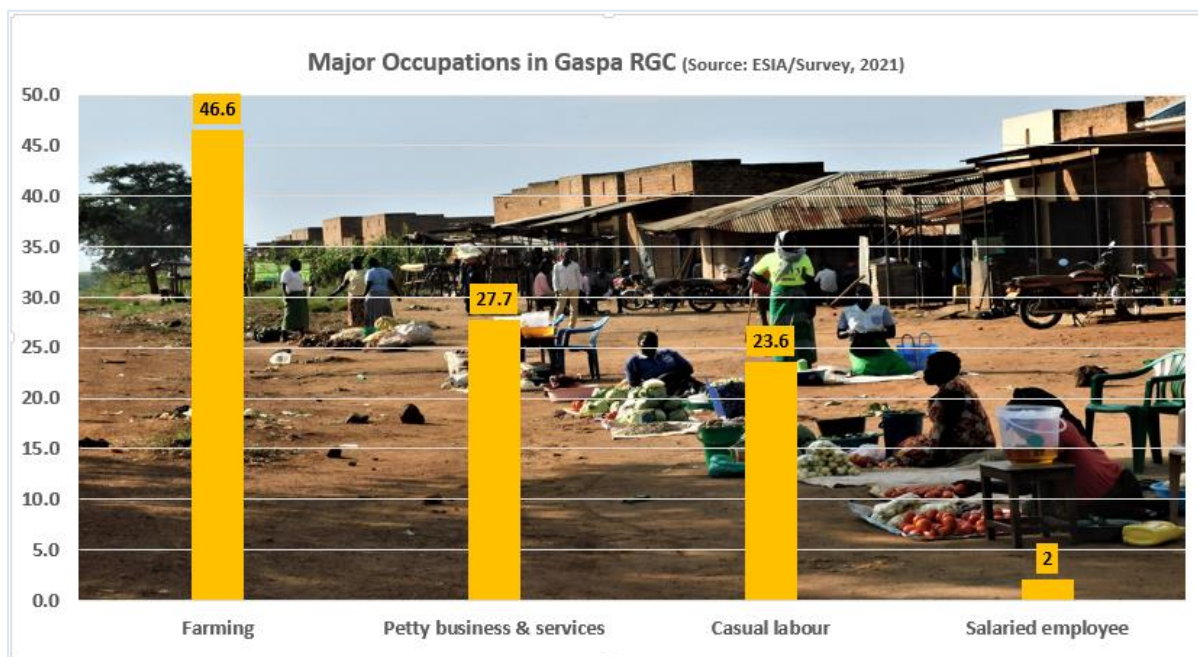


Figure 5-53: Major occupations in Gaspa RGC

Implications:

- The project will create jobs in the short, medium and long term across the implementation stages (pre-construction, construction, operation and maintenance). Locals have will be given short term jobs such as trenchers, porters, drivers, plumbers, masons, painters, electricians, as well as indirect employment opportunities. The members of the local community (especially youth and women) will be given short term jobs such as trenchers, porters, drivers, plumbers, masons, painters, electricians.
- It's been noted that other direct jobs could be PSP attendants and Yard Tap owners will also arise. It's not possible to ascertain the number of jobs to be created per category at the time of baseline assessment.
- In addition, there will also be indirect employment opportunities such as selling food stuffs, soft drinks on-site and/or near construction sites.
- There will be reduction and/or total loss of jobs for water vendors especially in Gaspa RGC. However, the project may as well create additional jobs for water vendors in other underserved areas.

5.4.4 POVERTY LEVELS

According to the NDP III 2020/21-2024/25, poverty is a major constraint for both local and national development characterized by persistent vulnerabilities such as zero/no income in both urban and rural communities (NPA, 2021). Nationally, one indicator of poverty is the 'population (in percentage) below the poverty line of \$1 US Dollar per day. A review of Kiryandongo Sub County 5-years Development Plan (2020/2021 - 2024/2025) indicated that the major poverty conditions affecting communities include lack and/or limited income, food, water and poor housing. Further to this, survey findings indicated that 59.5% (176 out of 296) of the respondents were earning below \$1USD (UGX 3,500/=) per day; 19.9% (59 out of 296) were earning between \$1- 2 USD dollars (U GX 3,500-7,000) per day; 13.2% (39 out of 296) were earning above \$3 US dollars (UGX 10,000/=) per day; 7.4% (22 out of 296) were earning between \$2-3 USD (UGX 7,000 – 10,000/=) per day earn as shown in **Table 5-30** and **Figure 5-54** below. The distribution of households earning below poverty line (<\$1 US dollar per day) shows that 71.4% live in Ranch 37; 63.9% are in Kibeka parish; 62.5% are in Southern Ward and 56.1% are in Kikube parish as shown in Table 40 below.

Table 5-30: Poverty Line by income levels (<=> \$1USD per day)

Income level per day (< = > 1 USD / 3,500/=)	Kibeka		Kikube		Ranch 37		Southern Ward		Overall	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Below UGX 3,500	69	63.9	97	56.1	5	71.4	5	62.5	176	59.5
UGX 3,500 - 7,000	20	18.5	39	22.5	0	0	0	0	59	19.9
UGX 7,000 - 10,000	6	5.6	14	8.1	1	14.3	1	12.5	22	7.4
Above UGX 10,000	13	12	23	13.3	1	14.3	2	25	39	13.2
Grand Total	108	100	173	100	7	100	8	100	296	100

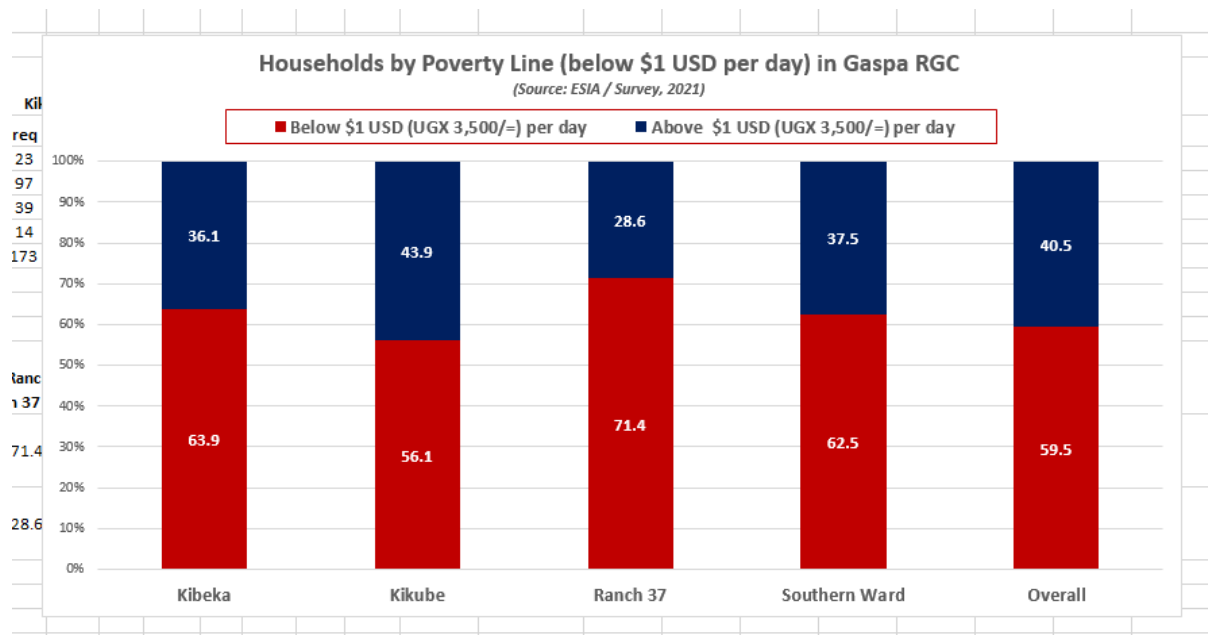


Figure 5-54: Percentage Households living below Poverty Line (<\$1 US Dollar per day) in Gaspa RGC

Implications:

- The project will positively impact on the achievement of SDG 6 that aims to achieve (Target 6.1) universal and equitable access to safe and affordable drinking water for all by 2030. At national level, GoU aims at increasing access to safe water and sanitation level in rural and urban areas (NDP III, 2020). At district levels, local governments are also endeavouring to increase water coverage.
- It's noticeable that there will be reduction in water poverty levels. In this case, Water Poverty is defined as manifestation of wide discrepancies in terms of access, availability, and utilization of safe and clean water as well as sanitation and hygiene services (Julie and Johnson, 2013 and Eran and Jonathan, 2002). It also means water scarcity due to physical shortage, or scarcity due to lack of adequate infrastructure, irregular supply and inability to afford payable water services (UN Water, 2021).
- Positively, the utilization of safe and clean water will increase due to ability to afford connections and pay water bills. There will be reduced water insecurity, decrease in vulnerability due to water poverty conditions by making communities more accessible to essential service.
- Negatively, the inability to pay will increase the level of substitutability. This means that those who are unable to afford resorting to free and/or cheaper sources within the area.
- In a similar way, there are free open surface water sources that serve as alternatives in case of inability to afford piped water.
- Survey findings indicated that about 70.9% (161 out of 227) respondents mentioned ponds as alternative sources of water for domestic use; 22.5% mentioned River Nyakafunyo and 6.6% said River Apodorwa (refer to Section 5.4.5.1 for details). In order to counter the negative impact of the above scenarios, its important to continue investing in construction of more safe water source points such as deep boreholes.

5.4.5 ACCESS TO WATER

By definition, access to safe water is the ratio of people served by a safe water point and piped water supply to the total population, calculated basing on the estimated number of people per water point type (DWD/MWE, 2021). Data provided by Ministry of Water and Environment indicates that access to safe water in Kiryandongo district stands at 71%, with rural access at 77% and urban access at 48% (MWE/Uganda Water Atlas, 2022).

5.4.5.1 WATER SOURCE POINTS

Within Gaspa RGC, there are 14 functional water source points that comprise of 8 deep boreholes (Table 5-31); 1 piped water system with 3 PSP / Tap stands of which 2 are in Kalwala village (constructed by MWE) and Tecwa Primary School (donated by UNICEF in Figure 5-55); 1 rain water harvesting tank (RWHT). The usage of these sources is majorly attributed to varying levels of proximity, affordability, availability, accessibility and location. It was noted that the people often resort to alternative free cost sources including open sources such as ponds, River Nile located within a distance of 5-7 km.

Table 5-31: Number of water source points in Gaspa RGC

Type of water source points	Number of water source points Gaspa RGC - Direct Beneficiary Area									Overall (Kiryandongo SC)
	Kitwara	Kitingozi	Tecwa	Mirima	Ndoyo	Kalwala	Siriba Cell	Cluster O	TOTAL	Functional
Protected spring	0	0	0	0	0	0	0	0	0	17
Shallow wells	0	0	0	0	0	0	0	0	0	243
Deep Boreholes	1	1	1	2	1	0	1	1	8	403
Rain water harvesting tanks	0	1	0	0	0	0	0	0	1	3
Valley Dams	0	0	0	0	0	0	0	0	0	1
Valley Tanks	0	0	0	0		0	0	0	0	0
Piped systems	0	0	1		0	1	0	0	1	6
PSP / Kiosk, Tap stands	0	0	1	0	0	2	0	0	3	8
Yard Taps										1,096
Household connections	0	0	0	0	0	0	0	0	0	24
Institutional connections	0	0	0	0	0	0	0	0	0	28
OVERALL	1	2	3	2	1	3	1	1	14	



Figure 5-55: Deep borehole & Tap stand in Tecwa



Figure 5-56: Community deep borehole at Kitwara parish

Survey findings indicated that 88.5% (262 out of 296) of the households depended on communal deep boreholes compared to 11.5% (34 out of 296) who used PSP / Tap stands in Kalwala and Tecwa villages as shown in **Table 5-32** below.

Table 5-32: Main water sources in Gaspa RGC

Main water source	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Borehole	96	88.9	152	87.9	6	85.7	8	100	262	88.5
PSP / Tap Stand	12	11.1	21	12.1	1	14.3	0	0	34	11.5
Grand Total	108	100	173	100	7	100	8	100	296	100

5.4.5.2 SOURCE FUNCTIONALITY

Data by DWD/MWE indicates that in Kiryandongo district, there are 403 functional (F) deep boreholes and 46 non-functional (NF); 243 functional shallow wells; 17 functional protected springs; 8 PSPs / Kiosk/ Tap Stands; 3 rain water harvesting tanks; 1 valley dam; 1,096 yard taps; 24 household connections; 28 institutional connections. The major reasons for non-functionality are diversely attributed to technical breakdown at 32%; vandalism at 18%; use of alternative sources nearby at 14%; low yield at 18%; non-functioning water and sanitation committees; water quality related at 5% and other unspecified factors at 9% (Uganda Water Atlas, 2021). It's notable

that there is mini solar powered system within Kikube parish at Kalwala village (immediate influence zone0 but it's no longer functional. During a KII with LC 1 Chairperson it was revealed that the non-functionality is attributed to inability of community to meet costs of repair (damaged pump). He further said that even before the technical breakdown, the community had abandoned the system (PSP in **Figure 5-57** below) due to salinity.



Figure 5-57: Non-Functional solar powered mini water system at kalwala village

5.4.5.3 ALTERNATIVE WATER SOURCES

Survey findings showed that 97.6% (289 out of 296) of the households mentioned that they use open surface water sources such as ponds and wetlands as shown in **Table 5-33**, compared to 2.4% (7 out of 296) who said they also depend on River Nile shore line at Kikungulu village even though its located within 3-5 km away (**Figures 5-58 to 5-61**).

Table 5-33: Alternative water sources people use

Alternative water sources people use	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Open surface - pond & wetlands	101	93.5	173	100	7	100	8	100	289	97.6
Open surface - ponds, wetlands & River Nile	7	6.5	0	0	0	0	0	0	7	2.4
Grand Total	108	100	173	100	7	100	8	100	296	100

Implications: The level of level of substitutability to payable piped water within beneficiary villages would majorly be influenced by the inability to pay water tariffs and bills. In non-beneficiary area (immediate influence zone), the ability to use alternative open surface water sources is probably high.



Figure 5-58: Water ponds in Kikube parish (Latitude 2.1341723000; Lonitude 32.1318498000)



Figure 5-59: Water Pond in Ndoyo Trading centre



Figure 5-60: Wetlands in Kitwara and Kikube parishes



Figure 5-61: River Nile at Kikungulu village near Ndoyo

5.4.5.4 DISTANCE TO NEAREST SAFE WATER SOURCE

Survey findings indicated that the 42.9% (127 out of 296) move a distance of more than 1000 meters to nearest borehole; compared to 65.5% (194 out of 296) who are located more than 1000 meters from a nearest PSP / Tap stand as shown in **Table 5-34** below.

Table 5-34: Distance to safe water sources

Distance	Communal borehole		PSP / Tap Stand	
	Freq	%	Freq	%
Less than 100 meters	16	5.4	41	13.9
100-300 meters	72	24.3	46	15.5
300-500 meters	81	27.4	15	5.1
More than 1000 meters	127	42.9	194	65.5
Grand total	296	100	296	100

Implications: The average distance to a safe water source will be reduced to less than 500 meters within the core villages (through provision of intermediate access to onsite yard taps and PSP), and at least 1km within the influence zone (basic access within 1 km / within 30 min round-trip), as per the WHO standards for drinking water (WHO ⁵, 2017).

5.4.5.5 TIME OF COLLECTION AND DURATION AT WATER SOURCE POINT

Collection time: In terms of time for water collection, 37.8% (112 out of 296) of the households collect in morning hours of between 7.00am and 10.00am as shown in **Table 5-35** below; 31.1% (92 out of 296) collect between 10.00am-2.00pm; 28.4% (84 out of 296) collect between 2.00pm - 7.00pm; 2.7% (8 out of 296) collect between 5.00am - 7.00am (**Figure 5-62**).

Table 5-35: Time for collecting water in Gaspa RGC

Time of the day when water collected most	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
7.00am-10.00am	43	39.8	67	38.7	0	0	2	25	112	37.8
10.00am-2.00pm	23	21.3	59	34.1	6	85.7	4	50	92	31.1
2.00pm-7.00pm	37	34.3	44	25.4	1	14.3	2	25	84	28.4
5.00am-7.00am	5	4.6	3	1.7	0	0	0	0	8	2.7
Grand Total	108	100	173	100	7	100	8	100	296	100

⁵ WHO Guidelines for Drinking-water Quality, 2017



Figure 5-62: Girl & Boy children at Gaspa Road junction going to collect water at 8.45am in the morning

Waiting time: About 54.1% (160 out of 296) households spend at least 1 hour waiting at a water source point; 29.7% (88 out of 296) spend between 2-4 hours; 10.8% (32 out of 296) spend less than 30 minutes and 5.4% (16 out of 296) spend 2 hours as shown in **Table 5-36** below.

Table 5-36: Waiting time (Round Trip)

Waiting time (Round Trip)	Kibeka		Kikube		Ranch 37		Southern Ward		Overall	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
<30mins	1	0.9	25	14.5	4	57.1	2	25	32	10.8
1 hour	55	50.9	96	55.5	3	42.9	6	75	160	54.1
2 hours	8	7.4	8	4.6	0	0	0	0	16	5.4
2-4 hours	44	40.7	44	25.4	0	0	0	0	88	29.7
Grand Total	108	100	173	100	7	100	8	100	296	100

Implications: The project aims to improve access to water source point, sufficient volumes of good quality water that meet peak demand, as well as year-round service which is uninterrupted. In this case, the burden of going to water source point early in the morning will reduce, since consumers will be assured of reliable and low cost water at a 24/7 basis. This will directly contribute to other human capital development parameters. Firstly, there will be reduced interference with school reporting time in the morning hence improved school attendance among school going children (boys and girls).. Secondly, there will be health gains accruing from improved service levels more in terms of sanitation and hygiene promotion. In addition, there is likely to be a reduction to GBV related vulnerabilities that manifests in household heads (esp. men) complaining about their wives and/or children over delaying at water sources.

5.4.5.6 WHO COLLECTS WATER THE MOST

Survey findings showed that 64.9 % (192 out of 296) of respondents said all children (boys and girls) below age 17 years take the biggest burden of collecting water compared to 31.1% (92 out of 296) who said it's the women; 2.7% (8 out of 296) who said water vendors; 1.4% (4 out of 296) said husband / father / adult men as shown in **Table 5-37** below.

Table 5-37: Who collects water most

In your opinion, who mostly collects the water for in your home / business?	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
All children below age 17 years	60	55.6	118	68.2	6	85.7	8	100	192	64.9
Husband/father/adult man	2	1.9	2	1.2	0	0	0	0	4	1.4
Water vendor	2	1.9	6	3.5	0	0	0	0	8	2.7
Wife/mother/adult woman	44	40.7	47	27.2	1	14.3	0	0	92	31.1
Grand Total	108	100	173	100	7	100	8	100	296	100

In terms of burden of water collection among the children, 87.2% (211 out of 242) of the respondents said the Girl Child did most of the water collection at home compared to 12.8% (31 out of 242) said it's the Boy Child who carried a heavier burden as shown in **Table 5-38** below.

Table 5-38: Among the children (<17 years) who takes a heavy burden of fetching water?

Among the children (<17 years) who takes a heavy burden of fetching water?	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Girl child	74	80.4	126	92.6	3	50.0	8	100	211	87.2
Boy child	18	19.6	10	7.4	3	50.0	0	0.0	31	12.8
Grand Total	92	100	136	100	6	100	8	100	242	100

Implications:

At household level, the burden of collecting water among the children (girls and boys) has direct influence on development and gender dimensions such as gender inequality, vulnerability and marginalization, exposure to GBV, violence against children (VAC), violence against women and girls (VAWG).

5.4.5.7 AMOUNT OF WATER CONSUMED PER DAY

Survey findings indicate that 32.4% (96 out of 296) use at least 100 liters (5 jerry cans) of water per day; 23% (68 out of 296) use 80 liters (4 jerry cans) of water per day; 17.2% (51 out of 296) use 40 liters (2 jerry cans); 13.9% use 60 liters (3 jerry cans); 9.1% use 120 liters (6 jerry cans) per day; 3% (9 out of 296) use 140 liters (7 jerry cans) of water per day; and 1.4% (4 out of 296) use 20 liters (1 jerry can) of water per day as shown in **Table 5-39** and **Figure 5-63** below.

Table 5-39: Amount of water consumed per day

Amount of water in liters / jerry can per day	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
20 liters (1 jerry can)	1	0.9	3	1.7	0	0	0	0	4	1.4
40 liters (2 jerry cans)	20	18.5	27	15.6	2	28.6	2	25	51	17.2
60 liters (3 jerry cans)	12	11.1	26	15.0	2	28.6	1	12.5	41	13.9

80 liters (4 jerry cans)	23	21.3	40	23.1	2	28.6	3	37.5	68	23
100 liters (5 jerry cans)	39	36.1	56	32.4	0	0	1	12.5	96	32.4
120 liters (6 jerry cans)	10	9.3	16	9.2	0	0	1	12.5	27	9.1
140 liters (7 jerry cans)	3	2.8	5	2.9	1	14.3	0	0	9	3
Grand Total	108	100	173	100	7	100	8	100	296	100

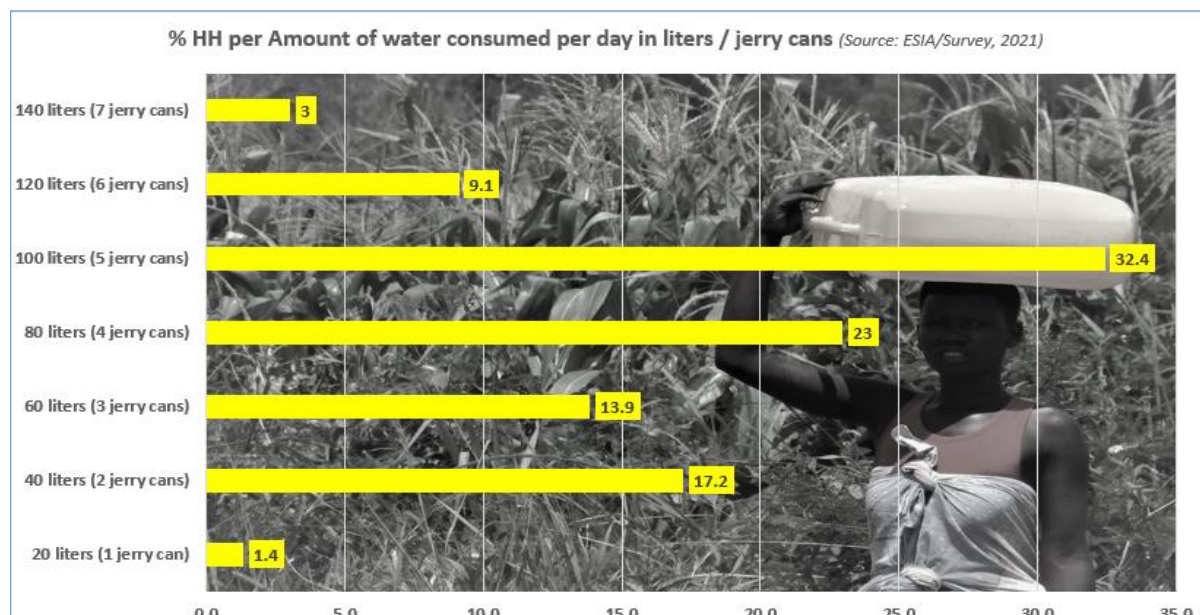


Figure 5-63: Number of HHs per Amount of water consumed per day in liters / jerry cans

Implications: The project will be able to increase supply of water per capita. At baseline the lowest water use per capita (for all water sources) is at 20 liters reportedly consumed by about 1.4% of the sampled households. However, the project will provide sufficient and reliable supply of clean and safe water that conforms to the post emergency standard of 20 liters per capita per day (Design Report, 2021). Further still the system will be enough to maximum day demand is between 188.08 m³/day for initial year and 422.17m³ m³/day for ultimate year 2046 (Design Report, 2021). In addition, there are measures to ensure reliable supply of quality water. However, the contractor and utility operators will have to ensure that the taste, odour or appearance of supplied water conforms to the consumers' preferences in order to avoid a scenario where system is rejected / abandoned.

5.4.5.8 HOUSEHOLD EXPENDITURE ON WATER

Survey findings showed that 95.6% (283 out of 296) of the respondent households spend \$0.29 USD (UGX 2,000/=) per month as borehole maintenance fees; 3.4%% (10 out of 296) pay above \$1 USD (UGX 3,500) to buy from water vendors and 1% (3 out of 296) spend \$0.57 USD (UGX 2,000/=) as PSP / Tap stand user fees as shown in **Table 5-40** below.

Table 5-40: Monthly household expenditure on water per source

How much do you spend on water per month?	Kibeka	Kikube	Ranch 37	Southern Ward	Grand Total

	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
\$0.29 USD (UGX 1,000/=)	105	97.2	164	94.8	6	85.7	8	100	283	95.6
\$0.57 USD (UGX 2,000/=)	0	0	2	1.2	1	14.3	0	0	3	1.0
Above \$1 USD (UGX 3,500/=)	3	2.8	7	4.0	0	0.0	0	0.0	10	3.4
Grand Total	108	100	173	100	7	100	8	100	296	100

Implications:

The project will provide water at affordable. The planned cost of accessing water (tariff) at house Connection, Yard Tap, PSP and Part Time Users has been determined at UGX 83/20 liters under NWSC operation areas. However, unlike the house connection, the end user collecting from a PSP and Yard tap will more likely have to pay between \$0.03 – 0.06 USD (UGX 100 – 200/=) per 20 liters jerry can in a single round. In contrast, the cost of water will be higher than the prevailing average monthly cost of \$0.011 USD per day equivalent to \$0.29 USD (UGX 1,000/=) per month (25 days).

5.4.5.9 WILLINGNESS TO PAY FOR PIPED WATER

Survey findings indicate that 78% (231 out of 296) of the respondents said YES, they are willing to pay for piped water; 14.2% (42 out of 296) said want free service without paying anything; and 7.8% (23 out of 296) said NO, they are not willing with majority being in Cluster O (IDPs in Kiryandongo Refugee Settlement) as shown in **Table 5-41** below.

Table 5-41: Willingness to pay for piped water supply

Willingness to pay for piped water supply	Kibeka		Kikube		Ranch 37		Southern Ward		Overall	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
No	3	2.8	14	8.1	5	71.4	1	12.5	23	7.8
Want for free	11	10.2	29	16.8		0	2	25	42	14.2
Yes	94	87	130	75.1	2	28.6	5	62.5	231	78
Grand Total	108	100	173	100	7	100	8	100	296	100

5.4.5.10 AMMOUT THEY ARE WILLING TO PAY

Survey findings indicated that 88.7% (205 out of 296) of the respondents are willing to pay between \$0.029 USD (UGX 100/=) per jerry can of water of 20 liter capacity; 8.7% (20 out of 296) are willing to pay \$0.057 (UGX 200/=) for same as shown in **Table 5-42** below.

Table 5-42: Amount they are willing to pay per jerry can (20 liters)

Amount they are willing to pay per jerry can (20 liters)	Kibeka		Kikube		Ranch 37		Southern Ward		Overall	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
UGX 100	91	96.8	107	82.3	2	100.0	5	100.0	205	88.7
UGX 200	3	3.2	17	13.1	0	0.0	0	0.0	20	8.7
UGX 300	0	0	6	5	0	0	0	0	6	3

Grand Total	94	100	130	100	2	100	5	100	231	100
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Implication: The acceptability and willingness to pay water is among the key determinants of access and utilization of piped water systems. Since a big proportion (78%) are willing to pay U\$0.029 USD (UGX 100/=) per jerry can (20 liters), it's certain that the usability will be high because its within he range of the proposed tariff of UGX 83/20 liters. However, any increase in tariff will impact on water consumption and increase water demand, hence risks of substitutability with free and/or cheaper water sources.

5.4.5.11 ACCESS TO MOBILE PAYMENT METHODS

Survey findings showed that in case paying for water tariffs required use of mobile phone payment platforms, there are 87.8% (260 out of 296) who have access to cash-less mobile money payment services such as Airtel Money, MTN Mobile Money and Mobile Banking services. In comparison, only 12.2% (36 out of 296) don't have as shown in **Table 5-43** below.

Table 5-43: Access to cash less bill payment services (mobile money)

Access to cash less bill payment services (mobile money)	Kibeka		Kikube		Ranch 37		Southern Ward		Overall	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
No	6	5.6	24	13.9	4	57.1	2	25	36	12.2
Yes	102	94.4	149	86.1	3	42.9	6	75	260	87.8
Grand Total	108	100	173	100	7	100	8	100	296	100

Implications: It's anticipated that since NWSC is likely to be a utility manager of the system, paying a water bill will be easier for the owners of water connections through use of cash-less mobile money payment services such as Airtel Money, MTN Mobile Money and Mobile Banking services. Note that country wide the water bills charged by NWSC are payable either by cash less payment platforms and/or direct deposit on NWSC bank account.

5.4.6 WATER IN HEALTH CARE FACILITIES

In Uganda, there 33% of health facilities with basic water supply (WHO Global Baseline Report, 2019). According to UNICEF/JMP ⁶, 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'.

There are 2 health facilities (MoH / GoU) namely Kitwara HC II and Tecwa HC II (**Table 5-44**) with a total OPD Utilization rate of 40.2% and 59.8% respectively between period of year 2020 – 2021 (Kiryandongo DLG/HMIS, 2021). All these facilities have on-site water supply at free and/cheap costs per month. At Kitwara HC II, there is an on-site deep borehole as well as 2 RWHTs with capacity of 5,000 liters. The average water consumption per day is about 140 liters (7 jerry cans). In Tecwa HC II, there is a mini – solar powered water supply system with a reservoir of 20,000 liters and 2 Tap stands, one serving Tecwa Primary School. During a KII with Kiryandongo SC Health Assistant, it was noted that all government owned health facilities have a budget allocation for

⁶ UNICEF Joint Monitoring Programme (JMP)

utilities including water supply. In this case, any additional water supply is welcomed so long as it's affordable.

Table 5-44: Status of Water Sources in health facilities within Gaspa RGC

Health Facility	Catchment Area (parishes & villages)	Major Source of water supply	Distance to source	Liters (Jerry cans) Per Day	Cost month	Functional RWHTs	Capacity in Liters	OPD Utilization / clients per Annum (Yr2020-2021)
Kitwara HC II	Kitwara parish – Kirogoro, Kitwara, Kiryapugura, Kokii, Kakoba, Kabonyi, Kisenyi, Kakonge	Deep borehole	Onsite	140 (7 cans)	No cost	2	5,000	40.2% (1,454 patients)
Tecwa HC II	Kideka parish – Ndoyo, Mirima, Nyamutende, Kamusenene, Tecwa, Kyakakugulu	Tap stand (solar powered system – UNICEF) – Figure 5-64	Onsite	120 (6 cans)	10,000	2	5,000	59.8% (2,163 patients)

Source: Kiryandongo DHO & Health In-charges



Figure 5-64: Solar piped water system that partly supplies Tecwa HC II (Latitude 1.52528024; Longitude 32.1183292)

5.4.7 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 (UNICEF⁷, 2020). It's notable that water in schools has direct impact on education outcomes in primary, secondary and tertiary levels (MOES, 2020). A document review of Kiryandongo SC Development Plan (2021-2025) revealed that there government aided schools are faced with a high demand of water amidst inadequate water storage facilities. Survey findings indicated that all 8 schools (with a total enrollment of 5,100

⁷ <https://gdc.unicef.org/resource/drinking-water-sanitation-and-hygiene-schools>

learners) have access to safe water sources. More specifically, 13% (1 out of 8) have access to piped water (1 Tap Stand) constructed by GoU and UNICEF at Tecwa primary school; and 87% (7 out of 8) have access to deep boreholes with an average distance of between 30 - 200 meters. In term of water storage, only 25% (2 out of 8) schools (both Gov't & private) own a rain water harvest tank (RWHT) as shown in **Table 5-45** below.

Table 5-45: Status of water sources, storage and capacity at schools in Gaspa RGC

Name of school	School enrolment population	Major Source of water supply	Distance to source (meters)	Jerry cans per day	Litres per day	Cost month	Functional RWHTs	Capacity in litres	Functional Pit Latrine
Kitwara parish									
Kitwara P/S	1,127	Borehole	100	282	5,635	1,000	0		YES
Kakoba P/S	759	Borehole	Onsite	190	3,795	1,000	2	12,500	YES
Kitwara Seed SSS	352	Borehole	Onsite	88	1,760	1,000	1	2,000	YES
Tecwa P/S	781	Piped / Tap Stand (GoU / UNICEF - Figure 5-65)	Onsite	195	3,905	1,000	2	1,000	YES
Kikube parish									
Kisekura P/S	575	Borehole	Onsite	144	288	1,000	0		YES
Nyakatama P/S	561	Borehole	Onsite	140	281	1,000	0		YES
Runyan ya P/S	687	Borehole	100	172	344	1,000	0		YES
Nyakagando Nursery & PS	258	Borehole	200	65	129	1,000	0		YES
Total	5,100			1,275	16,136		5	14,500	



Figure 5-65: Piped water supply system (by GoU & UNICEF) at Tecwa primary school

Implications:

There is need for more institutional connections in 7 schools as well as water storage facilities. The availability of water at school has a direct influence on a number of educational outcomes such reduction in school dropout rate; school feeding among others. The actual baseline values for education outcomes was not possibly obtained from Kiryandongo District Education Office at time of ESIA.

5.4.8 HUMAN NUTRITION (FOOD AND DRINKING WATER)

5.4.8.1 NUMBER OF MEALS PER DAY

In Kiryandongo district, approximately 7.3% (3,332) households have less than 2 meals a day (UBOS SAP Western Region, 2014). The host community living has the highest rate at 12.4% (318) households having less than 2 meals a day. Survey findings indicted that within Gaspa RGC, 5.4% (364) households have less than 2 meals a day, with 4.6% (149) and 6.2% (215) households in Kikube and Kitwara parishes respectively (Figure 5-66). In Kyankende and Kichwabugingo parishes, the rate is at 3.1% (110) and 6% (309) respectively.

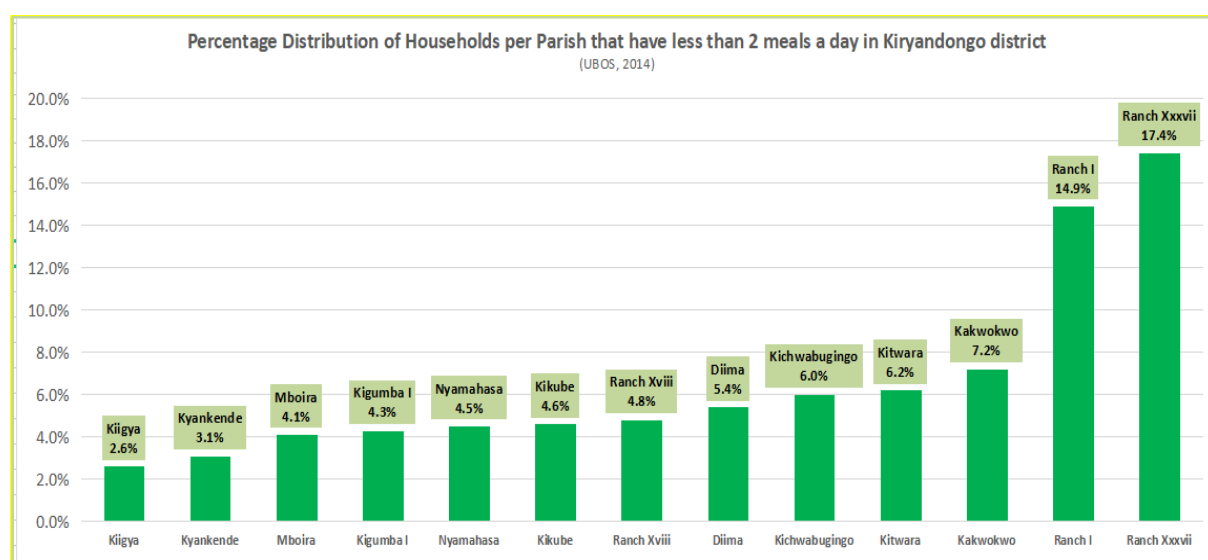


Figure 5-66: Absolute Poverty levels by % HHs having less than 2 meals in a day per in Kiryandongo District

5.4.8.2 DRINKING WATER

It should be noted that safe drinking water is essential for their health and survival, and drinking unsafe water can increase incidence and prevalence of water related diseases.

Source of drinking water: In Gaspa RGC, the deep boreholes are the major sources of drinking water. However, only 8.1% (6 out of 74) boil water on daily basis; 27% (20 out of 74) boil on weekly basis; 59.5% (44 out of 74) don't boil drinking water as shown in **Annex 9**. Method of water treatment: 57.4% (39 out of 74) treat water for drinking using indigenous methods such as smoking; 41.2% (28 out of 74) boil using firewood; 1.5% (1 out of 74) use water purification tablets such as Water Guard (**Annex 9**). Storage of drinking water: 69.9% (51 out of 74) store drinking water in plastic jerrycans; 21.9% (16 out of 74) store in pots; 8.2% (6 out of 74) store in buckets (**Annex 9**).

Implications: It should be noted that safe drinking water is essential human nutrition and health. Drinking unsafe water can increase incidence and prevalence of water related diseases. The project will directly contribute to increase in access to water which is easily treatable for drinking. However, there is need to promote the use of energy saving stoves that can be used in reducing the cost per capita on charcoal and firewood used in boiling water and cooking food. The increase in access and utilization of energy saving stoves will also have directly contribute to sustainable environmental management of water catchments.

5.4.9 WATER FOR PRODUCTION

There is increasing demand for water for production especially for livestock as well as crop irrigation. There is no valley dam nor valley tank. Majority of farmers rely on rainfall for crop cultivation while livestock farmers rely on open surface water such as ponds (**Figure 5-67**), wetlands and rivers including River Titi and River Nile as shown in **Figure 5-68**.

Due to climate variability, drought and dry spells are major barriers to agricultural production and productivity, and in turn affect livelihoods especially water stress and insecurity. This is causing conflict over the limited water resources. With an increasing influx of cattle keepers in the area, there is great demand for water for production (crop and animals). Livestock is watered any nearest water source, and many times herdsmen take livestock to boreholes. The severity of water scarcity is causing human migrations to water catchments such as Nanda wetland.

Implications: The piped water will to a small extent be used in farm production especially livestock.



Figure 5-67: Cattle taking water in a roadside borrow-pit



Figure 5-68: Cattle watering point along River Nile in Kikungulu village (located 4.5km between Ndoyo and River Nile)

5.4.10 SANITATION & HYGIENE

5.4.10.1 PIT LATRINE COVERAGE

Households with Pit Latrine: Survey findings indicated that all the respondent households (100%) reported to have functional pit latrines; however; 24.3% (72 out of 296) share pit latrine with neighbors compared to 75.7% (224 out of 296) who said NO, they don't share pit latrine as shown in **Table 5-46** below.

Table 5-46: Sharing Pit latrines

	Kibeka	Kikube	Ranch 37	Southern Ward	Grand Total

Do you share this toilet facility with other HHs?	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
No	88	81.5	127	73.4	4	57.1	5	62.5	224	75.7
Yes	20	18.5	46	26.6	3	42.9	3	37.5	72	24.3
Grand Total	108	100	173	100	7	100	8	100	296	100

Implications:

- In case there are conditionality of first having a functional toilet facility, then there will be an increase in construction of pit latrines in order to meet the eligibility criteria for connection. In this case it latrine coverage will increase.
- The MWE and local governments can influence the modification the redesigning of pit latrine and enforce it as well. The modified design can be that of lined pit latrine aimed at minimizing the level of contamination of underground water. This is supported by a study conducted by NCBI in 2013. It revealed that there is increasing concern about contamination of underground water due to discharges of chemical and microbial contaminants from pit latrines that in end negatively affect human health (NCBI, 2013⁸). Findings further show that although concentrations of most faecal microorganisms decline after excretion, these microorganisms may still impair groundwater quality. The study measured faecal indicator bacteria, including total coliforms, faecal coliforms, and Escherichia coli (previously known as Bacillus coli), which can affect underground water quality (Wade et al. 2003).
- In similar way there will be an increased uptake / adaptability and usability of flush toilets and other types of water borne toilets at household and institutional levels.
- It's also anticipated that there may be deliberate emptying of faecal sludge into storm drainage and swamps, consequently leading to environmental and health-related risks.
- In order to improve adaptability, the local governments should regulate the construction of flush toilets and septic tank by inspections, enforcement and dissemination of construction specifications, and training of local masons and plumbers by contractors, IRWMD/MWE and local government.

5.4.10.2 PUBLIC TOILETS

Survey findings indicated that 66.2% (196 out of 296) of the respondents support the proposal to construct of public toilet while 33.8% (100 out of 296) said NO, they don't support the proposal as shown in **Table 5-47** below.

Table 5-47: Need for Public toilet

In your opinion, is there need for a public toilet in your area?	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
No	20	18.5	70	40.5	4	57.1	6	75	100	33.8

⁸ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3673197/>

Yes	88	81.5	103	59.5	3	42.9	2	25	196	66.2
Grand Total	108	100	173	100	7	100	8	100	296	100

Implications:

- The project will construct 3 public toilets in Gaspa RGC located at Gaspa trading center and Bweyale Town council, and primary schools. The design will be a) Construction of 2No. 6 Stance Waterborne Toilets; b) Construction of 2No. 5 Stance VIP Latrine for Girls; c) Construction of 2No. 5 Stance VIP Latrine for Boys. The planned new distribution system will influence the adoption and use of water flush toilets and septic tanks. However, the diffusion of flush toilet system as an innovation may be slow due to several barriers.
- The major anticipated challenges during operation would include risk of water shortages, blockages, high costs of maintenance (conventional emptying techniques e.g. use of cesspool trucks), poor user behaviors (e.g. use of bulk materials for anal cleansing) among others.

5.4.10.3 HAND WASHING

Survey findings indicated that 86.5% (256 out of 296) of the households had a hand washing facility (e.g. tip tap, jerry can) without soap; 9.5% (28 out of 296) had washing facility with soap and water; 4.1% (12 had hand washing facility that had n soap and water as shown in **Table 5-48** below.

Table 5-48: Hand washing facility

Access to Hand washing facility (e.g. tip tap)	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
With soap and water	8	7.4	17	9.8		0	3	37.5	28	9.5
Without soap	97	89.8	147	85.0	7	100	5	62.5	256	86.5
Without soap With soap and water	3	2.8	9	5.2	0	0	0	0	12	4.1
Grand Total	108	100	173	100	7	100	8	100	296	100

Implications: Hand washing is a key parameter of community and personal health. It's dependent on accessible and sufficient water supply. The high coverage of hand washing facilities at households is attributed to enforcement of Covid-19 SOP for communities and household. However, the cost of water and soap hindered their proper utilization. The project will contribute positively to hand washing.

5.4.10.4 WASTE MANAGEMENT

The major waste streams generated are crop and food residues, polyethene bags, plastics, roadside and street litter and waste water from bathing. There is no designated landfill neither a service provider within Gaspa RGC.

Waste materials - Survey findings indicate that 100% (296) of the respondent households generate waste in form of polythene bags (often used as packaging materials for consumables); 74.3% (220 out of 296) generate food residues; 74.35 9220 out of 296) generate waste water from bathing and washing; 58.8% (178 out of 296) generate agricultural waste especially crop residues; 29.7% (88 out of 2960 generate waste plastic bottles as shown in **Table 5-49** and **Figure 5-69** below.

Table 5-49: Major waste generated in Gaspa RGC

Major waste generated	YES		NO		TOTAL	
	Freq	%	Freq	%	Freq	%
Plastic bottles	88	29.7	208	70.3	296	100
Agricultural waste	174	58.8	122	41.2	296	100
Roadside / Street liter	208	70.3	88	29.7	296	100
Waste Water (Bathing & washing)	220	74.3	76	25.7	296	100
Food waste	220	74.3	76	25.7	296	100
Polythene bags	296	100	0	0.0	100	100

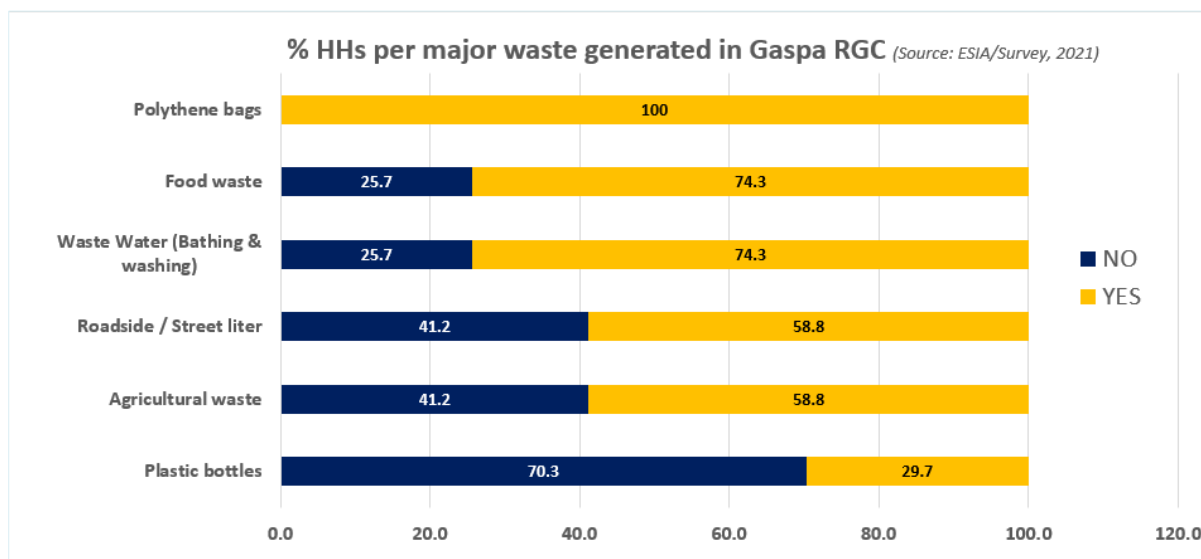


Figure 5-69: Major waste generated in Gaspa RGC

Waste management - Survey findings indicated that the most often used waste management practices reported by households were open dumping by 44.6% (132 out of 296); burning by 36.5% (108 out of 296); throwing in backyard, door side or compound by 20.3% (60 out of 296); burying by 4.1% (12 out of 296) as shown in **Figure 5-50** below.

Table 5-50: Common waste management practices

Common waste management practices	Open dumping		Burning		Burying		Throw in backyard, door side, compound	
	Freq	%	Freq	%	Freq	%	Freq	%
Can be useful	0	0	0	0	8	2.7	0	0
Not sure	20	6.8	16	5.4	60	20.3	4	1.4
Not used at all	40	13.5	32	10.8	116	39.2	156	52.7
Used very often	132	44.6	108	36.5	12	4.1	60	20.3
Used, but Not often	104	35.1	140	47.3	100	33.8	76	25.7
Grand Total	296	100	296	100	296	100	296	100

Implications: In order to maximize the benefits of piped water, there is need to ensure proper waste management practices that minimize risks of environmental degradation, human disease and contamination at point of collection and storage at household, institutional and community levels. In future, there is need to demarcate dumping area for solid waste as well as utilize service providers for waste water management (e.g. cesspool).

5.4.10.5 ORDINANCES AND BYLAWS ON WASH

Level of Awareness: Survey findings indicated that 67.6% (200 out of 296) of the respondents are aware about ordinance & bylaw on water, sanitation & hygiene (WASH) passed by both higher and lower local governments,; while 32.4% (96 out of 296) are not aware as shown in **Table 5-51** below.

Table 5-51: Awareness about Ordinances & Bye-laws on WASH

Awareness about Ordinances & Bye-laws on WASH	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
NO – not aware	13	12	71	41	7	100	5	62.5	96	32.4
YES – Aware	95	88	102	59		0	3	37.5	200	67.6
Grand Total	108	100	173	100	7	100	8	100	296	100

Preferences on WASH laws: In addition to the above, 73.3% (217 out of 296) of the respondents said they prefer to have the current ordinances and bylaw modified while 26.7 (79 out of 296) don't prefer as shown in **Table 5-52** below.

Table 5-52: Preference to have a new bylaw / modify ordinance and bylaws

In your opinion, do you prefer to have a new bylaw / modify the current one?	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Modify existing bye law	94	87	120	69.4		0	3	37.5	217	73.3
New bye law	14	13	53	30.6	7	100	5	62.5	79	26.7
Grand Total	108	100	173	100	7	100	8	100	296	100

Implications:

- In similar way, the operation and maintenance of solar piped water system may invoke local governments and refugee administration units to enforce and/or pass new laws and regulations regarding eligibility of connections, operation and maintenance.
- The local governments and refugee authorities are mandated to enforce against poor water, sanitation and hygiene conditions. At Lower LG level, this function is done by the Health Inspectors, Health Assistants, Town Agents and Parish Chiefs.

5.4.11 DISEASE BURDEN

Within Gaspa RGC, the catchment population served by Kitwara HC II and Tecwa HC II is affected by both communicable and non-communicable diseases, whose incidence & prevalence is partly attributed to poor water, sanitation and hygiene (WASH) conditions.

5.4.11.1 WATER RELATED DISEASES

The World Health Organisation (WHO) notes that water related diseases encompasses diseases and illness resulting from both direct and indirect exposure to contaminated water, whether by consumption or by skin exposure. These includes disease due to waterborne or water-associated pathogens and toxic substances (WHO, 2014). It also includes illness and diseases related to vectors with part of their life cycle in water habitats; and disease related to inhalation of contaminated water aerosols, as well as contamination during adverse climate events (Stanwell, R.S⁹, 2020). It notable that constraints related to safe and clean domestic water supply, access and utilization are directly linked to Incidence and Prevalence of water related diseases. These water related diseases are both communicable and non-communicable.

A review of Kiryandongo DLG/DHO/HMIS2 data for 2020-2021 indicated that Malaria had the highest prevalence at 71%; Diarrhea at 12%; Intestinal Worms at 11.1%; Viral gastroenteritis at 5.8%; Skin diseases (Scabies) at 4.4%; Schistosomiasis (Bilharzia) at 3.1% as shown in Table 63 below. Further still, there was an increase in prevalence of Diarrhea from 9.7% in 2020 to 15.7% in 2021. In 2021, the prevalence for skin diseases was higher within Tecwa HC II catchment area at 2.8% (25 cases) compared to Kitwara HC II catchment area with 1.9% (14 cases). The prevalence rate for intestinal worms was at 14.5% (132 cases) within Tecwa HC II catchment area compared

⁹ Royal Institute of Public Health, 2020; <http://www.eolss.net/sample-chapters/c03/e2-20a-01-01.pdf>

to 0.7% (5 cases) within Kitwara HC II catchment zone. NOTE: Disease Incidence refers to the number of new cases in a period of time usually one year. Disease Prevalence refers to the proportion of individuals who have an illness or condition at any moment over total number examined (WHO, 2004).

In comparison with the above, survey findings indicated that among the sampled households about 55.7% 9165 out of 296) said Malaria was the most common disease; 32.4% (96 out of 296) said Cough & Flu; 4.1% (12 out of 296) said Diarrhea; 3.7% (11 out of 296) said Typhoid; 2.7% (8 out of 296) said Bilhazia; 1.4% (4 out of 296) said Dysentery as shown in **Table 5-53** and **Figure 5-70** below .

Table 5-53: Prevalence rate of Water related diseases in Gaspa RGC (Catchment area of Kitwara HC II and Tecwa II).

Category of water related Diseases	Description	Risk & Exposure factors	Reported Diseases & illnesses	Prevalence Rate					
				2020		2021		(2020-2021)	
				Freq	%	Freq	%	Freq	%
Waterborne microbiological diseases	Diseases related to consumption of pathogens consumed in water; most due to human or animal faecal contamination of water	Ingestion of food, water, drink, or another substance into the body by swallowing or absorbing it	Cholera	0	0	0	0	0	0
			Typhoid fever	103	61.1	66	38.9	168	4
			Intestinal Worms	331	12.9	137	8.4	468	11.1
			Diarrhoea	250	9.7	256	15.7	506	12
			Dysentery	ND	ND	ND	ND	ND	ND
Waterborne chemical diseases	Disease related to ingestion of toxic substances in water	Drinking contaminated water	No reported case	0	0	0	0	0	
Water hygiene diseases	Diseases whose incidence, prevalence or	Contaminated water used for washing /	Skin diseases (Scabies)	145	5.6	39	2.4	184	4.4

Category of water related Diseases	Description	Risk & Exposure factors	Reported Diseases & illnesses	Prevalence Rate					
				2020		2021		(2020-2021)	
				Freq	%	Freq	%	Freq	%
	severity can be reduced by using safe (clean) water to improve personal and domestic hygiene	personal hygiene	Trachoma	ND	ND	ND	ND	ND	ND
Water contact diseases	Caused by skin contact with pathogen infested water or with chemical contaminated water	Contaminated open surface / fresh water sources	Schistosomiasis (Bilharzia)	80	60.9	51	38.8	131	3.1
Water vector habitat diseases	Diseases where vector lives all or part of its life in or adjacent to a water habitat	Rivers, Streams, wetlands, bushes; Small collections of stagnant water e.g., water butts	Malaria (mosquitoes)	1,828	61.1	1,163	38.9	2,991	71
Excreta disposal diseases	Diseases related to unsanitary disposal of human waste (faeces and urine)	Diseases related to human / animal waste in drinking water; (ii) diseases related to direct/ indirect contact with faeces/ urine	Faecal-oral infections Trachoma	ND	ND	ND	ND	ND	ND
Water aerosol diseases	Diseases related to respiratory transmission, where a water aerosol airway	water containing suspended pathogens enters residential buildings; (ii) raw water sources	Viral gastroenteritis	144	5.6	98	6	242	5.8
Overall OPD Utilization Rate / Clients				2,574		1,638		4,212	

(Source: Kiryandongo DHO/HMIS, 2020-2021) * No data (ND)

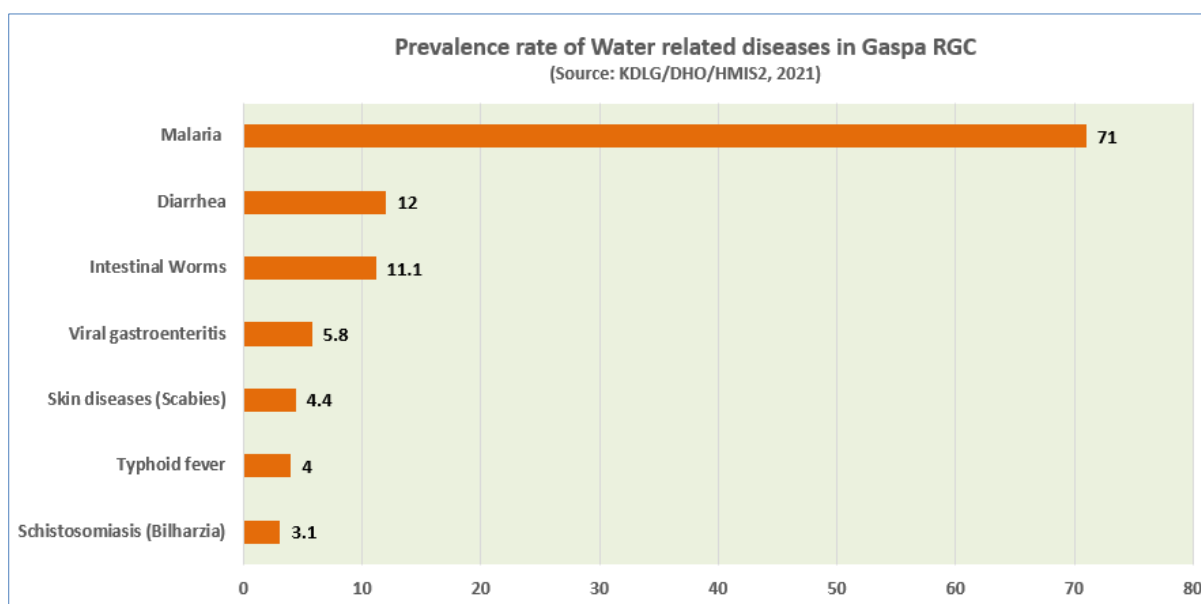


Figure 5-70: Prevalence rate of Water related diseases in Gaspa RGC (Catchment area of Kitwara HC II and Tecwa II).

Implications: The project will contribute to reduction in incidence and prevalence of water related diseases and illness which can be avoided through

- a) Supplying sufficient quantities of clean drinking water;
- b) Good personal and food hygiene conditions and practices
- c) Hygienic excreta evacuation
- d) Ingestion of boiled food and water, uncontaminated drinks, or substance into the body by swallowing or absorbing it
- e) Malaria vector control methods such as using mosquito nets, cleaning physical environment (proper waste management practices).

However, the provision and access to safe and clean water, may not entirely translate into reduced disease burden in short run. Therefore, measuring attribution of water supply to reduction in disease burden is outside the scope of this baseline assessment.

5.4.11.2 HIV/AIDS

By national comparison, the Mid-West region (covering project area), had an HIV/AIDS rate at 5.1% among the adult age 15-64 years by 2017 slightly lower than in rural areas at 5.8% in Central 1 region (UPHIA, 2017¹⁰). At national level, the prevalence of STI (active syphilis) is higher among rural residents at 2.3% compared to 1.6% in urban areas (PHIA, 2017). The ART initiation rate is at 88% with 46.5 % having HIV positive Individuals with presumptive TB (UPHIA, 2017).

¹⁰ Uganda Population-Based HIV Impact Assessment - https://phia.icap.columbia.edu/wp-content/uploads/2019/07/UPHIA_Final_Report_Revise_07.11.2019_Final_for-web.pdf

A review of Kiryandongo DLG/DHO/HMIS2 data for 2015-2021 indicated that within the last seven years, the HIV prevalence rate lowered from 7% in 2016 to 3% in 2021 within the Gaspa RGC (Kiryandongo SC and Bweyale TC) as shown in **Figure 5-71** below and **Annex 9**.

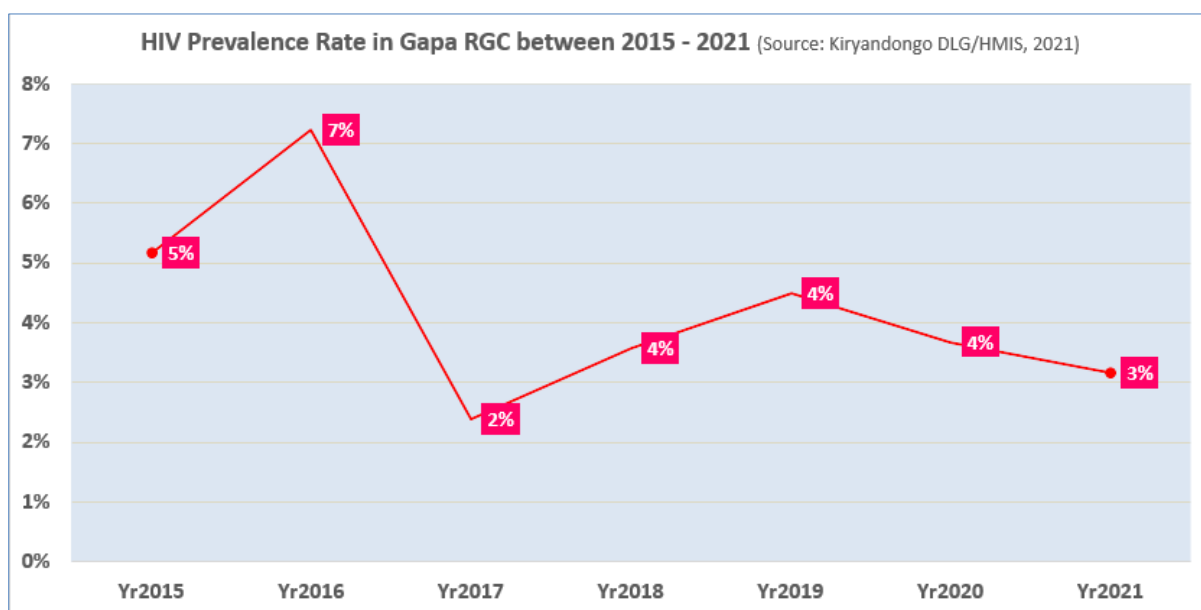


Figure 5-71: HIV Prevalence rate in Gaspa RGC between Years 2015 – 2021

5.4.11.3 STIS AND OTHER RELATED CONDITIONS

According to World Health Organisation, sexually Transmitted diseases are spread predominately through unprotected sexual contact. These STIs include Genital Herpes, Chlamydia, Gonorrhea, Syphilis, HIV/AIDs and Human Papillomavirus Infection (WHO, 2021). A review of Kiryandongo DLG/DHO/HMIS2 data for 2020-2021 indicated that there was a high prevalence rate for Urinary Tract Infections (UTIs) at 7.6%; STIs due to SGBV was at 1.5%; Pelvic Inflammatory Disease (PID) was at 0.8%; Urethral discharges was at 0.6% and Genital ulcers was at 0.4% as shown in **Table 5-54** below.

Table 5-54: Prevalent STIs & related conditions within Gaspa RGC (2020-2021)

Prevalent STIs & related conditions	Risk Factors	2020		2021		OVERALL	
		Freq	%	Freq	%	Freq	%
Urethral discharges	Exposure to STIs	22	0.9	5	0.3	27	0.6
Genital ulcers	Exposure to STIs	16	0.6	0	0	16	0.4
STIs due to SGBV	Exposure of urethra to bacteria due to unprotected sexual contact exacerbated by GBV	18	0.7	47	2.9	65	1.5
Other STIs	Unprotected sexual contact	124	4.8	40	2.4	164	3.9

Urinary Tract Infections (UTI)	Exposure of urethra to bacteria due to unprotected sexual contact	199	7.7	122	7.5	321	7.6
Pelvic Inflammatory Disease (PID)	Exposure to STIs	13	0.5	19	1.2	32	0.8

5.4.11.4 DRIVERS OF INFECTIONS (HIV/AIDS & STIS)

During the key informant interview with District Health Officer (DHO) it was revealed that the major driver of infections are majorly a) risky sexual behaviours such as having unprotected sexual intercourse, including early sexual debut, multiple sexual relationships, limited and inconsistent condom use; b) rampant transactional, cross-generational and sexual activities; c) poor attitudes such as stigma; d) limited awareness about personal and/or partner HIV & STI status; e) high prevalence of sexually transmitted infections and diseases (STI/Ds); f) low utilization of antenatal care (ANC) and delivery services such as PMTCT; g) low uptake of safe male circumcision (SMC) services; h) sub-optimal scale-up of ART; i) gender inequalities including gender-based violence (GBV) exacerbated by alcohol drinking; j) exposure to risk due to effects of Covid-19 lockdown especially among young girls (adolescents and youth).

5.4.11.5 MOST AT RISK POPULATIONS

During the key informant interview with District Health Officer (DHO), it was revealed that the Most At Risk Populations (MARPs) include school going age children, adolescents, traders (transiting outside project area), bodaboda riders, Bar and lodge attendants, married couples, sex workers, migrant workers, transit traders, casual labourers, rural-urban migrants, HIV+ve persons, pregnant mothers and un-born children. A review of Kiryandongo DLG/DHO/HMIS2 data for 2020-2021 indicated that an increase in cases of women and newly born babies initiating ART in maternity from 0 in 2015 to 7 in 2019 at Kitwara HC II. No case was recorded at Tecwa HC II. Note: There was no available data for 2020-2021.

5.4.11.6 HIV & STIS TESTING

Survey findings revealed that 51.4% (152 out of 296) of the respondents had Never taken an HIV test in the past 12 months compared to 41.9% (124 out of 296) who said YES; 4.1% (12 out of 296) said they preferred but they were not aware of any HIV service provider; 2.7% (8 out of 296) said they can't not test due to fear, majority being as shown in **Figure 5-72** and **Annex 9** below.

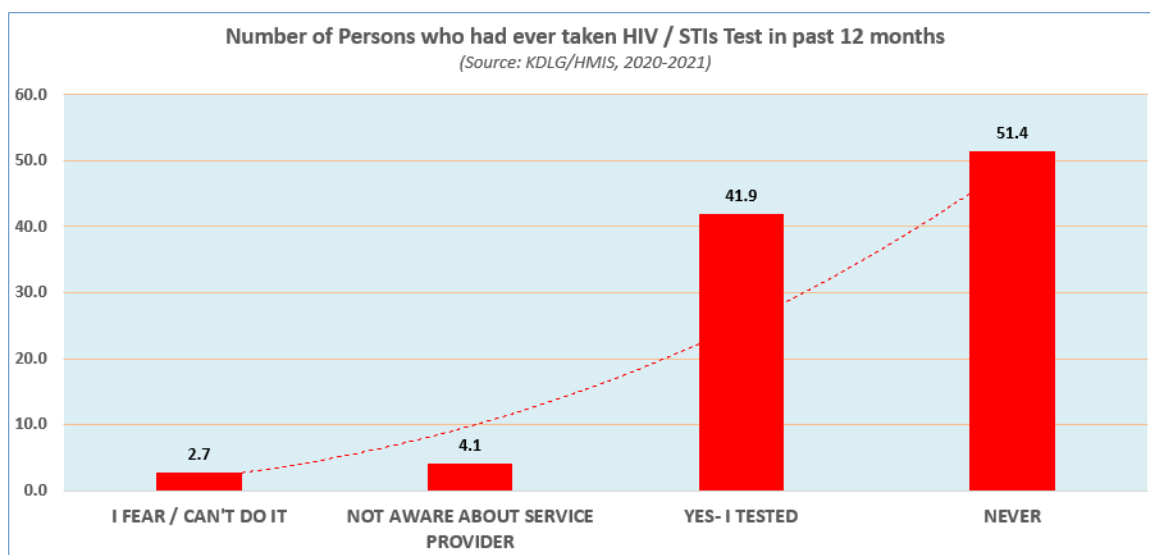


Figure 5-72: Number of Persons who had ever taken HIV / STIs Test in past 12 months

5.4.11.7 COVID-19

During the FGDs within Mirima and Ndoyo villages, it was revealed that Covid19 pandemic had impacted on the communities both directly and indirectly. In terms of level of satisfaction in regard to Covid19 response by government, survey findings indicated that 55.4% (164 out of 229) of the respondents said the measures were Satisfactory; 20.3% (60 out of 296) said Not Satisfactory; 17.6% (52 out of 296) said Highly Satisfactory and 6.8% (20 out of 296) said Not Sure as shown in **Annex 9**.

Additionally, 63.5% (188 out of 296) of the respondents said they Highly Agree that the piped water supply will contribute to community responses towards Covid19 prevention (**Annex 9**) especially in terms of hand washing, reduction in social gathering at water source points, among others.

Implications: The risk of HIV/AIDs, STIs and Covi-19 spreading is predictively possible especially during construction phase due to population influx especially of workers, and locals. It's a requirement to have in place the following:

- HIV/AID workplace policy that emphasizes no-discrimination and/or stigmatizing HIV+ve workers, and allowing them to access ART services.
- Contractor procuring a nominated HIV service provider - condoms, VCT, male circumcision, HIV testing, BCC / IECs materials by contractor and service provider such as Kiryandongo Hospital and other community outreach service providers.
- Provide Voluntary counselling and testing (VCT) among worker and communities
- Provide condoms.
- Ensure adherence to COVID-19 prevention especially hand washing, wearing masks, among others.

5.4.12 TRANSPORT AND ROAD SAFETY

Transport services in the RGC comprise of trucks, pickups, motorcycles (bodaboda) and bicycles. According to the Kiryandongo Police Station, the most common means of transport are bicycles and motorcycles, and the most common accidents are motorcycle accidents (**Figure 5-73**). There has been an increasing trend in Road Traffic Accidents in Kiryandongo District as captured by the HMIS, mainly occurring on the Kampala-Gulu highway.

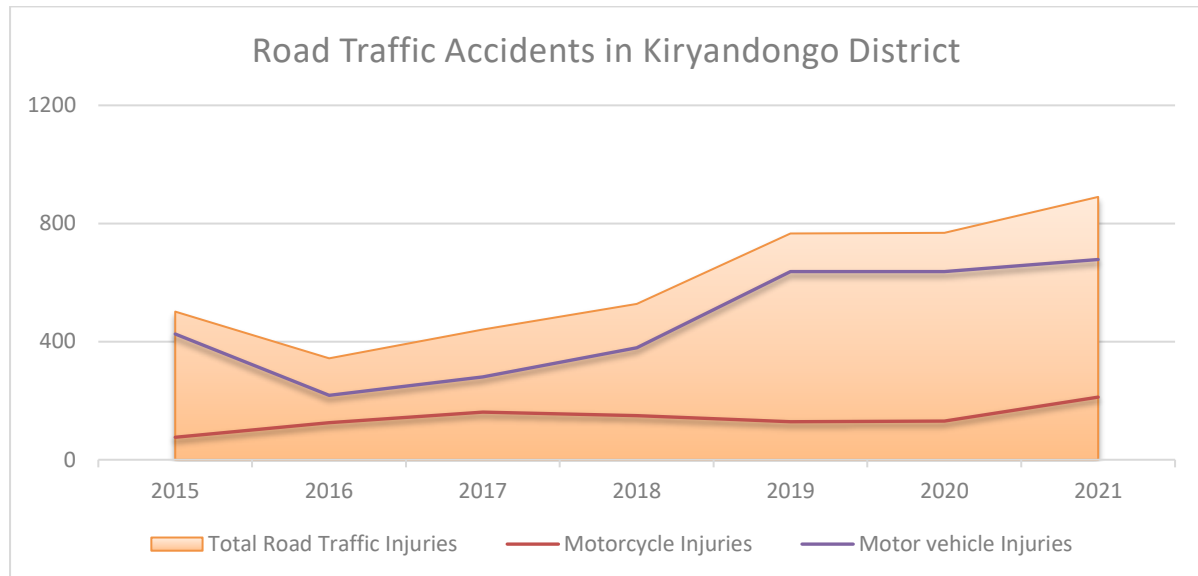


Figure 5-73: Road Traffic Accidents in Kiryandongo District From 2015 - 2021

Implications: Pipe laying for the project will follow the road reserve and while crossing busy trading centres such as Gaspa and Ndoyo, the pipes will cross the main road, hence affecting the flow of traffic. The contractor needs to develop a traffic management plan to manage their fleet and traffic along the road during the digging and laying of pipes.

5.4.13 EMERGENCY PREPAREDNESS

5.4.13.1 MEDICAL FACILITIES

For the two water sources and Mutunda trading centre, the nearest health facilities are Kitwara HC II and Tecwa HC II. Kitwara HC II and Tecwa HC II provide only outpatient medical services. When patients from require further attention and or more specialised medical care, they are referred to Kiryandongo Hospital. Kiryandongo Hospital is equipped with ambulances unlike Kitwara HC II and Tecwa HC II.

5.4.13.2 FIRE READINESS

Kiryandongo district lacks a fire station, a situation that has made it difficult for the Authorities to respond to fire outbreak and fire related emergencies in time. According to the District Police Commander, the nearest fire station is the one in Masindi, about 30km away, serving the district and big factories like Kinyara Sugar Works Ltd.

5.4.14 LAND TAKE AND ACQUISITION

During project construction, the project developer, MWE, intends to mostly use road reserves of the existing public roads which are government land for the transmission and distribution lines.

The project will acquire **3.3723** acres of land to for all project related components. The ESIA assessed the conditions of sites, consulted the land owners to confirm whether they consent to offer the land. The risks and challenges related to land acquisition were assessed in relation (relocation, loss of residential land, or loss of shelter), economic displacement (loss of land, assets, or access to assets leading to loss of income sources or other means of livelihood); alternative sites and possibility of land conflicts.

However, the water sources, storage reservoir and access road sites shall be located on private land mainly covered by crop gardens as indicated in Figure 5-74, whose owners will be engaged MWE in the process of land acquisition in accordance with the land act and World Bank Environmental and Social safeguard policies as well as relevant national laws. According to the RAP (2022), the project will require a permanent land take and an easement corridor (Table 5-55) from a total of 226 PAPs.

Table 5-55: Project Land Takes

Infrastructure	Site location by village & parish	GPS Coordinate	Original land size estimate	Land cover/use	Land uptake, sq.m	Land owner	Land tenure system	Remarks on site conditions
Borehole Pump Station DWD 77380	Mirima / Kikube	36N 405106 mE, 208535 mN	25 Acres	Grass/Grazing land	900m ² (30m square)	Magusi Robinson (Tel: 0773137709)	Customary (Un titled)	Photo of site is shown in Figure 5-74(B)
Borehole DWD 77380 Access Road	Mirima / Kikube				654m ² (109m long, 6m wide)	Magusi Robinson (Tel: 0773137709)	Customary (Un titled)	
Borehole Pump Station DWD 77381	Mirima / Kikube	36N 405656 mE, 209091 mN	20 Acres	Farming (Maize)	900m ² (30m square)	Wekesa Victor (Tel: 0785862713)	Customary (Un titled)	Photo of site is shown in Figure 5-74 (A)
Borehole DWD 77381 Access Road	Mirima / Kikube				708m ² (118m long, 6m wide)	Wekesa Victor (Tel: 0785862713)	Customary (Un titled)	
Gaspa Reservoir Tank	Cluster O, Ranch 37, Kiryandongo Refugee Settlement	36N 409261 mE, 211274 mN	30 Acres	Farming (Maize)	900m ² (30m square)	OPM Commandant - Kiryandongo Refugee Settlement	Customary (Un titled)	



Figure 5-74: Site location for boreholes - Source 1 & 2 in Mirima village

5.4.15 PHYSICAL CULTURAL RESOURCES (PCR)

There were no physical cultural resources encountered along or in the immediate vicinity of the project foot print. During community consultations, it was revealed that there was no tangible PCR (such as graveyards) within proposed project sites. Please note that it was not possible to assess and verify if there existed PCR under-surface or any other resources of archaeological importance within the project area.

5.4.16 GENDER, VULNERABILITY AND MARGINALISATION

Gender, as a social construct of roles, behavior, activities and attributes considered appropriate and ascribed to men and women, has direct linkage to water, sanitation and hygiene. In order to obtain baseline conditions, a gender analysis was conducted within the project area. It assessed the roles of female and males, and their access to and control of resources related to water supply and utilization; relation and power (decision making); benefits and the constraints they face. The assessment involved data collection using survey questionnaire; direct observation; KII; FGDs while integrating gender activity profiles; gender access, control and benefits profiles.

5.4.16.1 GENDER ROLES & DECISION MAKING

Gender Roles: Survey findings indicated that 64.9 % (192 out of 296) of respondents said all children (boys and girls) below age 17 years take the biggest burden of collecting water compared to 31.1% (92 out of 296) who said it's the women. Findings from community consultations at Mirima (Gaspa Trading Centre) indicated that women and children (**Figure 5-75**) bear the heavy burden of collecting water, moving long distances (not matter whether conditions – dry or rainy conditions), loss time and not paid for the work done.



Figure 5-75: Collage of photos showing girls and women collecting water in Kikube parish in Gaspa RGC

Household Decision Making: Survey findings indicated that 44.9% (133 out of 296) of the respondents said that decisions making related to purchasing household items are major done by BOTH man and women (husband and wife); 39.9 % (118 out of 296) said its mostly by men / husbands; 15.2% (45 out of 296) said women especially when they both married, single, widow, divorced or separated as shown in **Table 5-56** below.

Table 5-56: Decision making on household purchases

In your opinion, who decides most when purchasing household items e.g. Assets?	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Both	47	43.5	78	45.1	4	57.1	4	50	133	44.9
Man / husband	43	39.8	68	39.3	3	42.9	4	50	118	39.9
Woman	18	16.7	27	15.6	0	0	0	0	45	15.2
Grand Total	108	100	173	100	7	100	8	100	296	100

Implications: In all the village communities. Gender socialization is a cultural norm and practice, where girls and boys, women and men learn social roles based on their sex, which leads to different behaviors and creates differing expectations and attitudes by gender. This done by all major socialization agents namely at family, community, school, religion, media. The effect of the gender socialization is that it creates gender stereotypes that are commonly related to water. The most profound one is that girls and women do more household chores, such as fetching water, cooking and cleaning. It's notable that the project will likely not reverse the above gender socialization processes and gender stereotypes. However, it will contribute to the following:

- Improve access to safe and clean water with sufficient volumes to meet household needs (especially drinking, cooking, washing), hence lessening the burden of water collection in case of frequent shortages.
- Reduce the burden of moving long distances to collect water.
- Provide a reliable and year-round service supply of water even during peak hours, days, and seasons.

- Provide quality clean and safe water, with no contaminants that exposes women, men, boys and girls to diseases and illnesses.
- Improved levels sanitation and hygiene (household and personal hygiene)

5.4.16.2 ACCESS, CONTROL AND OWNERSHIP OF RESOURCES

A gender access, control and benefits profile (**Table 5-57**) was used during a meeting with LC 1 committee at Mirima village. The purpose was to assess ownership, access, control and benefits of household and community assets related to WASH.

Household Assets: Findings showed that land is mainly controlled by men, though with equal access and benefits for all family members (women, men and children). In some households, women also have control and ownership over land. The water collection items (e.g. jerry cans, buckets) are accessed by all, controlled majorly by women, children and benefits to all. In terms of common transport means to water source, the men mainly control bicycles, with equal access and utilization to all, as well as benefits. Both men and women have access to money because each of the genders in many households has ability to work, earn, save and/or remittances. However, men have an upper hand over money than women.

Community Resources: In terms of community resources, the deep boreholes and PSPs are mainly controlled by both men and women who compose the water user committees. An example is the water user committee for Kalwala Mini Water Supply system that has a composition of 50% women and 50% men. All genders have equal access and utilization for roads, open surface water points (e.g. River Titi, Siriba Wetland and River Nile). Both women and men equally participated in the construction of 2.2 km Kalwala- Mirima Community community access road (**Figure 5-76** below) constructed under the World Bank funded OPM/DRDIP Program. Both women and men were part of the community project management committee (CPMC), Community Procurement Committee (CPC), Community and community monitoring (CMC). However, decisions on repair and maintenance of road, boreholes and mini water system are majorly done by Local Governments dominated by men.

Table 5-57: Access, Control and Benefits Profile for water related household assets and community resources at Mirima (Gaspa Trading centre)

Household assets / Resource	Access & Utilization				Control & Ownership				Benefits			
	Men	Women	Boys	Girls	Men	Women	Boys	Girls	Men	Women	Boys	Girls
Land	✓	✓	✓	✓	✓✓	✓			✓	✓	✓	✓
Water collection items e.g. jerry cans, buckets	✓	✓	✓	✓	✓	✓✓	✓	✓	✓	✓	✓	✓
Household Utensils e.g. cups, plates	✓	✓	✓	✓	✓	✓✓			✓	✓	✓	✓
Bicycles	✓	✓	✓	✓	✓✓	✓			✓	✓	✓	✓
Money	✓	✓	✓		✓✓	✓			✓	✓	✓	✓
Radio	✓	✓	✓	✓	✓✓	✓	✓		✓	✓	✓	✓
Solar lights	✓	✓	✓	✓	✓✓	✓			✓	✓	✓	✓

Household assets / Resource	Access & Utilization				Control & Ownership				Benefits			
	Men	Women	Boys	Girls	Men	Women	Boys	Girls	Men	Women	Boys	Girls
Electricity	✓	✓	✓	✓	✓✓	✓			✓	✓	✓	✓
Boreholes	✓	✓	✓	✓	✓✓	✓✓			✓	✓	✓	✓
PSPs	✓	✓	✓	✓	✓✓	✓✓			✓	✓	✓	✓
Open surface water – River Titi, Siriba Wetland, River Nile	✓	✓	✓	✓	✓				✓	✓	✓	✓
Roads	✓	✓	✓	✓	✓				✓	✓	✓	✓

Note: There are no water tanks in the area



Figure 5-76: Kalwala – Mirima Community Access road

Implications: Household assets are a major poverty and wealth indicator in many of the communities, and in this case they have direct influence on the level of access and utilisation of piped water. It's clear that wealth household will have more assets, hence ability to afford household connections unlike the poor households with few assets. The nature of access, control and ownership is generally the same among both poor and rich households commonly based on cultural norms that prioritize patriarchal hierarchical relationships. However, the project will make significant contributions as outlined below;

- The gender needs are taken into consideration. Firstly, the Practical Gender Needs (PGNs) will be enhanced. These PGNs encompass needs required to maximise benefit of development opportunities as well as overcome constraints. In this case, the project will contribute to enhancing PGNs by; a) improving access to water clean and safe water (availability, quantity, quality, affordability, reliability); b) increasing access to sanitation facilities (public toilets; hand-washing); c) contribute to reduction of burden of water related diseases hence lowering morbidity and household expenditures; d) provide employment opportunities. However, concerns of menstrual health should be included into design of public toilets.
- Secondly, the project also considers Strategic Gender Needs (SGNs). These encompass the requirements of women and men to improve their position or status, by enabling all genders to have control over their lives beyond socially-defined restrictive roles. In this case, the

project will contribute to enhancing SGNs by; a) provide equal access to community assets such as water source points (PSPs, public toilets); b) equal participation in project related decision making such as project design (Feasibility, ESIA, RAP) and future project events such as disclosure meetings, ground breaking, commissioning, utility operations; c) benefit from any available skills transfer opportunities. It's advisable that the both the contractor and utility operator gives priority to women and female youth, men and male youth.

- There are vulnerable and marginalised groups with in Gaspa RGC whose needs and interests need to be critically given attention such as the orphans and vulnerable children (OVC), people with disabilities (PWDs).
- The project shall ensure repair and maintenance of water supply infrastructures especially repair of broken pipes and taps.
- The water connection charges for household connections will have to be affordable, as well as the tariff.

5.4.16.3 VULNERABLE & MARGINALISED INDIVIDUALS AND GROUPS

In terms of social safeguards, the project is committed towards enhancing development opportunities among the disadvantaged or vulnerable and marginalized individuals or groups. According to the World Bank, a vulnerable individual or group is a population that has some specific characteristics that make it at higher risk of falling into poverty and constrained from maximising benefits of development opportunities than others living in areas targeted by a given project. The ESIA assessed the various categories of vulnerable and marginalised individual and groups using survey questionnaires, KII, FGD, document review, direct observations and photography.

Findings obtained during the FGD with men and women at Tecwa, Mirima and Ndoyo as well as non-beneficiary village of Kitwanga (**Figure 5-77**), it was noted that most vulnerable and marginalised individuals and groups who may not maximally benefit from piped water supply include majorly Poorest of the poor households (HHs) such as child headed HHs, female headed HHs and older person headed HHs, as well as communities outside project area without any single source of water. One such village is Kitwanga village where members depend on River Kayitasimbi.



Figure 5-77: Community members in Kitwanga village (Non-beneficiary area) at Latitude 2.0188634; Longitude: 32.11517775)

A review of UBOS 2014 Census data for Kiryandongo district (Gaspa RGC parishes) revealed that the number of child headed HHs are 0.6% (52); female headed HHs are 30.3% (2,237) and older person headed are 11.7% (1,105). This gives a total of 6,116HHs representing a mean / average of 27% as shown in **Table 5-58** below. However, the data obtained from UBOS Census Report does not classify these households either poor or not poor. Therefore, survey findings give an insight on the degree of poverty (income levels) for sampled female and older persons headed HHs but not child headed HHs (because none was encountered) as discussed in **Section 5.4.1** above.

Table 5-58: Vulnerable & Marginalized individuals & groups in Gaspa RGC

Sub County / Town Council	Vulnerable & Marginalized individuals & groups (UBOS Census, 2014)							Total HHs in Gaspa RGC
	Parish / Ward	Child Headed HHs (10-17 years)		Female Headed HHS		Older Person Headed (60+ years)		
		No.	%	No.	%	No.	%	
Bweyale Town Council	Southern	17	1.2	448	30.9	168	11.6	1,499
Kiryandongo	Kikube	19	0.6	679	20.8	464	14.2	4,111
Kiryandongo	Kitwara	11	0.3	480	13.9	348	10	2,096
Kiryandongo Refugee Camp	Ranch 37	5	0.4	630	55.5	125	11	4,842
Mean / Average		52	0.6	2,237	30.3	1,105	11.7	12,548
Overall		27% (3,394 out of 12,548) are vulnerable households						
<i>Note: The percentages are derived from UBOS publication as there</i>								

Survey findings in **Table 5-59** indicate the opinions of respondents on whether the project will be helpful to vulnerable individuals and groups namely poor households headed by children, women, disabled, older persons within Gaspa RGC. The data shows that a higher proportion of 65.2% respondents who YES-Highly that poor women headed HHs will benefit; 49% for poor child headed HHs; 36.5% for poor older persons HHs; and 36.5% for poor PWDs headed HHs. Further consultations with local leaders revealed that there is small proportion of these poorest of the poor child headed and PWD headed HHs who are vulnerable and can't afford to pay for piped water connection or at PSP on daily basis. The major underlying reason is related to inability to afford water (lack / limited disposable income to buy water daily or even pay monthly fees).

Table 5-59: Opinion on how project will be useful to vulnerable groups

Survey Question per category of vulnerable HHs	Yes- Highly		Yes, but not so much			Total
	Freq	%	Freq	%	Freq	%
In your opinion, do you think the piped water supply project will be helpful to Poor Child Headed Households (OVCs) in your area?	145	49	151	51	296	100
In your opinion, do you think the piped water supply project will be helpful to poor households headed by People with Disabilities (PWDs) in your area?	108	36.5	181	63.5	296	100

Survey Question per category of vulnerable HHs	Yes- Highly		Yes, but not so much			Total
	Freq	%	Freq	%	Freq	%
In your opinion, do you think the piped water supply project will be helpful to poor households headed by Older Persons above 65 years in your area?	108	36.5	188	63.5	296	100
In your opinion, do you think the piped water supply project will be helpful to poor households headed by Women in your area?	193	65.2	103	34.8	296	100

Implications: The project will enhance human rights, child rights, older persons rights, disability right and women rights. For instance, it will increase the potential for vulnerable persons to take advantage of project benefits such as

- Jobs for women, PWD, older persons but not children;
- Access to public services (providing safe water source points);
- Access to information during disclosure and consultation process in a meaningful way.
- There is likely to be no discrimination of the vulnerable and marginalized individuals that violates the legal frameworks during construction and operation phases. It is notable that child labour is prohibited, so orphans and vulnerable children (OVC) will be protected.
- The project has mechanisms of minimizing vulnerabilities resulting from loss of property (land, crops, fruit trees) and displacement due to construction activities (distribution lines, easement, transmission lines, water source, toilets). This mechanism involves compensation (refer to RAP Report).
- Accessibility to safe and clean water will be improved.
- It may not be possible to offer ‘free water’ to vulnerable persons by the utility operator.
- Scale up distribution network to cover Kitwaga and Kalwala villages

5.4.16.4 GENDER BASED VIOLENCE (GBV)

Gender Based Violence (GBV) refers to “Any act that result in a bodily, psychological, sexual and economic harm to somebody just because they are female or male (MoGLSD, 2017). In view of this the ESIA assess the baseline condition in regard to GBV. The findings were obtained through survey questionnaire, KII, FGD and document review.

5.4.16.4.1 PREVALENCE OF GBV INCIDENTS (VICTIMS)

A review of GBV Register (2021-2022) revealed that there are 440 reported GBV incidents (victims) in Gaspa RGC representing 25.2% (440 out of 1,735) of the total number of reported GBV incidents in whole of Kiryandongo district. By category, 43.9% (193) were Physical Assault; 26.4% (116) were Defilement; 13.4% (59) were Denial of Resources, opportunities & services; 13.2% (58) were Psychological Abuse; % rape; 1.6% (7) were sexual assaults; 0.7% (3) were child marriage and 0.2% (1) were forced marriages as shown in

Table 5-60 and **Figure 5-78** below.

Table 5-60: Prevalence of GBV in Gaspa RGC

Reported GBV Incidents	Gaspa RGC		District Wide	
	Number	%	Number	%
Child Marriage	3	0.7	13	0.7
Defilement	116	26.4	338	19.5
Denial of Resources, opportunities & services	59	13.4	184	10.6
Forced Marriage	1	0.2	1	0.1
Physical Assault	193	43.9	816	47
Psychological Abuse	58	13.2	243	14
Rape	3	0.7	18	1
Sexual assaults	7	1.6	122	7
Grand Total	440	25.2	1,735	100

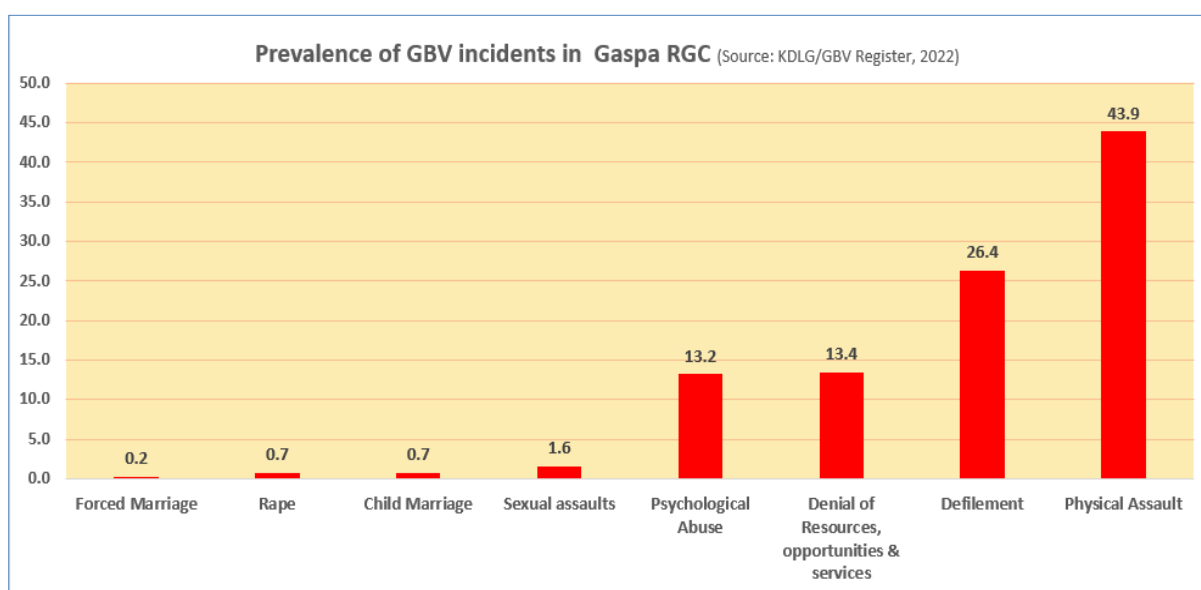


Figure 5-78: Prevalence of GBV incidents in Gaspa RGC

5.4.16.4.2 PERPETRATOR – VICTIM RELATIONSHIP

In terms of relationships, 50.2% (221 out of 440) of the perpetrators are current partners; 25.5% (112 out of 440) are Not-Related with the victim; 4.3% (19 out of 440) are Other relatives; 3% (13 out of 440) are Mothers to the victim; 5.7% (25 out of 440) are Fathers to the victim as shown in **Figure 5-79** below.

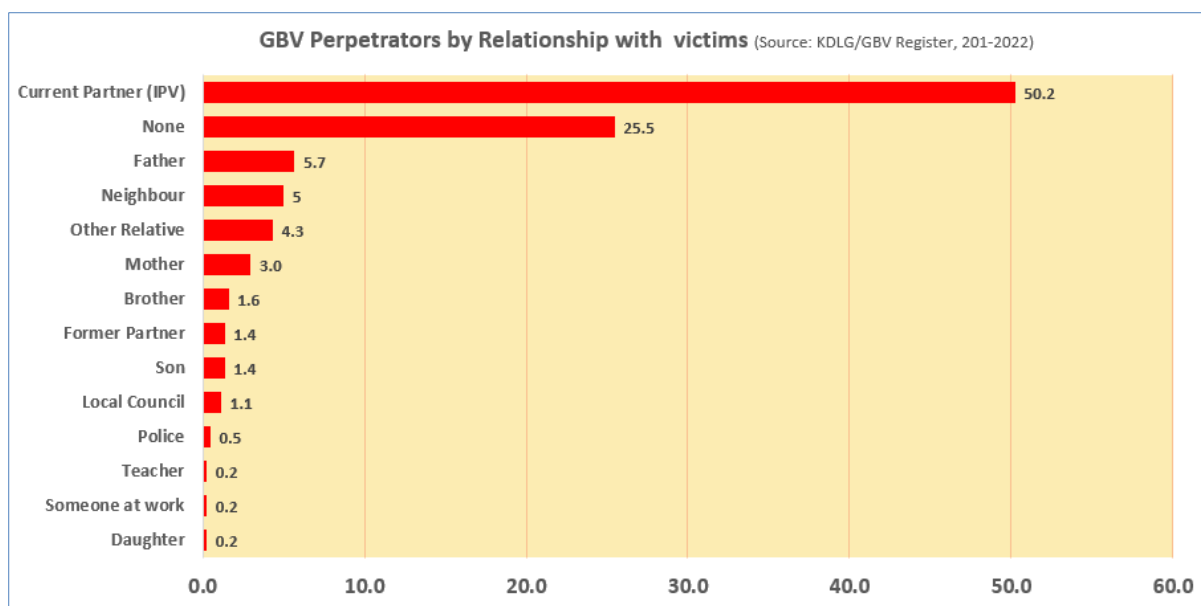


Figure 5-79: Perpetrators by Relationship with victims

5.4.16.4.3 GBV REFERRAL PATHWAYS

In terms of referral pathways, 55.9% (246 out of 440) GBV incidents were handled by police; 40.7% (179 out of 440) by health centres; 1.6% (7 out of 440) by Probation Office; 0.9% (4 out of 440) by GBV Shelter; 0.7% (3 out of 440) by Community Activist; 0.2% (1 out of 440) by Community Development Officer (CDO) as shown in **Table 5-61** and **Figure 5-80**.

Table 5-61: GBV Incidents Handled by Referral Pathways

GBV Referral Pathways	Kikube		Kitwara		Southern ward		OVERALL	
	Freq	%	Freq	%	Freq	%	Freq	%
CDO	0	0	0	0	1	0.9	1	0.2
Community Activist	0	0	0	0	3	2.8	3	0.7
GBV Shelter	0	0	0	0	4	3.7	4	0.9
Health Centre	102	44.9	49	47.1	28	25.7	179	40.7
Police	123	54.2	53	51.0	70	64.2	246	55.9
Probation Office	2	0.9	2	1.9	3	2.8	7	1.6
Grand Total	227	100	104	100	109	100	440	100

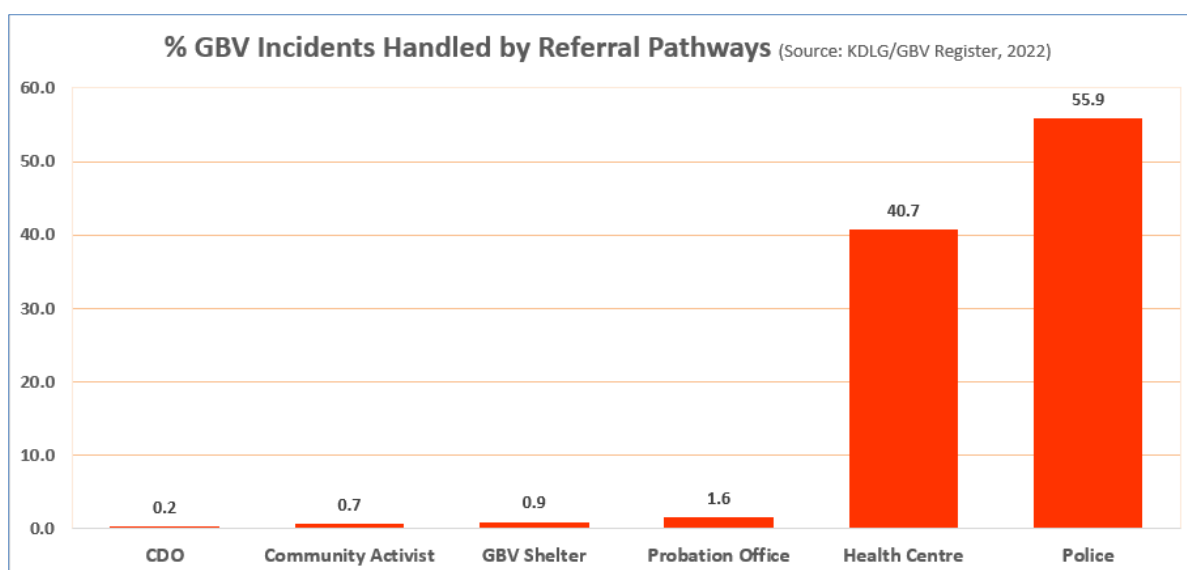


Figure 5-80: GBV Incidents Handled by Referral Pathways

5.4.16.4.4 VIOLENCE AGAINST WOMEN AND GIRLS (VAWG)

In terms of violence against women and girls (VAWG), there are 93.3% (125 out of 134) VAWG incidents related to Intimate partner Violence (IPV) and 6.7% (9 out of 134) were physical assaults against girls within school going age bracket (5-17 years) as shown in **Table 5-62** below.

Table 5-62: Violence against Women & Girls (VAWG)

VAWG Incident (Girls 5-17 years)	KIKUBE		KITWARA		SOUTHERN WARD		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Intimate Partner Violence (IPV)	58	90.6	24	96	43	95.6	125	93.3
<i>Against women</i>	48	75	20	80	33	73.3	101	75.4
<i>Against men</i>	10	15.6	4	16	10	22.2	24	17.9
Physical Assault	6	9.4	1	4	2	4.4	9	6.7
Grand Total	64	100	25	100	45	100	134	100

5.4.16.4.5 VIOLENCE AGAINST CHILDREN (VAC)

There are 161 reported VAC incidents against children below the age of 18 years between 2021 – 2022. Among the VAC incidents, 71.4% (115 out of 161) are defilement cases as shown in **Table 5-63** below.

Table 5-63: VAC incidents against children below 18 years

VAC Incidents (Children <18 years)	KIKUBE		KITWARA		SOUTHERN WARD		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Child Marriage	0	0	2	6.1	0	0	2	1.2
Defilement	78	75	21	63.6	16	66.7	115	71.4
Denial of Resources, opportunities & services	10	9.6	4	12.1	1	4.2	15	9.3
Physical Assault	9	8.7	1	3.0	3	12.5	13	8.1

VAC Incidents (Children <18 years)	KIKUBE		KITWARA		SOUTHERN WARD		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Psychological Abuse	7	6.7	5	15.2	4	16.7	16	9.9
Grand Total	104	100	33	100	24	100	161	100



Figure 5-81: Girl Child after collecting water & passing through a bushy road in Cluster O village

5.4.16.4.6 CHILD LABOUR

A 2019 study conducted by Community Driven network (CODNET ¹¹) Uganda revealed that that 8.6% of the children in Kiryandongo district are hired by different employees to do the farm related activities (esp. tobacco production) while 59.3% of the children work to supplement on their family income. During community meeting with local leaders, youth and women in Mirima village, it was revealed that that the common child labour conditions are related to commercial farming since there are several large scale farms that often hire cheap labour, in addition to market vending and cattle herding activities as shown in **Figure 5-82** below

¹¹<https://kkcr.urdt.net/2019/12/17/masindikiryandongo-districts-grapples-with-child-labor-in-tobacco-growing-areas-report/>



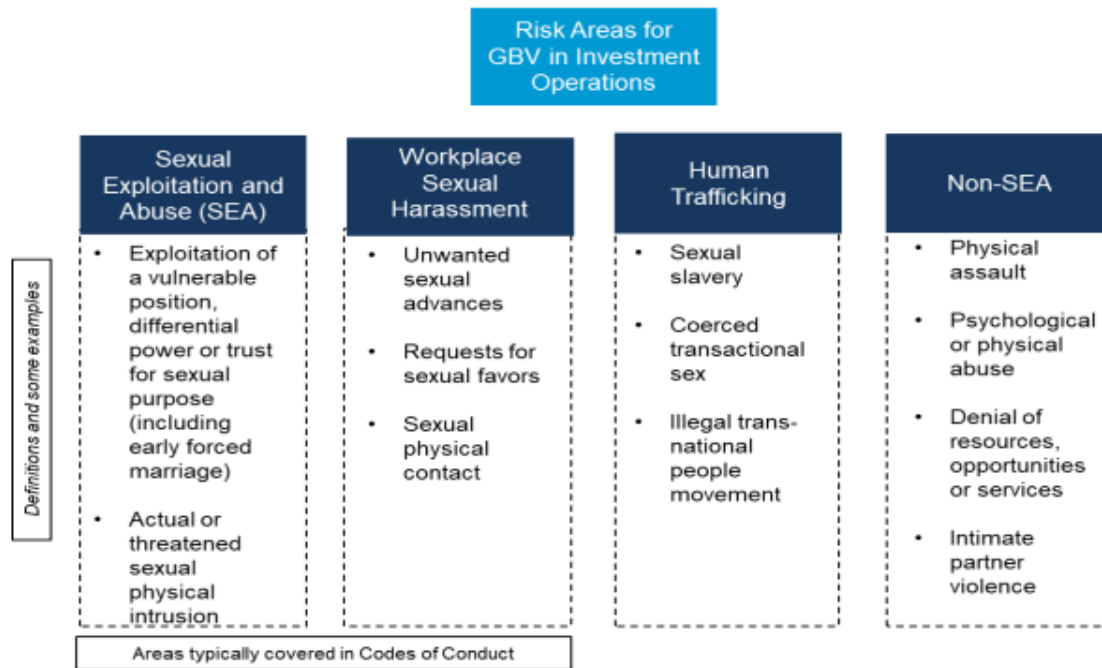
Figure 5-82: Boy Child herding cattle along Ndoyo - Mirima road

5.4.16.5 SEXUAL EXPLOITATION AND ABUSE (SEA) AND SEXUAL HARASSMENT (SH)

By definition, sexual exploitation and abuse (SEA) occurs against a beneficiary or member of the community while sexual harassment (SH) occurs between personnel / staff and involves any unwelcome sexual advance or unwanted verbal or physical conduct of a sexual nature (MoGLSD, 2018). A review of GBV Register (2021-2022) indicated that there are 55.6% (5 out of 9) of the SEA & SH incidents occurred in Kikube parish; 33.3% (3 out of 9) happened in Southern Ward and 11.1% (1 out of 9) happened in Kitwara parish as shown in **Table 5-64** below. There was no available data (n/d) on sexual harassment (SH) as per the GBV Register 2021-2022.

Table 5-64: SEA & SH Incidents in Gaspa RGC (2021-2022)

SEA & SH Incident (n/d = No Data)	KIKUBE		KITWARA		SOUTHERN WARD		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Sexual assaults & threats	4	1.8	1	1.0	2	1.8	7	1.6
Early Forced Marriage	0	0	0	0	1	0.9	1	0.2
Workplace sexual harassment	1	0.4	0	0	0	0	1	0.2
Unwanted sexual advances	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d
Requests for sexual favors	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d
Sexual physical contact	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d
Grand Total	5	55.6	1	11.1	3	33.3	9	100



Implications of GBV, Child Labour, VAC, VAWG, SEA & SH

It's notable that to a large extent, the project will have positive influence on GBV, child labour, VAC, VAWG, SEA and SH. However, there is need to ensure effective environment and social safeguards against the GBV, Child Labour, VAC, VAWG, SEA & SH throughout the project phases.

The appropriate mitigation measures include:

- Issuing zero tolerance on child labour policy among contractors and along supply chains such as construction materials (sand, gravel, timber, among others)
- Develop and implement comprehensive ESMP by both developer and contractors.
- Issue codes of conduct to workers
- Organise tool box meeting
- Disseminate GBV/SEA/SH Referral pathways
- Establish GRM committees

6 STAKEHOLDER CONSULTATION AND ENGAGEMENT

6.1 INTRODUCTION

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 Systems and Sanitation Facilities in Refugee Settlement and Host Communities of Kiryandongo 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.

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 October 2021 for the scoping stage and for the final ESIA during November 2021 and January 2022.

6.2 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:

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

6.3 STANDARDS FOR CONSULTATION

The public consultation was guided by Ugandan guidelines as well as World Bank policy guidelines summarized in Box below.

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

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

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

- i. Informing them about the proposed project.*
- ii. Open public meetings on the projects.*
- iii. Inviting written comments on proposed project.*

- iv. *Use of community representatives.*
- v. *Comment and review of the Environmental Impact Statements; and,*
- vi. *Making relevant documents available to any interested members of the public in specified places or at the cost of reproduction.*

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

a) public consultation before EIA is done

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

b) public consultation during the EIA

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

c) public consultation after EIA (EIA Review)

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

World Bank Safeguard Policy: Stakeholder Engagement and Information Disclosure

The Policy recognizes the importance of open and transparent engagement with project stakeholders. Success of any project is hinged on level and quality of stakeholder engagement which is an inclusive process expected to occur throughout the project life cycle. Engagement is more useful when introduced in the early phases of project development and is mainstreamed into all levels of decision making. Additionally, consultations should be done in a manner that gives affected communities, opportunities to express their views on project risks and impacts and their mitigation measures.

In applying Policy, the following scope is envisaged:

- a. **Stakeholder identification and analysis:** The Policy requires the identification of key project affected parties and those with interests in the project. At this level emphasis will be on vulnerable people or groups of people whose situation are likely to be accelerated by project implementation. Identification should be able to bring out different sets of affected people and their interests.
- b. **Information Disclosure:** The borrower is obliged to undertake timely and effective disclosure of information regarding the project including its purpose, nature, scale, potential risks and impacts on the local communities and further present possible mitigation measures.
- c. **Meaningful:** Consultation is meaningful if a dialogue exists, communities and individuals should be given an opportunity to interact with respect and dignity. Interactions should be based on prior disclosure of project relevant information to all parties.

6.4 Proceedings of Stakeholder Consultations

The emerging issues that were recorded through consultations have been detailed in the following subsections.

6.4.1 CONSULTATIONS WITH KIRYANDONGO DISTRICT LOCAL GOVERNMENT TECHNICAL TEAM (ACAO, DWO, DEO)

Date	21st October 2021	
Means of Engagement	Meeting at DLG Headquarters	
Contacts	Attendance List attached in Annex4	
QUESTION	Key Issues and Concerns Raised	RESPONSE
<p><i>What is the current situation on water, sanitation and hygiene among community?</i></p> <p><i>What are existing gaps in accessing piped water supply?</i></p> <p><i>Who is most affected? Who benefits from current situation? How will project benefit water vendors?</i></p>	<ul style="list-style-type: none"> The water coverage in district is at 70%, which is fairly good. However, in Kiryandongo refugee settlement, water coverage stands at 52%; 65% in Bweyale Town Council. There is some conflict over water sources in some parts especially between cattle keepers and land owners. The most affected area is Mutunda Sub County There are some water vendors especially in trading center but the number is no known. There is noticeable open defecation There is only 1 public toilet at Aduku open market in Mutunda SC 	<p>The project will support refugees</p> <p>Conflict resolution is very key in this project.</p>
<p><i>What are the existing piped water supply projects? Where are pipes located? How can we obtain the GPS Coordinates / Sharpe files on water systems in this area to enable proper laying and trenching?</i></p>	<ul style="list-style-type: none"> There are few piped water systems, namely – NWSC in Kigumba TC Bweyale TC, Kiryandongo Refugee Settlement, Kitwara mini-solar piped system The GPS coordinates for piped system can be obtained from NWSC, though they don't share any planning documents with DLG. WSDF asked for application but few were taken. 	<ul style="list-style-type: none"> Noted
<p><i>How can the project contribute to</i></p>	<ul style="list-style-type: none"> The project is very welcome. However, the culture of paying water bills is not yet favorable. 	<p>Noted</p>

<p><i>inclusive economic growth and reduction of vulnerabilities among community?</i></p>	<ul style="list-style-type: none"> • There is need for sensitization about proper user behaviors • All the multiethnic communities will benefit both directly and indirectly • It will reduce gender-based vulnerabilities especially child pregnancies among girls. 	<ul style="list-style-type: none"> • MWE will be advised to conduct sensitization on utilization of the proposed system among beneficiary communities
<p><i>What are the Environmental and Social Risks and Impacts of the project? How can they be enhanced and/or mitigated? What role can different stakeholders play?</i></p>	<ul style="list-style-type: none"> • Climate change is a big threat to the project • There are many land conflicts, and hopefully the project should not trigger any land conflict. There is need to ensure proper compensation. • There is misinformation as regards compensation • The information disclosure is totally inadequate because even us the DLG are not fully aware on how the project will operate, when it will start. • The involvement of DWO is so limited, and as a matter of fact, you the ESIA team are the first to come here for a detailed discussion. No one has ever done that. • There is need for an inception workshop • There is low funding for NRM, environment and climate change adaptation and mitigation actions • OPM (DRDIP, NUSAF3) have helped in promoting environmental protection. However, there is still a big gap. 	<p>Noted</p> <ul style="list-style-type: none"> • MWE commissioned a RAP study to streamline land acquisition and compensation requirements on the project • The project has identified key stakeholders and assigned implementation and monitoring responsibilities of key aspects on project in the ESMP

6.4.2 CONSULTATIONS WITH KIRYANDONGO SUB COUNTY LOCAL GOVERNMENT TECHNICAL OFFICERS

Date	18th November 2021	
Means of Engagement	Meeting at SC Headquarters	
Contacts	Attendance List attached in Annex4	
QUESTION	Key Issues and Concerns Raised	RESPONSE
<i>What is the current situation on water, sanitation and hygiene among community? What are existing gaps in accessing piped water supply? Who is most affected? Who benefits from current situation? How will project benefit water vendors?</i>	<ul style="list-style-type: none"> • There is inadequate knowledge about sanitation and hygiene, and all committees require training • Home sanitation campaign are limited due to low funding • There is need for VIP latrines in many schools • DRDIP has helped us especially through supporting schools, health facilities and villages with water supply facilities such as water tanks and rehabilitation of valley tanks, such as in Kitwara parish. • There are some other actors who support communities in WASH especially NGOs such as SALVATION ARMY, MACDEF, TOUCH AFRICA NOW, 	<p>Noted</p> <p>The project will contribute to some level of sanitation campaign</p> <p>The benefits of piped water supplement all other previous development achievements / actors</p>
<i>What other major problems are existing among community? What conflicts have been caused by water demands? How is solid waste managed in the host and refugee settlement?</i>	<ul style="list-style-type: none"> • There are some water sources that are no functioning, including the only piped water system at Kitwara parish that is no longer being used due to mechanical breakdown, and inability to repair it by communities themselves. • Many families are using open sources • There have been no reported cases of conflicts between communities regarding accessing water sources. During dry seasons, some mild disagreements erupt over sources of water for livestock. • There is no water board • Water quality is not yet good 	<p>The piped water will establish new connections</p> <p>Water source committees and water boards will be formed and trained on their responsibilities to eliminate conflict in access to water</p>
<i>What are the Environmental and Social Risks and Impacts of the project? How can they be enhanced and/or mitigated? What role can different stakeholders play?</i>	<ul style="list-style-type: none"> • There is increasing encroachment on forests, wetlands and river banks • Tree cutting is rampant without replacing that is cut down • Both surface and underground water sources are threatened • The sub county plans to undertake some mitigation actions that include (but not limited) the following: <ul style="list-style-type: none"> ➢ Demarcate the Innya wetland ➢ Promote institutional greening in schools and health centers ➢ Promote tree planting by distributing tree seedlings to household with land ➢ Promote use of energy saving stoves 	<p>Noted</p> <p>The project will contribute to environmental protection</p> <p>All SC interventions are welcome</p>



6.4.3 CONSULTATION MEETING VILLAGE WITH BENEFICIARY COMMUNITIES (KALWARA & MIRIMA VILLAGES)

Date	17th November 2021	
Means of Engagement	Meeting at DLG Headquarters	
Contacts	Attendance List attached in Annex4	
QUESTION	Key Issues and Concerns Raised	RESPONSE
<p><i>What is the current situation on water, sanitation and hygiene among community? What are existing gaps in accessing piped water supply? Who is most affected? Who benefits from current situation? How will project benefit water vendors?</i></p>	<ul style="list-style-type: none"> • Kalwala as village is located in Kikuube parish, Kiryandongo sub-county, Kiryandongo district. It has a total population of with males, and ... females of different tribes. However, there is a remarkable increasing population growth in the area due to new residents from in and out of settlement. Secondly, pressure increases in December when most workers have returned home “leaders say”. • There is high demand for accessible clean safe and plenty water required for mainly domestic use, and or commercial purposes. • The existing piped water system constructed by MWE/AFDB has a major technical breakdown for almost 1 year. All the 2 public stand points (PSPs) are not functioning • Communities have been complaining about the monthly/annual money that had been paid for the service but yet not delivered, for about a year. 	<p>Noted</p> <p>The provision of piped water may increase population influx, however, the project design factored in a 20-year water demand with increasing population for the project area of influence <i>(see Table 2.3 under Section 2.3.1 above).</i></p> <p>There is need to have adequate water storage such as</p>

	<ul style="list-style-type: none"> • There is increasing congestion at the existing 3 boreholes. • Violence against women and children due lack of water in homes. • It was revealed that the community have developed negative bias towards underground piped water. • There are no water vendors • The latrine coverage is estimated at 8 out of 10 households with an appropriate pit latrine. However, there is no public toilet in the entire community that hosts an evening market daily. 	<p>water tanks at household and institutional levels</p> <p>Piped water will be paid / tariff on daily / monthly bill</p> <p>Water from underground will be treated then supplied</p>
<i>What are the existing piped water supply projects? Where are pipes located?</i>	<ul style="list-style-type: none"> • There is an existing water system in Kalwala constructed by MWE. • It has 2 public stand points (PSPs) situated in the center, stretching from the neighboring village of Nyabukoni a few meters away from the main supply system. • However, these are non-functional since November 2020, and this tragedy resulted into serious demands for water since most community members had already paid to access the service. 	<p>The ESIA team has visited the system at Kalwala and consulted with the WUC</p> <p>The new piped water system will supplement that one at Kalwala</p>
<i>What other major problems are existing among community? What conflicts have been caused by water demands?</i>	<ul style="list-style-type: none"> • There is high demand for wood fuel coupled with limited coverage in ownership / access / utilization of energy saving stoves, and other technologies such as briquettes. • There are water related conflicts between the two communities of Nyabukoni and Kalwala as it was noted by Thomas the LC1 chairman of Kalwala village. • There is some fighting that takes place at boreholes, especially due to congestion at peak hours of 5.00pm-7.00pm. • The long lines cause disorder, disagreement on who to collect first, hence fighting 	<p>Noted</p> <p>The project is meant to increase the amount of water available to communities at any required time to reduce the conflict in access to water. Additionally, water user committees will be elected to manage conflict that may arise from access to water from the project</p>
<i>How is solid waste managed in the host and refugee settlement?</i>	<ul style="list-style-type: none"> • The common method used is open dumping and burning. There is some open defecation especially by children 	<p>Noted</p>
<i>What are the anticipated benefits of the new water project? Who will benefit more? Who will lose? How best can community access piped water? How</i>	<ul style="list-style-type: none"> • Much is expected from the project ranging, from small too big to include, most extensive farmers need water for irrigation especially rice, soya and growers. • While executing this project, there are expected risks as put forward by the community members as excavation of trenches and construction of the stands may involve cutting of trees and relocation of some settlements. 	<p>Noted</p> <p>The piped water system is not intended for irrigation. But if one can afford the cost, the it can be used to irrigate crop improve</p>

<p><i>will modalities of access affect community? What are the possible risks? How can they be mitigated?</i></p>	<ul style="list-style-type: none"> • When water comes, all will benefit • The major worry is about water quality especially if there is no treatment facility • The water quality in existing piped water is poor, water come with black microorganisms and people had started rejecting it before the technical breakdown. • Paying user fees is good, especially if its managed by community itself • Operation and maintenance (O&M) may be costly 	<p>access to water for animals</p> <p>NUWS will be responsible for management of the system. A fee will be levied on water to enable sustained operations and maintenance of the system. Water will be treated to ensure the quality supplied.</p>
<p><i>What are the Environmental and Social Risks and Impacts of the project?</i></p>	<ul style="list-style-type: none"> • The communities have cut down trees • The water level may reduce • The trenching may affect our business especially the dust in dry season, or even mud in rainy season • Roads may be affected yet not repaired • Employment opportunities 	<p>Noted Environmental and social impacts as mentioned here have been assessed further under the Impact section and mitigation measures recommended to ensure more benefits than effects are accrued from the project.</p>
<p><i>How can the project enhance employment creation and income generation?</i></p>	<ul style="list-style-type: none"> • There will be casual labour for trenching • There will be indirect employment opportunities such as accommodation, restaurants / eating points, selling of refreshments (e.g. sodas, water), alcohol selling, cigarettes, groceries, among others. • Micro irrigation may arise 	<p>Casual jobs will be offered to locals</p>
<p><i>How can construction of water distribution networks affect Community Health and Safety of community? How can it be mitigated? Who can be involved?</i></p>	<ul style="list-style-type: none"> • Community members revealed that the previous construction for Kalwala piped water system had adverse effects on the health of the people • Water was contaminated with small living particles which they claimed could have been the cause of frequent Diarrhea and Typhoid. • Use of standard gauge non corrosive pipes and installation of a water treatment section in a visible place to the community will build confidence in the project outcomes/deliverables. 	<p>The proposed system will include an online chemical dozer for treatment of water to acceptable drinking standards for people.</p>
<p><i>What are the most significant cultural sites in your area? Are there worship spaces, physical cultural resources e.g. trees, stones,</i></p>	<ul style="list-style-type: none"> • There is high cultural value attachment to graves and trees planted by grandparents in this community, churches, relocation of any of these requires adequately informed consent from the land owners. 	<p>All cultural resources identified by community and project will be valued, avoided and /salvaged/ compensated</p>

<p><i>and graves, of community importance? How will the water project affect them?</i></p>	<ul style="list-style-type: none"> • There is minimal effect on physical cultural resources (PCR) e.g. grave. None is within land for uptake. • There is no known worship spaces, physical cultural resources e.g. trees, stones 	<p>through a project RAP</p>
<p><i>What is ethnic composition of the community? Are there some indigenous peoples? What vulnerable and marginalized group have you come across? How can water distribution reduce on the vulnerability?</i></p>	<ul style="list-style-type: none"> • Kalwala village is a multi-ethnic community with over 5 tribes, majority being the Bagishu, Baruli, Lugbara, Itesots, Langi and Banyoro in that order. • There unity in diversity • There is no cultural-related vulnerability • The only vulnerable group are the landless, orphans and widows • The low user fees can reduce on the inability to afford • The alternative sources such as boreholes need to be maintained 	<p>Noted</p> <p>The project will benefit all people regardless of tribe.</p> <p>Alternative water sources will remain functional within the target communities</p>
<p><i>What categories of stakeholders can be useful in construction of water distribution system? What information do stakeholders need to know about the project? In what format? Any concerns about project can be raised</i></p>	<ul style="list-style-type: none"> • From the inception of this particular project, community participation should be highly encouraged by involving local council leader, representatives of PWDs, women representative, youth councilors, religious leaders, leaders of cultural sites, political leaders at all levels, water and sanitation projects implementing partners, District water office and technical staff, contracted engineers and any other deemed necessary herein. • The entry for these stakeholders remains but not limited to, the inception meetings, project launch events, as well as monitoring and evaluation/oversight role 	<p>Stakeholder participation and consultation is key and will continue all through the project phases.</p>
<p><i>In your opinion, what is the main source of energy at your home / place of work (used for cooking and lighting)?</i></p>	<ul style="list-style-type: none"> • Kalwala residents mainly use firewood in non-improved energy stoves. • Solar power is the dominant source lighting energy, followed by the use re-chargeable lamps with very few using candles and kerosene. 	<p>Noted</p>
<p><i>What is name of forest and wetland you commonly obtain utilize to obtain firewood, water, fruits, fish, etc?</i></p>	<ul style="list-style-type: none"> • There is no forest, either artificial or Natural. • There are 2 nearby wetlands in the locality, one being Siriba swamp across Nyabukoni and the other is Nyamilele seasonal swamp. 	<p>Noted</p> <p>The project will not affect wetlands in the project area. The project will develop and implement a Source Protection Plan (SPP) to protect the water</p>

		sources and ensure their sustainability.
<i>In your opinion, what other benefits do you get / obtained by others from nearby forest and Wetland?</i>	<ul style="list-style-type: none"> • The biggest benefit of the wetlands is supply of water for irrigation to big farmers, for example Sano Franko, a model farmer in Kalwala who taps water from Siriba swamp using a water pump to grow vegetables like Cabbages, Tomatoes and egg plants. • Other benefits include collection of papyrus for mats, water for livestock and cleaning breathing air. 	Noted
<i>What climate smart farming practices do you carry out for crop & livestock?</i>	<ul style="list-style-type: none"> • Few farmers in Kalwala practice intercropping, mulching, planting a variety of seedlings per season and have stores for post- harvest handling. 	Noted The SPP will be developed to ensure that water source / catchment is protected from human-driven threats
<i>In your opinion, what varieties of forage are available, harvested and used by livestock in your area?</i>	<ul style="list-style-type: none"> • Most of the forage in Kilwala is natural and included Impereta cylindrica (spear grass), penisterium papurium(Elephant grass), Amarathus, couch grass and other broad leaf shrubs. • From April to November (rainy season) fodder is plenty, then December to March (dry season) its scarce. 	Noted
<i>What are the current threats to the status of forage with in forests & wetland?</i>	<ul style="list-style-type: none"> • Prolonged dry spell; Overgrazing by migrant cattle keepers • Pests and diseases 	Noted





6.4.4 Consultation Meeting Village Community Leaders of Tecwa / Gaspa Trading Center

Date	18 th Nov 2021	RESPONSE
Means of Engagement	Meeting at Tecwa village / Gaspa trading center, Kitwara parish - Kiryandongo Sub County	
Contacts	Attendance List attached in Annex4	
Question	Key Issues and Concerns Raised	
<i>What other major problems are existing among community? What conflicts have been caused by water demands?</i>	<ul style="list-style-type: none"> • Mr. Simiyu David the vice chairperson said the problems in the area include; • Poverty where most of the youth have nothing to do and keep them busy • Draught, during the dry season most of the farmers tend to lose their crops due to lack of modern farming methods like use of irrigation system during the dry season 	<p>Noted</p> <p>Piped water will contribute to reduction of poverty, disease, cost of living.</p>

Date	18 th Nov 2021	RESPONSE
Means of Engagement	Meeting at Tecwa village / Gaspa trading center, Kitwara parish - Kiryandongo Sub County	
Contacts	Attendance List attached in Annex4	
Question	Key Issues and Concerns Raised	
	<ul style="list-style-type: none"> • Diseases such as cough, typhoid, and fever were identified as the major diseases in the village. • According to Akello Rose the LC 1 Treasurer (Tel: 0787055511) said due to lack of enough safe water sources, most of the community members result into sharing the dam water with the animals thus increase in infection of disease like typhoid since the village only has one functional bore hole of the two. • During the dry season, the bore holes tend to dry up leaving the community members (especially women and children) moving long distances in search of water thus ending up sharing the dam water with the animals. • There is limited market for locally produced farm products such as cabbages, onions, cassava, potatoes, beans • There is no any secondary school in the area this has led to high school dropout since after primary seven children are forced to move long distance to either Kiyandongo and Bweyale town councils to access secondary level education. • The area has no any electricity power line. Micro enterprises such as saloon, welders, fridges operators are affected. This has also led to insecurity in the center since there is no security light. • According to the vice chairperson, he said the area has only one health Centre 2 (HC II) which cannot handle some cases. The vice chairperson therefore requests for an upgrade the health center II to III. 	<p>However, positive / favourable human behaviors have a great influence on reducing burden of water related diseases</p> <p>Noted</p> <p>Noted</p> <p>Noted</p> <p>The power lines to the water source may be helpful to the community as well. This will enhance rural connectivity</p>
<i>How is solid waste managed?</i>	<ul style="list-style-type: none"> • According to the vice chairperson, bye-laws were put in place whereby every household should have latrine, drying rack, shock pit for waste water, dust bin,wire for hanging clothes ,and people are cooperating • In the settlement people are encouraged to burn their waste products such as paper and polythene bags, to bury waste got from food products, • They are encouraged to no defecate in bushes, water sources and open areas • There is a person in the trading center who cleans the town and deposits off the waste, he is paid, each vender pays him 500 shilling and also the shop owners, he takes the rubbish and burns it at his place since they have no dumping site 	Noted

Date	18 th Nov 2021	RESPONSE
Means of Engagement	Meeting at Tecwa village / Gaspa trading center, Kitwara parish - Kiryandongo Sub County	
Contacts	Attendance List attached in Annex4	
Question	Key Issues and Concerns Raised	
<i>What conflicts have been caused by water demands?</i>	<ul style="list-style-type: none"> • According to Kitesi Margret said the water problem has Increased Women Fight at the borehole since every woman wants to be the first to fetch water since they have one bore hole. • According Rose Akello, “during the dry season Cattle rearers chase away people from the bore holes so that their animals drink fast thus causing conflict in the area. • The people pay for water, the fee paid for water by the water users ranging from Ugx 2,000sh, Ugx 3,000 and Ugx 5,000/= being paid monthly for maintaining of the bore whole hence causing a big challenge since the community does not want to pay the fee thus resulting to the usage of dam water and wetland, • Poor hygiene since some people do not Bath due to lack of water. • Mr.Omusungu Korofas (Tel: 0781414430) said during dry season most of the people reduce on the times of bathing and this has left the hygiene at low rate. 	The conflicts will likely reduce when piped water comes
<i>What are the anticipation benefits of the new water projects?</i>	<ul style="list-style-type: none"> • Kyamanywa asumani the secretary of gaspa said that the distance to the bore hole will reduce since water will be accessed in short distances • Fighting among the community will reduce since there will be no more fighting for water at bore holes • The expense of water will reduce, we have been buying the water at 500 shilling, with this new water project we think it to reduce • Sanitation among the community will increase, were everyone will be able to access water for domestic us • Livestock farmers will benefit since their animals will be able to drink enough water according to the secretary. 	Noted
<i>How best can communities access piped water?</i>	<ul style="list-style-type: none"> • The vice person said that in his village there are people willing to connect to the system and have water at their homes and those who are willing to buy from the community public stand or water selling points. 	Applications for water connection will be handled by the system operators
<i>Who will benefit more?</i>	<ul style="list-style-type: none"> • The women and children will benefit more due to improved access to water for cooking, washing clothes, washing plates, feeding their live stocks such as chicken goats, cows and also the children’s 	Noted

Date	18 th Nov 2021	RESPONSE
Means of Engagement	Meeting at Tecwa village / Gaspa trading center, Kitwara parish - Kiryandongo Sub County	
Contacts	Attendance List attached in Annex4	
Question	Key Issues and Concerns Raised	
<i>Who will lose?</i>	<ul style="list-style-type: none"> Akello Rose said that in Tecwa village they have 7 water vendors when the project starts, they are likely to lose their jobs since everyone will have access to water 	The ESIA team will consult all water vendors and seek their opinion
<i>How can they be mitigated?</i>	<ul style="list-style-type: none"> One of the risks suggested was that in case the system breaks down and the people are used with the project they will find it hard to go to the bore hole The secretary said, if in the design some people are left out it may affect them since they will still have to move long distance to the bore hole to collect water The vice chairman said that there should be a lot of community sensitization about the project so that people can understand more about it 	<p>The system will be properly maintained.</p> <p>All operation procedures will be disclosed</p>
<p><i>What are the Environmental and social risks and impacts of the project?</i></p> <p><i>How can they be enhanced and/ or mitigated?</i></p> <p><i>What roles can different stakeholders play?</i></p>	<ul style="list-style-type: none"> The vice chairman said there will be tree cutting along the water pipe line and he encouraged tree planting in case they have been cut The community has not received trees from the government, it has been working with the save the children an ngo which gives farmers trees to plant, trees are given to a farmer who has 1 acre to 10 acres People and farmers are willing to plant trees in their gardens and farm but they have limited access to the trees, they suggested government, NGO, and well-wishers should give them trees and plants. 	<p>An Environmental action pln will be developed t guide on that.</p> <p>Tree planting is a must</p> <p>Tree seedlings will be provided</p>
<i>Roles different stake holders play</i>	<ul style="list-style-type: none"> Save The Children has been giving trees to the community to plant in their gardens and farms 	Noted
<p><i>How can the project enhance employment creation and income generation?</i></p> <p><i>How will women, men, children, youth, older persons, benefit from the employment opportunities e.g short term casual jobs water vending etc?</i></p>	<ul style="list-style-type: none"> The secretary said there will be increase in employment opportunities where people will engage in activities such as irrigation of their crops, brick making, creation of washing bays for car washing and motor cycle washing of clothes and also water vending 	Noted
<p><i>What are the land tenure in your area?</i></p> <p><i>Who owns the land where the pipe and</i></p>	<ul style="list-style-type: none"> According to the vice chairman, the land in Kiryandongo is owned by the government, there is no milo land is owned customary 	All land acquisitions issues will be

Date	18 th Nov 2021	RESPONSE
Means of Engagement	Meeting at Tecwa village / Gaspa trading center, Kitwara parish - Kiryandongo Sub County	
Contacts	Attendance List attached in Annex4	
Question	Key Issues and Concerns Raised	
<p><i>tank will be constructed?</i> <i>What proof of ownership?</i> <i>How can that land be acquired?</i> <i>What are the conditions /modalities of acquiring the site location?</i></p>	<ul style="list-style-type: none"> • The government gives a lease of 49 years and after the 49 years when your still alive that's when you can apply for the land title from the government, if you fail to apply for the land title the government take back its land • During the period of 49-year people are given form which shows owner ship of the land • When government is giving land to the people, it starts with 3 acres to 10acres, it doesn't go below or above the mention acres according to the chairman 	handled by the RAP team
<p><i>What is ethnic composition of the community?</i></p>	<ul style="list-style-type: none"> • The Dinkas from sudan, Congolese from DR Congo, Banyarwanda from Rwanda, Kenyans, 	Noted
<p><i>Are they some indigenous people?</i></p>	<ul style="list-style-type: none"> • No 	Noted
<p><i>In your opinion, what is the main source of energy used for lighting at your home/place of work (used for cooking)?</i></p>	<ul style="list-style-type: none"> • Firewood is the major source of cooking, according to Smiyu David the vice chairperson Tel no; 0782894421. He said firewood is collected from peoples' gardens and Mr. Onens' forest. 	Noted
<p><i>What is name of forest you commonly obtain utilize to obtain firewood, water, fruits, fish, etc</i></p>	<ul style="list-style-type: none"> • Mr. Odong Moris the secretary said that the only forest in the area is a private one owned by Mr. Onen and some of the trees found in his forest include; teak, graviola, mangoes, eucalyptus 	Noted
<p><i>What is the name of the wetland you commonly obtain utilize fire wood, water, fish ,etc</i></p>	<ul style="list-style-type: none"> • Tecwa wetland, fish caught include mud fish and also the community uses the water for domestic use and livestock use 	

Date	18 th Nov 2021	RESPONSE
Means of Engagement	Meeting at Tecwa village / Gaspa trading center, Kitwara parish - Kiryandongo Sub County	
Contacts	Attendance List attached in Annex4	
Question	Key Issues and Concerns Raised	



6.4.5 CONSULTATION WITH BENEFICIARY COMMUNITY OF NDOYO TRADING CENTER

Date	18 th Nov 2021	RESPONSE
Means of Engagement	Meeting at Ndoyo trading center - Kiryandongo Sub County	
Contacts	Attendance List attached in Annex4	
Question	Key Issues and Concerns Raised	
What other major problems	<ul style="list-style-type: none"> • There is a lot of water scarcity. • There is only 1 functional borehole serving a population of over 300 households 	Noted Jobs opportunities will be offered

are existing among community? What conflicts have been caused by water demands?	<ul style="list-style-type: none"> • There is no household with a water tank • No valley dam and valley tank • No piped water system • Even schools have no access to safe water • During dry season, people move up to River Nile located 7km away 	PSPs will be constructed in area
What is ethnic composition of the community?	<ul style="list-style-type: none"> • Ndoyo trading center has attracted multi-ethnic groups • At present, there are 18 ethnic groups living within namely – Bagisu, Alur, Lugbara, Bafumbira, Banyoro, Bakiga, Basoga, Langi, Acholi, Baganda, Kakwa, Karamojong, Bachope, Baluri, Sabiny, Batoro, Sudanese 	The population increase requires access to safe and clean water
How will project benefit your community?	<ul style="list-style-type: none"> • The entire community will benefit • The youth will get jobs, because currently unemployment is high • There is 1 plumber (Abdul Kadil), Masons, electrician (Kack Simiyu) 	Contractor will offer jobs to locals



6.4.6 CONSULTATIONS WITH WATER VENDORS IN GASPA TRADING CENTER

Date	21st October 2021	RESPONSE
Means of Engagement	Meeting	
Contacts	Attendance List attached in Annex4	
Questions	Key Issues and Concerns	
What major problems are existing among community?	<ul style="list-style-type: none"> • Water scarcity during dry season is a major problem • Water vendor help supply. • At present, we don't go to school because of covid19 Lockdown. So, we have resorted to water vending and earn some income. 	Noted

	<ul style="list-style-type: none"> We sell a jerrycan at UGX 500 – 1,000/= depending on the demand Our chairperson is Idi Amanya 	
How will project benefit your community?	<ul style="list-style-type: none"> It obvious that when the piped water comes, we shall not work again. We shall lose jobs. We hope the project can compensate us 	The project contractors may give you some work to do



6.4.7 CONSULTATIONS WITH NON-BENEFICIARY AREA (KITWANGA VILLAGE - KICHWABUGINGO PARISH)

Date	18 th Nov 2021	RESPONSE
Means of Engagement	Meeting at Kitwanga village, Kichwabugingo parish - Kiryandongo Sub County (New Kichwabugingo SC)	
Contacts	Attendance List attached in Annex4	
Question	Key Issues and Concerns Raised	
Location	Kitwanga as village is located in Kichwabugingo parish, Kiryandongo sub-county, Kiryandongo district. The area is now under the newly formed sub county called Kichwabugingo. It has a total population number of 879 of different tribes and ethnicities. However, there is a remarkable increasing population growth in the area due to new residents from in and out of settlement. Secondly, pressure increases in December when most workers have returned home “leaders say”	Noted
What is the current situation on water, sanitation and hygiene among community? What are existing gaps in accessing piped water supply?	<ul style="list-style-type: none"> There is high demand for clean safe water required for mainly domestic use and commercial purposes. According to the HVT Kitwanga says the village only have two boreholes and one shallow well compared to the population resulting to congestion which are not stable this forces most community to go for Katasimbi swamp water which is not safe however always available. 	Noted

<p>Who is most affected? Who benefits from current situation? How will project benefit water vendors?</p>	<ul style="list-style-type: none"> As a result, congestion at the existing boreholes increased, and more water stress to local council leaders including the WUCs members since there is no any person to connect the in accessing clean and safe water. There are no water vendors since the community members already have a regulation for each household to make monthly pay and The sanitation status is that each household according to the village by-law must have; Latrine, drying rack, rubbish pit, animal house. However, there is no public toilet in the center yet there's an evening market coming up 	<p>Congestion will reduce on PSPs</p> <p>Noted</p>
<p>What other major problems are existing among community? What conflicts have been caused by water demands? How is solid waste managed in the host and refugee settlement?</p>	<ul style="list-style-type: none"> There is high demand for wood fuel coupled with lack of technology of making ESS and Briquettes. Fecal waste is basically managed through the use of mainly pit latrines in the home stands around and the open dumping of food waste; street litter is mainly managed by burning the use of rubbish pit. No nearby health centers No market No nearby primary and secondary school in the village 	<p>Noted</p> <p>There is no fecal sludge system planned for th area under the project</p> <p>Noted</p>
<p>What are the anticipated benefits of the new water project? Who will benefit more? Who will lose?</p>	<ul style="list-style-type: none"> The IRWMD / MWE project has not included Kitwanga village as beneficiary area along the distribution network. Project will not benefit Kitwanga village is excluded Increased distances to PSPs in other villages Increase in social inequity and inequality 	<p>Noted</p> <p>The demand for water will increase in future</p> <p>ESIA will advise on whether to scale-up supply</p>
<p>What are the Environmental challenges?</p>	<ul style="list-style-type: none"> There is increasing loss of tree cover due to rampant cutting down of trees Degradation of wetland 	<p>Noted</p>
<p>What are the existing piped water supply projects?</p>	<ul style="list-style-type: none"> There is no existing Piped water system in Kitwanga but the existing piped water is at Bweyale town council and in case of extension the pipes will pass through underground in our lands and coordinates can be obtained by getting on ground. The LC 1 Chairperson has written a Letter requesting for inclusion of Kitwanga village into IRWMD / MWE project. 	<p>Noted</p>
<p>What is ethnic composition of the community?</p>	<ul style="list-style-type: none"> There many tribes namely Palow, Alur, Acholi, Lubugara, Baruri, Bayankole, Banyoro, Baganda 	<p>Noted</p>
<p>What is the main source of energy used for lighting & equipment at</p>	<ul style="list-style-type: none"> The main source of energy used for lighting & equipment is mainly solar lighting about 70% and with 30% using paraffin. 	<p>Noted</p>

your home / place of work?		
What is name of forest & Wetland you commonly obtain utilize to obtain firewood, water, fruits, fish, etc?	<ul style="list-style-type: none"> • The village has no any isolated forest used for firewood however a time pick the firewood from ranch 5 and 9 while others get from the remains of their cassava cuttings and maize steams. • The wetland commonly known and utilized is Katasimbi swamp 	Noted
What other benefits do you get / obtained by others from nearby forest and Wetland?	<p>According the verbatim quoted in the community meeting, the benefits got from wetland and forests include the following;</p> <ul style="list-style-type: none"> • water for our livestock use • water for domestic use • Commercial use like simple irrigation and fishing sliver fish 	Noted
What varieties of forage are available, harvested and used by livestock in your area? What period of the year is the fodder/grass abundant or scare?	<ul style="list-style-type: none"> • The only local forage available in the village is the potatoes veins. • The foddors/grass is always abundant during wet seasons that's from months of March, April, May, June, August, September and October. Yet in mouths of January, February, July, November and December are away for scare foddors. 	Noted
What are the current threats to the status of forage with in wetland?	<ul style="list-style-type: none"> • The current situation of the forage in the village is at the lower rate due to burning of grasses, increased demand for grasses for house construction and increased demand for settlement thus grass clearance. 	Noted





6.4.8 CONSULTATION WITH DEPARTMENT OF REFUGEES, OFFICE OF THE PRIME MINISTER

Date	22 nd March 2022	
Means of Engagement	Meeting	
Contacts	Attendance list attached in annex4	
Key Issues and Concerns Raised	Response	
The Kiryandongo refugee settlement land is government-owned. Therefore, any compensation activities may consider crops or structures encountered but not land.	Noted	
There are no host communities found inside the designated refugee settlement.	Noted	
Refugees should be considered for employment as laborers on the project since they had the right to work in Uganda.	Noted	
Ensure that no child (refugee or from host community) is employed on the project. Structures should be put in place for safeguards implementation.	Noted	
Conflict for water in the area has mainly been recorded amongst refugees than against or within the host community. Therefore, the project should be mindful of this.	Noted	



6.4.9 CONSULTATION WITH UGANDA NATIONAL ROADS AUTHORITY

Date	25 th March 2022	
Means of Engagement	Meeting	
Contacts	Attendance list attached in annex4	
Key Issues and Concerns Raised		Response
Kigumba – Masindi Road is a newly constructed project, therefore consultations with UNRA by the design consultant and contractor should be undertaken before any cross points are made.		Noted
MWE and NWSC need to interface with and provide the water network development master plan and envisaged requirements for the planned networks for decisions to be made collectively.		Noted
The design team should submit their typical road crossings and typical valve design so that these can be synchronised with UNRA’s requirements when designing and constructing roads i.e. putting into consideration the size crossing ducts and structurally sound concrete class.		Noted
UNRA’s policy for utilizing the road reserve should be followed by MWE the project developer.		Noted
There should be agreements for utility owners/operators to contribute to the funds required when creating the road reserve, otherwise UNRA bears all the cost, which burden would be eased with contribution from other users of the UNRA ROW.		Noted
MWE and the design consultant need to liaise with UNRA about future road construction project especially bridges in whose close proximity, water abstraction points would be vulnerable to pollution during the construction phase.		Noted
Swamp crossing with anchors should ensure not to block the flow from culverts or trap moving debris which may result in flooding.		Noted



6.4.10 CONSULTATION WITH MINISTRY OF LABOUR GENDER AND SOCIAL DEVELOPMENT

Date	17 th May 2022	
Means of Engagement	Meeting	
Contacts	Attendance list attached in annex4	
Key Issues and Concerns Raised		Response
For water supply system issues, land will have to be secured especially for the case of ground water (at abstraction and reservoir areas) and along transmission mains. Consent forms from local leaders and other concerned authorities on land ownership should be availed to address the issues of land ownership.		Noted
The contractor should construct sanitation facilities to cater for labour force to be employed different from public toilets planned for the communities.		Noted
Site layout plans and architectural designs for solar powered piped water system and all that is entailed therein, should be submitted to MoGLSD Geotechnical survey/ study reports on bearing ratio to hold the pipes should be submitted.		Noted. The Consultant is going to share accordingly
During trenching, the sites should be hoarded off with clear signage.		Noted
A traffic management plan should be in place to control the contractor's fleet. Likewise, driver competency, vehicle maintenance schedules should at all times be assessed and safe operating distances from the road addressed (50m for borrow pits and 15-20m for transmission mains).		Noted

Traffic control through signage / flagmen and diversions should be done with the aid of Police and other concerned stakeholders.	
Dust and noise pollution and emanating from the project should be addressed.	Noted
All permits, licences and certification from concerned ministries and authorities such as the Directorate of water resources management, should be acquired.	Noted
Hydrogeological studies should be done in relation to ground water and sanitation facilities in order to prevent contamination of the underground aquifers.	Noted
The design lifespan of the sanitary facilities should be based on the target population and consequently size of the septic tank.	Noted
<p>Health and Safety during construction should be observed. Risk assessments should be carried out, mitigation measures put in place and explained for preparedness of the community and workers. Personal Protective equipment should be provided based on the risk assessed.</p> <p>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.</p> <p>Firefighting mechanisms especially in camps e.g., Assembly points, fire extinguishers and smoking places should be designated.</p>	Noted
Welfare provision based on gender ranging from accommodation and sanitation facilities should be observed.	Noted
<p>The employment policy of the country should be followed; contracts, payment mechanisms, appointment letters should be in place. All employees should have written documentation of their contracts (explaining their salary/ wage, time-off duty etc.)</p> <p>Children should not be employed by the project.</p> <p>The contractor should be gender sensitive during the recruitment exercise to foster gender equality. And when employing, some percentage should be from the local people as part of ownership and sustainability of the project.</p> <p>The employees should have a pre-employment medical examination to determine among others their mental capabilities before engagement.</p>	Noted
HIV/AIDs services should be extended to the employees especially during the construction phase.	Noted

The vulnerable groups should be accounted for especially in the design of sanitary facilities.	Noted
Restore the sites after construction through revegetation and tree planting.	Noted
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.	Noted



7 ANALYSIS OF ALTERNATIVES

This section presents the analysis of alternatives done to maximize environmental and social safety. Alternatives can take on several forms including technological options, project site options, transportation options, labour sources and type and others. This ESIA considered analysis of the various feasible alternatives of the project under different scenarios to identify and describe the potential feasible alternatives that would allow the project to reach its objectives. It also presents a comparison of the potential alternatives on the basis of several factors which can influence the choice of alternatives to be considered by a Developer i.e. technical, economic, environmental and social criteria, as well as of public views and concerns. The comparison of alternative was done to evaluate and address the design alternatives that were examined and proposed during the feasibility and pre-design study of the proposed project. Therefore, according to the 2011 EIA Guidelines for water resources related projects, the following alternatives/options were considered:

- Site Location and Design Alternatives;
- Technology Selection Alternatives; and
- Project or No Project Alternative.

7.1 SITING AND DESIGN ALTERNATIVES

7.1.1 WATER SOURCE ALTERNATIVES

7.1.1.1 SURFACE WATER FROM VICTORIA NILE

The proposed Victoria Nile water source option entails an abstraction point located at Atura, Tenam A village, Nyamahasa parish, Mutunda Sub County and a treatment plant located in close proximity to the intake (1,100m away), a safe distance from the flood plain of the river. The main system components for sourcing water from the Victoria Nile will comprise of the following:

(i) Raw Water Intake

The intake will be located at the banks of Victoria Nile at Atura. The critical design consideration for the intake is to site the Intake pump house where space and accessibility allows and at an elevation to allow gravity flow of water from the River to the sump. Therefore, siting the suction pipes so as to minimize siltation and debris in the pipes, and the relative ease of laying the pipes into the river is a major consideration. Bathymetric readings of the river bed will be taken at detailed design along two or more profiles so as to determine the best location for the laying of the suction pipes to the raw water pumps sump.

(ii) Raw Water Pumps and Pumping Main

Submersible pumps capable of dealing with raw water will be installed inside the well. The use of submersible pumps will eliminate negative suction issues, pump priming challenges, foot valve blockages or malfunction and will keep the intake structure footprint to a minimum. A moving gantry crane will be provided to lift the pumps while the Mechanical and Electrical controls will be housed in a control panel.

There will be two raw water pumps installed in the suction well operating on one duty / one standby basis. The Raw Water submersible pumps (up to 2033) will have a flow of 52.33m³/hr. at 16m head. The Raw Water Main will be DN200 Steel to PN10, 1,394m long, installed on concrete pedestals.

(iii) Packaged Water Treatment Plant

The Treatment Plant will include:

- a) Treatment Plant Site Works;
- b) Packaged Water Treatment Plant of 1,072.51 m³/day (70.38 m³/hr for 16 hours pumping regime);
- c) Clear Water Tank;
- d) Sludge Drying Beds;
- e) Pump House;
- f) Staff Houses; and
- g) Office and Workshop.

The Packaged Water Treatment Plant will have a capacity of 70.38m³/hr. The system components will include:

- a) Coagulation- to form micro-flocs from the non-filterable suspended solids (colloids);
- b) Flocculation- to combine the micro-flocs into flocs;
- c) Sedimentation- to remove the flocs by settlement;
- d) Filtration- to remove the remaining suspended solids; and
- e) Chlorination- to disinfect the water and leave residual chlorine in the water which has to be transmitted over long distances.

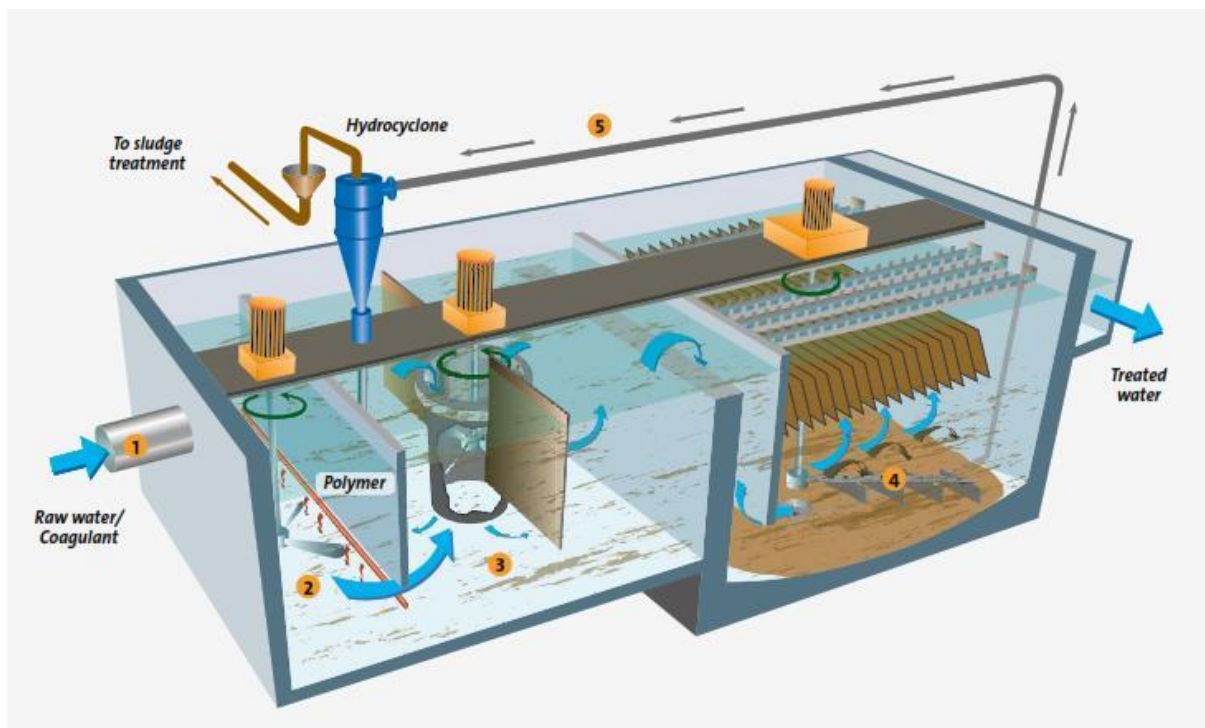


Figure 7-1: Packaged Water Treatment Plant

Source: MWE, Feasibility Study and Design Report, 2021

1. **Coagulation Stage:** where a coagulant will be added is added to the raw water
2. **Injection Tank:** where the flocs produced during coagulation stage are balloted by dense micro-sand, which is continuously reinjected into the process
3. **Maturation Tank:** which is fitted with a mixer designed to produce the optimum velocity gradients to allow flocs to swell and mature.
4. **Counter Current Lamella Clarification:** which allows a fast settling of the micro-sand balloted sludge
5. **Recirculation:** where the sludge is pumped to the hydrocyclone to be separated from micro-sand. The clean micro-sand is returned into the injection tank to minimise loss; the sludge is continuously removed for further processing

(iv) Treated Water Pumps, Mains and Booster Station

The treated water pumps will comprise of 2No. horizontal centrifugal pumps (1No. duty and 1No. standby) with a flow of 14.4m³/hr. at 146m head.

The treated water transmission system therefore consists of:

- A transmission main of Steel- DN 100 PN25, 20,700m long.
- The Booster Station with 100m³ capacity sump will be located in Kasanja B village, Kakwoko parish, Mutunda Sub County. The Booster Station will have 2No. horizontal centrifugal pumps (1No. duty and 1No. standby) with a flow of 14.4m³/hr. at 130m; and
- A transmission main of Steel- DN 100 PN25, 14,800m long.

However, considering the system's reliance on Mutunda Water Treatment Plant, this would require the treatment plant to have been chosen in the design and feasibility study of the Mutunda RGC system. However, since the Mutunda Water Treatment Plant option was not selected in the development of the Mutunda RGC water supply system due to the hardships in handling the post treatment waste (sludge). The required technology to treat the surface water in a WTP is advanced compared to the requirements for treating ground water. Additionally, all the above-mentioned result into high capital investment and operating cost as indicated in

Table 7-1 below hence opting for the ground water option. This rendered this option not feasible.

Table 7-1: Summary cost estimation variation of the systems entailed for the respective water sources for Mutunda RGC water supply system

Cost Item		Water Source Cost Estimate (UGX)	
		Victoria Nile	Groundwater
Capital Investment	Borehole Pump Houses / Intake	420,000,000	220,000,000
	Water Treatment	2,010,555,046	-
	Transmission Mains	2,351,074,823	1,683,955,431
	Mechanical and Electrical Items	3,012,000,000	900,700,000

Operating Costs	Annual Staffing	85,000,000	76,000,000
	Chemicals (UGX/ m ³)	134.87	66.69
	Energy (UGX/ m ³)	3,725.76	1,095.41
	Annual Maintenance	352,650,000	136,400,000

7.1.1.2 GROUNDWATER SOURCES

Considering the maximum day demand (MDD) for Gaspa RGC piped water supply system is 386.58m³/day in the Ultimate Year 2043, the project considered two groundwater sources (DWD 77380 and DWD 77381). The proposed boreholes DWD 77380 and DWD 77380 yield 37.0m³/hr and 85.7m³/hr have estimated abstraction yields of the boreholes are 30.0m³/hr and 50.0m³/hr for a 16-hr pumping regime yielding over 1280m³/day, respectively, which exceeds meets the MDD of Ultimate Year 2043. Groundwater source option was chosen mainly due to its relatively lower costs compared to the Victoria Nile water source option as summarised **Table 7-2** below.

Table 7-2: Summary cost estimation variation of the systems entailed for the respective water sources

Cost Item		Water Source Cost Estimate (UGX)	
		Victoria Nile	Groundwater
Capital Investment	Borehole Pump Houses / Intake	120,000,000	145,000,000
	Water Treatment Plant	Covered Mutunda RGC	-
	Transmission Mains	8,255,258,750	1,280,184,775
	Mechanical and Electrical Items	1,245,000,000	884,600,000
Operating Costs	Annual Staffing	66,000,000	61,000,000
	Chemicals (UGX/ m ³)	134.87	66.69
	Energy (UGX/ m ³)	618.27	1,189.49
	Annual Maintenance	254,050,000	117,730,000

7.2 TECHNOLOGY SELECTION ALTERNATIVES

7.2.1 WATER TREATMENT PROCESS TECHNOLOGY

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 (**Section 5.2.8**). 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.

7.2.1.1 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 7-3** 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.

According to Table 7-3, ozone, the most efficient disinfectant but not a persistent disinfectant, thus from the health aspect, unsafe water consumption can occur in case of recontamination along transmission/distribution lines and reservoirs. Environmentally, 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). Therefore, Chlorine which is a persistent chemical (used locally) in transmission and distribution was selected as a disinfectant.

Table 7-3: Technology analysis of disinfection types

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

7.2.2 ALTERNATIVE SANITATION SYSTEMS

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.

7.2.2.1 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 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.

7.2.2.2 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 properly lined.

7.2.2.3 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.

The cost of an Ecosan toilet is high compare to pit latrines, its operation & maintenance requires additives while its proper use requires behavioural change to maintain sanitation of excreta.

7.2.2.4 SEPTIC TANKS

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 providing:

- 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.

7.2.2.5 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 described in **Section 7.2.2.6** below.

7.2.2.6 FAECAL SLUDGE DISPOSAL

When the sanitation facilities are filled up, they have to be emptied and faecal sludge disposed of. This sludge is to be disposed somewhere and according to the Ministry of Water and Environment (National faecal sludge assessment for small towns, 2013). The Ministry proposed that faecal sludge treatment plants should be constructed in selected towns with in the country. The towns under WSDf-C that were considered were ranked and Clustered. From the National faecal sludge assessment for small towns report, 2013, Kiryandongo town was clustered under the Kigumba area. Gaspa RGC being located in Kiryandongo subcounty is also a potential source for Faecal sludge.

There is no faecal sludge treatment facility in Kiryandongo District. The nearest faecal sludge treatment facility is located in Masindi Town (86km), Gulu Town (98km) and Lira Town (101km). There is a faecal sludge treatment facility under construction in Nakasongola. It will be located approximately 162km away.

African Development Bank through the African Water Facility and Government of Uganda are funding a study for the development of the Faecal Sludge Management Facility in Kigumba with the catchment areas being Kigumba, Bweyale, Kiryandongo and Katulikire. This study is being undertaken through the Urban Water and Sewerage Services Department of the Ministry of Water and Environment.

Currently there is one privately owned cesspool emptier in Kiryandongo District. The cesspool emptier has a capacity of only 4m³. There is high demand for the services and the limiting capacity of the emptier, coupled with the haulage distances, has reportedly resulted in poor disposal of the faecal sludge in swamps.



Figure 7-2: 4m³ Cesspool Emptier in Bweyale Town

Due to the long haulage distance, the faecal sludge is sometimes disposed of at the waste stabilization ponds located in Kiryandongo Hospital in Kiryandongo Town Council. The Hospital limits the volume of faecal sludge that is disposed of at the treatment facility hence illegal dumping of waste is carried out in the maturation pond, resulting in poor treatment of waste.

Given the limited access and capacity of the faecal sludge treatment plants and the low haulage potential in the area, a lot of financial and human resources would be required to build the system to cover the RGC population efficiently. This option has a high risk of resulting in pollution of the environment and was therefore not chosen.



Figure 7-3: Waste Stabilization Ponds at Kiryandongo Hospital

A combination of lined VIP latrines for institutional sanitation facilities and septic tank systems for public sanitation facilities were chosen. The VIP latrines were chosen due to their low cost, easy to construct and maintain features. Additionally, they have odour and vector control features that would minimise the health risk from the sanitation facilities. Due to the numerous users in the institutions such as pupils/ students in schools, this option also presents one with minimal water requirements i.e. mainly for hand washing and cleaning the facilities. The septic tank system was chosen for the public sanitation facilities as the locations are along the planned water distribution lines and also due to the presence of population in growing trading centres with capacity to pay a user fee to cater for maintenance of the facilities.

7.3 THE “NO PROJECT” ALTERNATIVE PROJECT JUSTIFICATION

7.3.1 KEY BENEFITS OF THE “NO PROJECT” OPTION

- a) The water resource potential of the proposed ground water sources would remain unchanged as water will not be extracted;
- b) Short-term impacts such as noise, dust generation, vibrations, etc., emanating from construction activities would be avoided;
- c) The loss of the relatively small amounts of agricultural land to the construction of water source facilities and storage reservoirs would be avoided;
- d) Temporary inconveniences emanating from construction activities within urban areas such as temporary road closure for pipeline crossings, would be avoided; and
- e) The health risks associated with handling of harmful water treatment chemicals would be avoided.

7.3.2 KEY BENEFITS OF IMPROVED WATER SUPPLY IF PROJECT IS IMPLEMENTED

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

7.3.3 KEY BENEFITS OF IMPROVED SANITATION FACILITIES IF PROJECT IS IMPLEMENTED

- a) Reduced incidences of diarrheal and other water borne diseases; this leads directly to lower rates of mortality and morbidity, especially of children;
- b) Greater school attendance by the girl children since they are more comfortable with cleaner and safer toilets. This leads to increased gender awareness and improvement;
- c) Cleaner and more conducive environment for urban activities such as sports, markets, public places, etc.;
- d) 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;
- e) Increased revenue to the local authority and the country in general through the collection of taxes.

7.3.4 CONCLUSION ON THE 'NO PROJECT' OPTION

Kiryandongo District is an ever-growing district both innately from the increasing resident population and the inflow of refugee and IDPs to the district, thus the urgent need of a sustainable water supply system and sanitation facilities. The existing water supply system is operating below

demand. The current sanitation systems are unreliable, in sorry state and sub-standard. If this is allowed to continue, not only will the residents be exposed to public health risks but development opportunities will continue to be stifled and curtailed.

This certainly will have local, national and regional implications given that it's a major refugee and IDP hosting district in the country. Secondary implications include continuing trends of water-related diseases, no direct or indirect employment opportunities associated with the project, and continuing degradation of the environment and water resources due to unplanned disposal of faecal sludge.

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

8 ENVIRONMENTAL AND SOCIAL IMPACT ANALYSIS, ENHANCEMENT AND MITIGATION MEASURES

One of the key components of an ESIA is to identify and analyse impacts (both positive and negative), for the various project phases, on physical/chemical, biological and socio-economic environments. This section presents the identified impacts and analysis for the pre-construction, construction and operation phases of the project. The project developer (MWE) will be required to develop a comprehensive decommissioning plan before the decommissioning exercise, analysing the impacts of project decommissioning, which will be submitted to NEMA for review and approval.

8.1 POSITIVE IMPACTS

8.1.1 PRE-CONSTRUCTION PHASE

8.1.1.1 FAVOURABLE SOCIAL LICENSE TO OPERATE (SOCIAL ACCEPTABILITY, COMMUNITY INVOLVEMENT AND OWNERSHIP OF THE PROJECT)

There is favourable social license for the project to operate acceptability, evidenced through positive manifestations of social acceptability, community involvement and sense of ownership to the proposed project. The levels of awareness about the project is adequate among all primary stakeholders (direct beneficiaries and local governments – HLG & LLGs).

It should be noted that the social license is the level of acceptance or approval by local communities and stakeholders towards the project (World Bank, 2020). The SLO is a key factor in ensuring social accountability, which encompasses a broad range of actions and mechanisms that stakeholders (esp. citizens, beneficiary communities, media, CSO) can use to hold public sector actors (MWE/IWMDP) accountable. Some of the social accountability mechanisms have to be adhered to by the project hence social license to operate (World Bank, 2014).

In this case, the level of SLO within beneficiary communities was assessed by benchmarking with key indicators for social accountability. More vividly, there is increasing social inclusion and participation, trust, acceptability of planned project activities. This is a positive pre-construction impact that often enables successful project implementation. Feedback obtained during stakeholder consultations at district, sub county, parish and village levels indicated that there is significantly favourable social license to operate (SLO) by revealing that they are eagerly waiting for the piped water supply project. The SLO is a positive impact classified as direct, short, medium, long-term, highly significant, permanent and continuous. The likelihood of occurrence of the impact is Certain (already happening). The impact magnitude has been assessed as High, because without SLO the project can be adversely affected.

Enhancement measures

- Organise public disclosure of design and other information before, during and after construction, and directly engage the Local government technical staff who are closely in line with the WASH sector namely DHO, DCDO, DLO, CDOs, SAS, Parish Chiefs,
- Ensure meaningful social accountability for such a public investment (piped water supply) by closely monitor service delivery.

- Engage citizen groups in monitoring the project.

8.1.2 CONSTRUCTION PHASE

8.1.2.1 SHORT TERM EMPLOYMENT OPPORTUNITIES FOR LOCAL COMMUNITIES

The project will create direct and indirect employment to local people. The possible direct jobs include community workers (casual labour) and semi-skilled such as trenchers, plumbers, masons, painters, carpenters, mechanics, electricians, mixer operators, steel benders, drivers, community educators, porters, cooks, security guards, etc.). These will be involved in construction works for laying pipes, water towers, sumps, pump stations, among others. 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.

Enhancement measures

- Involve LC 1 village leaders in identifying casual and semi-skilled workers (Offer Identification / registration forms). However, the contractor has jurisdictions over recruitment process and eligibility requirements.
- Prioritize giving jobs to water vendors to minimize the effect of loss of jobs after commission of this proposed water supply project.
- Where possible, the project should integrate social protection mechanisms such as offering casual jobs to vulnerable and marginalized people using a group model (labour intensive public works) especially women and youth groups, as well as refugees.
- Coordinate with Refugee Welfare Councils (RWCs) on sourcing of labour (casual & semi-skilled e.g. plumbers, masons).

8.1.3 OPERATION PHASE AND MAINTENANCE PHASE

8.1.3.1 IMPROVED / INCREASED ACCESS TO SAFE AND CLEAN WATER WITHIN COMMUNITIES

The project will significantly contribute to achieving global SDG 6 target that aims to ‘Ensure access to water and sanitation for all’ (UN¹², 2021) as well as development targets for achieving water for all under the NDP III (2020 – 2025) and Kiryandongo DLG Development Plan (2020 – 2025) Under increased access to safe water, the project will specifically contribute to the following:

- 1) **Improved physical access to safe water points / connections:** The project will construct new portable water access points in Kiryandongo sub county. 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

¹² <https://www.un.org/sustainabledevelopment/water-and-sanitation/>

hitherto under-served areas that have been facing water stress and extreme water vulnerabilities in this rural area. The project will:

- Construct 17.92km distribution network that will improve physical access to clean and safe portable water to beneficiary villages.
- Install 200 start-up domestic connections including yard taps.
- Install 25 new public stand points (PSPs).
- 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 2,000m /2km between each PSP. Findings of the WASH survey indicate that, presently 79.7% of households access water in distance of more than 500-1,000 meters. This will be reduced.
- **Reduced time to collect water** – At baseline, 54.1% household spend more than 1 hour to collect water from any available source especially deep boreholes. This will be reduced.
- Increased reliability of water supply with a 200m³ water reservoir (Cold Pressed Steel Tank Elevated on 15m steel tower), able to supply sufficient volumes of good quality water that meet peak demand, as well as year-round service which is uninterrupted. In this case, the burden of going to water source point early in the morning will reduce, since consumers will be assured of reliable and low-cost water at a 27/7 basis.

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.

8.1.3.2 PROVISION OF SUFFICIENT QUANTITIES OF PORTABLE WATER

The project will provide **better sufficient quantities of portable water** for personal and domestic uses for present and future generations by year 2046. More specifically, the project will

- a) Meet the maximum day demand for the Gaspa RGC piped water supply system of 422.17m³/day in year 2046 as per feasibility report.
- b) Provide a reservoir (water tower) with storage capacity of 250m³ able to withstand shortages and no rationing.
- c) The distribution system is assumed to operate 24 hours per day. The pumping stations and water treatment plant will however operate for a maximum of 20 hours per day.

Enhancement measures

- Sensitize communities about the benefits of piped water, in order to minimise on the possible misconception and negative attitudes.
- Sensitize communities about importance of safeguarding water infrastructure and other installations, in order to ensure physical security, avoid / minimise vandalism.

- Establish / integrate water treatment system to ensure supply of quality water with acceptable colour, odour and taste free from micro-organisms, chemical substances and radiological hazards.
- Plan for expansion of the reservoir capacity by 50%-100% in case of expanded distribution network and increased population / maximum day demand.

8.1.3.3 IMPROVED PUBLIC HEALTH CONDITIONS AND HEALTH SECURITY

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;

- Contribute to reduction in incidence and prevalence of water related diseases and illnesses (e.g. Typhoid, diarrhoea, dysentery, bilharzia, gastronomic disorders, malaria, etc) resulting from better access to safe drinking water, sanitation and hygiene. For instance, at baseline, HMIS2 data shows that incidence of water related diseases has been increasing.
- 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). 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’. Within Gaspa RGC, there is no health facility with piped water. Therefore, this baseline condition will certainly improve because availability of sustainable water supply is essential to quality of care and infection prevention and control in health care facilities.
- Improve living conditions of medical staff at Health facilities – The improved access to on-site supply of water will contribute to better living conditions of medical staff that reside at health facilities. Baseline conditions show that majority fail to access water for their domestic use (e.g. bathing, washing) which in turn affects their work performance.
- Improved community sanitation and hygiene – The project will construct one water borne toilet at Gaspa trading centre.
- 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.
- Reduced exposure to Covid-19 infections – The improved water access will directly contribute to better responsiveness towards COvid-19 prevention, hence health security. This will be through increase in water availability for hand washing with soap.
- 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/NAPHS¹³, 2019). In this case, Kiryandongo district is regarded as

¹³ Uganda National Action Plan for Health Security (NAPHS) 2019-2023

high-risk hotspot due to its high refugee population (mostly South Sudanese), as well as influx of Most At Risk Populations (MARPS) that include traders, sexual workers, truck drivers, soldiers, among others. More so, the project 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 in Kiryandongo Sub County 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 if done will enhance public health and safety.
- Provide water tanks to health facilities to enable them store enough water.

8.1.3.4 REDUCTION IN GENDER BASED VIOLENCE (GBV, VAC & VAWG)

Baseline conditions of the project area indicate a prevalence of violence GBV, violence against children (VAC) and violence against women and girls (VAWG). Data showed that 25.28% of the total number of reported GBV incidents in whole of Kiryandongo district happened in Gaspa RGC between years 2021-2022. Among these, there were 13% GBV incidents related to denial of resources, opportunities & services at household level, mostly perpetrated by fathers and current partners. The driving factors are partly linked to water, sanitation and hygiene aspects. Therefore, it's certainly possible that the project will contribute to reduction in GBV incidents through improved accessibility in terms of availability (reduce distance, time), reliability and sufficiency, affordability.

Enhancement measures

- The project should take water to every homestead in the project area. In informal settlements, public tap should be located within 100 m from the homestead.
- Provide affordable connection fees and tariff.

8.1.3.5 IMPROVED EDUCATION OUTCOMES DUE TO ACCESS TO SAFE WATER IN SCHOOLS AND EARLY CHILDHOOD DEVELOPMENT CENTERS

The piped water project will contribute to improved education outcomes and targets due to increased access to safe water in schools and Early Childhood Development (ECD) centres within Gaspa RGC area. The availability of safe and clean water will enhance education outcome at primary and secondary schools. The critical indicators that will be improved include: -

- Reducing the distance to water source from an average distance of between 100 - 500 meters and above, to less than 100 meters.
- Provide sufficient volumes of safe water
- Provide affordable rates for institutional connections
- Provide 2 public toilets at Nyakataama P/S and Kalwala P/S
- Enhance water storage capacity at schools
- Improve menstrual health conditions for girls and female teachers (water for washing)

The above benefits will certainly have direct influence on education outcomes such as enrolment rate; Attendance, staff welfare, learner & teacher performance, Completion rate, Reduced Absenteeism among learners and teachers; Lower Dropout rate especially for girls, improved functionality of toilet facilities

Enhancement measures

- Provide intensified lines / piped water connections to all Early Childhood Development centres, primary schools and secondary schools.
- Provide water tanks to enable them store enough water
- Conduct sensitization on community led total sanitation (CLTS).

8.1.3.6 IMPROVED PROVISION AND UTILIZATION OF WATER SERVICES AMONG IDPS AND REFUGEES IN RANCH 18 (A.K.A ABADUDA AREA)

The piped water system will supply water to Siriba Cell (a.k.a Abaduda area), were IDPs from Bududa were resettled. Its benefits will include:

- a) Improved access and utilization of piped water for 726 households and 3,108 people living in 6 clusters / villages.
- b) Increased quantities per capita – There will be increased quantities access per households (litres per capita per day.
- c) Improved system functionality – there will be improved water quality control, water safety, leakage control, Operational Cost Per cubic, water balance, residual chlorine monitoring, etc.

Enhancement Measures

- The operation protocols should take into consideration Extremely Vulnerable Individuals (EVIs) and Persons with Special Needs (PSNs) among IDPs and refugee communities who cannot afford to pay for billed water.
- Adjust the user fees enhance affordability among IDPs and refugees in Ranch 18 area.

8.1.3.7 REDUCED EXTREME WATER VULNERABILITIES AMONG RURAL AND URBAN HOST AND REFUGEE COMMUNITIES

The project will reduce the vulnerability among poor host and IDP/refugee communities within Gaspa RGC area. There are also sub groups of people who are affected by extreme water vulnerabilities such as children, women, youth, lactating mothers, health and education facilities, urban poor, rural poor, farmers. For instance, 27% of children in Uganda are experiencing high /

extremely high-water vulnerability (UNICEF¹⁴, 2021). The project will contribute to reduction of the extreme water vulnerability as follows:

- d) Reduced water scarcity – the average annual water supply availability will be at least above 500 cubic metres per person (WHO Standard).
- e) Reduced water stress based on temporal and spatial (geographical determinations) of water sources and users.
- f) Improved water security whereby communities will safeguard water access points and water catchments.
- g) Improve food security - water access/availability will have dynamic interplay on food security. The project will provide at-least 15 litres/ppp/day which is regarded as “generally food secure / usually adequate” for any household as per Global Integrated Food Security Phase Classification (IPC) classification. It should be noted that water access is a Key Reference Outcomes on human welfare and livelihoods (IPC¹⁵, 2008).
- h) Reduced exposure to SGBV resulting from inability to afford water; poor personal hygiene; poor household sanitation; sexual violence (e.g. rape & defilement).
- i) Reduced exposure to human-livestock-wildlife conflicts caused by accessing open sources such as rivers, lake, streams, ponds.
- j) Reduced poverty conditions especially reduction in household expenditure on water among all categories including those below poverty line (less than \$2 a day).
- k) Improved climate resilience and adaptive pathways in case of hazards and risks (such as drought, dry spell, pests and diseases, floods) due to availability of piped water among individuals, households, communities and institutions.

Enhancement measures

- Integrate gender mainstreaming in water operations.
- Promote climate resilience and other feasible adaptive pathways among host, IDP/refugee communities such as water storage.

8.1.3.8 RURAL TRANSFORMATION THROUGH IMPROVED LIVING CONDITIONS (RELIABLE AND AFFORDABLE PIPED WATER SUPPLY)

The project will contribute to Improved Quality of Life in line with the national targets stated under the 3rd National Development Plan (NDPIII). More specifically, the Gaspa RGC piped water system will contribute to the following:

- a) Enhance the social well-being of the population within the RGC in terms of community health (reduced incidence and prevalence of waterborne diseases and conditions (meaning adverse effects) on human health, such as death, disability, illness or disorders caused by pathogenic micro-organisms that are transmitted in water.
- b) Transform urban agglomerations from villages, trading centres / hamlets and into suburbs and towns (as categorised under urban sociology). These include Gaspa and Ndoyo.

¹⁴ UNICEF Report on Water Security For All 2021

¹⁵ Integrated Food Security Phase Classification (IPC) Technical Manual 2008

- c) Strengthen social service infrastructures (health, educational and local administration facilities).
- d) Appreciated value of property.
- e) Boost local trade, leisure and hospitality sub sector.

Enhancement measures

- There is need to improve physical planning of Gaspa trading centre and other mushrooming ones such as Ndoyo trading centre.
- Secure funding for sewage systems to handle expected demand for faecal sludge management facility.

8.1.3.9 IMPROVED LOCAL GOVERNANCE AND SOCIAL ACCOUNTABILITY

There will be improved local governance and social accountability between the leaders and communities. The political leaders have been actively involved in lobbying for better water supply systems in Kiryandongo. The new water system will be a tangible deliverable, and will enhance the social accountability between government and the population. At baseline, water is a critical social need that often fronted as political demand.

Enhancement measures

- The operations and maintenance of new water system should be safeguarded from political undertones arising from the discrepancies between those who are connected in phase 1 and ‘those not yet connected’ in phase 2.

8.1.4 PHASE CROSSCUTTING POSITIVE IMPACTS

8.1.4.1 BENEFITS TO THE ECONOMY

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 Kiryandongo 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 Kiryandongo District Local Government for review and approval. NUWS, the foreseen operator of key project facilities, should obtain operational licenses from Kiryandongo 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.

8.1.4.2 SKILLS AND TECHNOLOGY TRANSFER

Skills and technology transfer is foreseen to 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 Kiryandongo community. The operational phase will equally offer skills build-up, particularly for students from institute such as Kiryandongo Technical Institute, Kigumba Business and Vocational Institute and Kigumba Petroleum Institute through internships, with respect to the operation, management and maintenance of the various water supply and sanitation facilities.

Enhancement measures

- The terms of agreement as per the contracts given to the construction works contractor and NUWS for the project's O&M phase should emphasize knowledge transfer and the project developer (MWE) should monitor and ensure that the objectives are met.

8.2 NEGATIVE IMPACTS AND RISKS

8.2.1 CONSTRUCTION PHASE

8.2.1.1 IMPACTS ON LAND USE/COVER

The project mostly traverses farmland under cultivation along with settled and built-up areas. The project developer, MWE, intends to mostly use road reserves of the existing public roads which are government land for the transmission and distribution lines. Given the current land use/cover of the key project sites as described in **Section 5.1**, this will be converted as construction of project facilities occurs on the respective sites. The clearing of corridor, movement of equipment and contractor staff and laying of pipes may lead to spot destruction of crops. According to the baseline, the reservoirs and sources are located on cropland dominated by maize.

The intensity of the impact will be low considering that the environment is already modified. Since the scale of the activities is short term and limited in extent, the intensity of impact is considered to be 'low'. The overall impact significance is assessed as minor.

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

Mitigation measures

- The water transmission line routes should be as much as possible restricted within the road reserves.
- Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the water sources, reservoir tanks and any other activity either by the developer or contractor shall be compensated for in accordance with land Act and World Bank Environmental and Social Safeguard Policies.
- Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses to secure settings. Prior to the construction phase, farmers shall be sensitised on the pending project at least 6 months in advance such that cultivation within the project sites/ components' footprint is stopped or reduced.
- As part of the RAP, a comprehensive impact survey is being conducted by experienced valuers in association with the district land board and local leaders. The results of the RAP will indicate all affected crops within the water transmission corridor/way leave, th respective owners and the replacement costs.

- PAPs should be given financial literacy on how to use their compensation packages.
- LGs should be involved in mobilisation and sensitizing PAPs.
- Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to vegetation and crops.
- Upon completion of construction activities, disturbed areas should be restored to as close to pre-project conditions as possible, using native vegetation.
- Put in place a community complaint reporting / GRM as a mechanism for managing feedback, appeal, response and resolution

8.2.1.2 LOSS OF LAND AND DISPLACEMENT OF ECONOMIC ACTIVITIES

During project construction, the project developer, MWE, intends to mostly use road reserves of the existing public roads which are government land for the transmission and distribution lines. However, the water sources, storage reservoir and access road sites shall be located on private land mainly covered by crop gardens as indicated in Table 8-1, whose owners will be engaged MWE in the process of land acquisition in accordance with the land act and World Bank Environmental and Social safeguard policies as well as relevant national laws. According to the RAP (2022), the project will require a permanent land take and an easement corridor (**Table 8-1**) from a total of 226 PAPs.

Table 8-1: Project Land Takes

Impact	Land Affected in Acres
Permanent Land Affected (Water Source Sites, Reservoir Sites, Access Roads, And Sanitation Facility Sites)	3.3723
Permanent Land Restriction (Easement for Transmission and Distribution Pipes)	16.5858
Total Land Affected	19.9581

In general, the loss of land will be direct, permanent and irreversible but non-cumulative. This will be limited to proposed sites and a long-term impact. The intensity will be low since the project foot print requires small pieces of land per component, per locality and the water pipelines will mainly lie in the road reserve except the areas where access to the source and reservoir sites is required. The sensitivity has been assessed as medium because there is no physical displacement of human settlement, physical cultural resources and/or significant economic displacement. Therefore, the overall impact significance is moderate.

		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
Inten sity	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

- Where land take is envisaged, compensation should be adequate and timely done. All land acquired for establishment of the water sources, reservoir tanks and any other activity either by the developer or contractor shall be compensated for in accordance with land Act and World Bank Environmental and Social Safeguard Policies.
- Sensitize the community early enough about the project so that, those affected by the project will have time to relocate their businesses to secure settings. Prior to the construction phase, farmers shall be sensitised on the pending project at least 6 months in advance such that cultivation within the project sites/ components' footprint is stopped or reduced.
- As part of the RAP, a comprehensive impact survey is being conducted by experienced valuers in association with the district land board and local leaders. The results of the RAP will indicate all affected crops within the water transmission corridor/way leave, the respective owners and the replacement costs.
- PAPs should be given financial literacy on how to use their compensation packages.

8.2.1.3 DETERIORATION OF LANDSCAPE AND VISUAL AESTHETICS

During construction of the Gaspa water supply system and sanitation project, excavation will be undertaken at the sanitation facility sites, water office and during the levelling of the reservoir site and trenching for transmission and distribution lines. Further to this, sourcing earth materials which are used for construction works such as murrum and gravel can pose considerable visual and socio-environmental impact if quarry pits are not properly managed or restored. Water impounded in derelict borrow pits forms a breeding ground for mosquitoes or other disease vectors, posing health risks to local communities which is a negative but reversible impact. Furthermore, Excavations and heaping of spoil soil or storage of the construction materials may be un-aesthetic to some people. Because of this, the project may attract resistance and complaints from a section of the affected people which may slow down the project implementation pace.

The potential impact receptors are assigned a low sensitivity, given that projects with similar requirements for earth materials such as road construction and maintenance go on in the area.

Since the scale of the activities is short term and limited in extent, the intensity of impact is considered to be 'low'. The overall impact significance is assessed as minor.

		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

- Murram and subsoil will be obtained preferentially from a licensed source and in accordance with any terms of the license. "Licensed" means approved by NEMA or the respective Project District Local Governments. The contractor will provide a copy of the license to MWE before the beginning of works at the murram/subsoil extraction location.
- Surface water run-off will be controlled during earthworks. Surface water features down-slope of the earthworks will be identified, and the necessary berms and drainage channels will be installed to ensure that run-off does not collect or pond in excavated areas or quarries.
- The contractor should source materials such as sand, murram and stones from certified and approved mines and burrows by either Kiryandongo District or NEMA.
- Restoration of borrow pits to as close to pre-project conditions as possible will be done immediately after use in cases where they are specifically opened up for this project. Native vegetation must be used for re-seeding the excavated site.
- Excavated soil shall be heaped for a short time (1-5 days) and re-used for backfilling. In case the soil is not required for backfilling, it shall be ferried to designated waste disposal sites in the districts of Kiryandongo District.
- The Contractor should limit excavation works to sections required, and ensure that the trenches are restored before moving to the next section especially in busy town centres.
- There will be close monitoring of impact on natural resources with enforcement of contract or legislative options.

8.2.1.4 SUSCEPTIBILITY TO SOIL EROSION

The site earthworks during construction of access roads, water sources, water transmission and distribution network, water storage reservoirs and the booster station will reduce soil stability and hence make the soils aggregated and more susceptible to erosion especially during the rainy season. Minor excavation works will take place at the reservoir sites; soils excavated along pipe routes and access roads will be used for backfilling. Thus, minimal loss of top soil at these localities.

The potential impact receptors are assigned a low sensitivity, given that the soils in the project area consists of mainly sandy loam soils on gentle slopes, and when eroded would affect the immediate environment. The project components are not located near any water sources to cause siltation. 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 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

- 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.

8.2.1.5 LOSS OF VEGETATION COVER

Vegetation clearance and removal will take place at the water source sites, transmission mains, reservoir sites, access roads, water office and location of the sanitation facilities. The removal of trees will be minimal (only done when necessary) as indicated in **Section 5.3.2.8** but will contribute to increase of carbon dioxide in the atmosphere (trees fix carbon dioxide from the atmosphere). All these will contribute to the greenhouse effect that causes global warming, thus climate

change. The reservoir sites and pipeline routes are mainly covered by short grass that will rejuvenate on completion of construction works. Seven invasive/alien plant species were registered in the project area and if not appropriately handled could be spread further by construction activities.

The Impact intensity is considered low since the transmission and distribution pipeline will mainly be laid in the road reserve and natural vegetation exists along the proposed pipeline route in a post cultivated form. The sensitivity of the receptor is rated low given that most of the areas traversed by the project were already disturbed with human activities and out of the one hundred and fifty (150) plant species encountered in the study area, one species, *Mondia whitei* is listed as vulnerable on the IUCN Redlist of Uganda 2016. This gives rise to resulting in an overall minor impact significance.

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

Mitigation measures

- Vegetation clearance should be limited to only localities required for development.
- Avoid and minimise cutting of trees at all project sites.
- Where cutting a tree is unavoidable, replanting ten trees per tree cut of the same species should be implemented.
- The contractor should restore sites where activities will be carried out at all the project sites. This site restoration and revegetation should be carried with local plant species as the preferred biodiversity upon completion of construction works.
- The topsoil that will have been removed before pitting the trenches for the pipeline should be put back to cover the trenches so that the crops can regrow in a natural environment. Excess soil, stones and boulders should be dumped in an area that has been approved by the District Environment Officer.
- Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to vegetation.
- When invasive species are encountered, they will be removed and destroyed, for example, by burning. The equipment and cars shall be inspected and cleaned to ensure that the construction activities do not contribute to the spread of the invasive species.

8.2.1.6 LOSS OF HABITAT FOR FAUNA

Several researchers have looked extensively on data collected on birds, mammals and amphibians and have established that fauna is affected / impacted when habitat is destroyed or lost. Habitat loss impact the earth system in a variety of ways, including: Species populations, ranges, biodiversity and the interaction of organisms. Habitat loss can also fragment ecosystems and can cause species extinction.

A leading ecologist Daniel Janzen (1974) identified that habitat destruction brings about extinction of ecological interactions. Janzen observed that these relationships between species (which range from interactions between prey and predator to mutually beneficial ones such as those between plants and the animals that pollinate them) are lost independently. The results suggest that habitat loss affects community stability, through changes in ecological interactions, by altering the abundance and spatial distribution of species through time.

During project implementation vegetation clearance, landscaping and excavations will happen thereby bringing about loss of hiding, feeding, roosting and breeding grounds for fauna. Khan (1990) noted that disturbance and modification of the environment adversely impact amphibians by destroying their natural habitat. He also noted that disturbance and modification of habitat will also favourably impact amphibians by creating new habitat types. Davenport, T. and Howard, P. 1996 observed that birds are sensitive to habitat loss because some of them specialize and live within a narrow habitat band. Habitat modification and destruction equally affect mammals, butterflies and dragonflies. When vegetation on which butterflies depend for nutrition is cleared butterflies are affected indirectly. Likewise, dragonflies are indirectly affected when vegetation on which they patch is cleared.

The intensity of the impacts of vegetation clearance, landscaping and excavations will be medium since the project alignment follows the road reserve where natural vegetation that provide habitat to fauna exist in a post cultivated form except at some swamps. The trees are located away from the road reserve except a water source Borehole DWD 77379. The sensitivity of the receptor is rated low given that most of the areas traversed by the project were already disturbed with human activities resulting in a moderate impact significance..

The Impact intensity is low since the project alignment follows the road reserve where natural vegetation that provide habitat to fauna exist in a post cultivated form except at some swamps. The sensitivity of the receptor is rated low given that most of the areas traversed by the project were already disturbed with human activities 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

- Clearance of fauna habitat (vegetation and soils) should be limited only to localities required for development.
- Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to fauna.
- The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been removed before pitting the trenches for the pipeline should be put back to cover the trenches so that the mobile fauna is not affected.
- All project workers should be sensitized to minimize damage to vegetation and fauna.
- If wild animals are encountered, the Contractor shall notify UWA so that it is picked and taken to a secure place.
- Trenching, pipework laying as well as well as backfilling will be done concurrently. For any pits dug during construction, the contractor shall ensure that every evening, the pits are covered with timber while being secured with a warning tape.
- Wetlands along the project alignment should be given due attention during the construction phase to avoid negative impacts by:
 - Avoiding intentional spilling of petroleum products.
 - Implementation of the water act and wetlands policy, specifically articles that prohibits pollution and dumping of waste.
 - Scare the fauna before undertaking the activities to minimize injury and burying the hiding fauna
 - Relocate those fauna species that cannot move on their own and this should be done by a trained person.

8.2.1.7 DISTURBANCE AND DEGRADATION OF WETLAND ECOSYSTEMS

The transmission lines from both water sources will cross through a seasonal wetland before joining Gaspa – Kitongozi road. Trenching will be undertaken in the seasonal wetland for pipe installation. The impact on the seasonal wetland is likely to be minor since minimal clearing of vegetation will occur during construction. Further, no Critical Habitat species was found along the proposed project route and hence no impact on critical habitat is expected to be caused by the project.

Impact intensity is considered low since the transmission line will be installed along a defined alignment to ensure minimal disturbance while vegetation regeneration occur after the construction phase. The sensitivity of the receptor is rated low given that most of the area is under cultivation, resulting in an overall minor impact significance.

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

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

Mitigation measures

- Construction works across wetlands will use existing road corridors for and operational access wherever possible.
- All project workers should be sensitized to minimize damage to flora and fauna.
- Close monitoring and supervision of the construction operations to avoid causing further damage to undesignated project areas.

8.2.1.8 GENERATION OF SOLID WASTE

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 receptors is assessed as 'high' given that some sites for the proposed water source are located close to the bank of River Nanda while the water transmission line traverses a number of swamps. The impact intensity is assigned 'low' rating 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 Nakasongola.
- 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 Kiryandongo for onward transmission to plastic recyclers.
- Human excreta shall be managed using a mobile toilet and then disposed at the waste stabilisation ponds at Kiryandongo Hospital.
- The contractor will work with Kiryandongo 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.

8.2.1.9 NOISE AND VIBRATIONS

Noise and vibration will occur both on and off site. This will emanate from movement of trucks, excavation works, usage of equipment (compactors, generators, etc.), etc. Noise level measurements taken at Gaspa Trading Centre, Goshen Primary School, Tecwa Primary School, Panyadoli Health Centre III, and Canrom Primary School were observed to be above the maximum permissible noise limits and this was mainly attributed to the vibrant human activity in the area. Exposure of communities and workers to high noise and vibration levels can be a health concern and needs to be mitigated in line with the National Environment (Noise) Control Regulations, 2003.

The receptor sensitivity is considered low given that most of the proposed project area is located in relatively noisy areas as indicated in the baseline, while the intensity of the impact is rated low ultimately resulting in a minor impact significance.

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

Mitigation measures

- No employee should be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. (National Environment (Noise) Standards and Regulations). Workers operating equipment generating noise levels greater than 80 dBA over long hours must be given earmuffs.
- Workers should be provided with the necessary personal protective equipment (PPE) such as ear muffs.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.
- Sites must be hoarded to curb noise impacts to neighbouring communities.
- Works should be undertaken during day time i.e. from 8am to 6pm.
- Works near schools or health centres should be done in periods like weekends in order for noise and vibrations not to interfere with learning environment.
- Weekly monitoring of noise levels at active sites should be carried out by the contractor.

8.2.1.10 AIR POLLUTION

The most significant issues that could potentially impact on air quality and climate during construction are combustion gas emissions and nuisance dust. During the construction phase there will be an increase in road traffic associated with material and equipment haulage. Furthermore, exhaust emissions from vehicles and machinery (e.g. generators) consisting mainly of poorly burnt fuels and oils, including nitrogen oxides, carbon oxides, hydrocarbons, particulate matter, etc are expected to occur. The potential impacts are nuisance to people in the area, coverage of crops (possibly leading to reduced yields) and deposition on natural vegetation and fauna who feed on the vegetation. Due to the temporary nature of construction, dust emissions are not anticipated to have a long-term impact on local air quality. Dust nuisance will decline as stripped areas of land re-vegetate. Ambient air quality measurements indicate that the environment around the project area is currently devoid of sources of high air pollution.

The manageability of the impact is high since typical impacts are well understood in conventional infrastructure construction industry and the ability to adapt to the impact is high because construction activities have been going on in the project area especially for access roads. Due to the intermittent and short-term nature of the activities, the intensity of impact is assessed as low and sensitivity of the receptors as low. The impact significance is 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 on the highway and 40 km/h off the highway.
- Trucks will be covered during haulage of construction materials to reduce on spillage of materials and wherever dust suppression is necessary, water will be sprayed over dusty areas.
- Workers will be provided with PPE and the use of PPE shall be enforced.
- All surfaced roads shall be subject to road cleaning and un-surfaced roads to dust suppression, the methodology and frequency of which shall be included in the Contractor's Traffic Management Plan.
- Stockpiles of friable material will be grassed in order to prevent wind erosion.
- A maintenance programme for equipment and vehicles will be implemented, to ensure air emissions like particulates, SO₂ and NO₂ are minimised.

8.2.1.11 INCREASED RISK OF ROAD ACCIDENTS

The proposed project will cut across several roads within the project area. Construction activities will involve trenching mainly in the road reserve, however, with concern about the points where the trenches cross major roads and trading centres as will be the case at Gaspa trading centre. At these points the risk of road accidents is increased and it is therefore necessary that key precautions be undertaken at such road crossing to avoid accidents and impairing traffic activities. The movement of project vehicles while dropping workers and delivering materials may also compromise the safety of the road. Furthermore, the use of project vehicles and equipment on community access roads will expose road users to more traffic accidents.

The receptor sensitivity is considered low given that the project is being implemented in remote areas where traffic volumes are very low, and the main mode of transport is by bicycles and motorcycles while the intensity of the impact is rated medium ultimately resulting in a moderate impact significance.

		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
Int en	1	1	2	3	4

		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
	Very low	Negligible	Minor	Minor	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
- Disruptions to public access shall be identified in the Contractor's Traffic Management Plan, under which suitable notice of intending delays and closures are given to all concerned parties and approved prior to commencing work. All road closures shall be separately notified and agreed with the subcounty administration.
- Where access to or from an individual property is closed for a period of 2 hours or more, the owner shall be informed at least 7 days in advance.
- Vehicular access to and from hospitals, police stations, and other public institutions shall be maintained through the use of steel road plates over open trenches. Pedestrian access to schools, health facilities, and other premises frequently accessed by the public will be maintained with the use of walking boards.
- To minimize interference with traffic, half of the road shall be closed to enable vehicles use one half as the other half is being excavated and installed with pipe work. The excavated soil shall be temporarily consolidated on the sides of the road and re-used for backfilling immediately the laying of pipework is completed.
- Road safety and site safety training should be done involving construction workers, police and local community.
- Conspicuous signage shall be well placed on roads and the Contractor's Traffic guides on ground shall direct traffic in case of diversions or open trenches.
- All company vehicles used in the transportation of construction workers, material and equipment to and away from the site shall be in sound mechanical conditions. Evidence shall always be provided by recording the status of the vehicle in the Daily Vehicle Inspection Form before usage.
- All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits.
- The vehicle speed shall be limited to a maximum of 30km/hr areas near sensitive facilities.
- Works near sensitive facilities like schools and health centres shall only be limited to day time (7am to 6pm).

8.2.1.12 IMPACTS ON VIOLENCE AGAINST CHILDREN (VAC)

It is anticipated that violence against children cases like labour, child sexual abuse and exploitation practices may occur under the following circumstances; a) contracted workers engaged by third parties (if any) and b) primary supply workers engaged by suppliers in providing goods and services (e.g. stone quarries, sand mining, transporters, etc); c) supply chains that engage children in extraction, processing, distribution, storage of goods and services before being delivered to contractors, or even at construction sites without contractors notice (e.g. Children vending food stuffs, drinks at / near construction sites).

However, the above-mentioned exposure factors to VAC MUST be prohibited and compliance of contractors closely monitored. If well done, the contribution of the project in reducing child labour will be HIGH.

This impact is short term and direct impact but Reversible. The receptor Sensitivity is assessed to be low because the contractor and Local governments are greatly aware of the side effects. The impact Intensity is medium especially in short run but can be handled immediately. The ultimate 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 project implementation team should put a mechanism in place to identify the presence of all persons under the age of 18 and ensure that they are not employed on the project.
- All third parties and suppliers should be made to comply to No-Child Labour policy.
- The contractor should put up notices on work sites (NO CHILD LABOUR) in order to silence agitations
- Document all workers and issue work contracts with codes of conduct against VAC
- The Developer should engage District Education Officer, District Community Development Office (DCDO), Gender Officers, Parish Chiefs among others in monitoring school attendance in the project's area of implementation.
- Sensitization on VAC should be carried out in schools and in communities.
- Reporting mechanisms should be put in place such as a whistleblowing system. Annex 11 provides the referral pathways and reporting mechanisms for VAC, GBV and other Sexual related incidents/ allegations.

- The contractor, where a case arises, will cooperate with law enforcement agencies in investigating complaints of VAC.

8.2.1.13 IMPACT ON SEXUAL AND GENDER BASED VIOLENCE (SGBV)

Baseline conditions of the project area indicate a prevalence of violence GBV (violence against children (VAC), Violence Against Women and Girls (VAWG) and Intimate Partner Violence (IPV). Data showed that 25.28% of the total number of reported GBV incidents in whole of Kiryandongo district happened in Gaspa RGC between years 2021-2022. Among these, there were 13% GBV incidents of related to denial of resources, opportunities & services at household level, mostly perpetrated by fathers, as well as Intimate partners (IPV). Given that all users of the proposed piped water supply will be required to pay, there is possibility of denial of resources (money to pay for water) among households who have less ability to afford, and this may in turn affect women and children who carry the burden of collecting water for domestic use. In addition, the benefits of cash compensation to PAPs will mostly be to the male household heads and this could stimulate exposure risks to GBV cases. Therefore, it's certainly possible that the project's influence on increasing exposure to GBV. The intensity of the impact is HIGH given that the inability to afford water bills may be continuously fluctuating (either high / low) depending on seasonality. Sensitivity of the receptor is rated HIGH because children and women are often the victims and males are mainly perpetrators.. Therefore, significance of the impact 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

- Contractors to develop and implement GBV codes of conduct for workers, visitors, sub-contractors and service providers
- Promote GBV/SEA/SH awareness before and during project implementation
- Strengthen GBV Referral pathways within the community (core and influence zone of project area). The referral pathways and reporting of GBV is provided under annex 11.
- There is need to engage into community policing with emphasising on prevention of GBV. This can be done by the local area police department of Family Protection Unit (FPU).
- The local government (CDO) should strengthen awareness and sensitisation against GBV.
- MWE should consider having a dedicated service provider for GBV, VAC, HIV/AIDS to provide overall mitigation implementation and management during civil works.
- The contractor, where a case arises, will cooperate with law enforcement agencies in investigating complaints of SGBV.

8.2.1.14 RISK OF CONTRACTING AND SPREADING COVID-19

Construction sites are places where people from different places can meet and interact while executing various construction activities including meetings and trainings such as daily assemblies and toolbox meetings. Such interactions pose the risk to spread COVID-19 and other similar respiratory such as pandemic influenza. COVID-19 is a new virus that had not been previously identified in humans and therefore no population-level immunity exists. While most people with COVID-19 develop mild or uncomplicated illness, approximately 14% develop severe disease requiring hospitalization and oxygen support and 5% require admission to an intensive care unit¹⁶. Uganda is currently experiencing an outbreak of COVID19. The statistics as of 11th January 2022 were 150,301 confirmed cases (only Ugandans) and 98,601 cumulative Ugandan recoveries (Source: <https://www.health.go.ug/covid/>).

The duration of the impact will be short-term and the extent of the impact will be local or regional depending on origin of construction workers. The likelihood of the impact occurring is medium if the contractor adequately sensitises workers about responsible and safe behaviour. The intensity of the impact is Medium given that a Covid 19 outbreak would require shutdown of works, possible a local/ regional lockdown with some patients requiring hospitalisation. The sensitivity of the receptor is rated medium given that Covid 19, if contracted, is has short to mid-term effects. Therefore, significance of the impact 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

- Sensitize all project employees about the signs and symptoms of COVID-19 as well as the ways to control its spread.
- Screen local employees/contractors for COVID-19 during recruitment.
- Screen all visitors to construction sites using a temperature gun and enforce washing of hands before entry and wearing of approved masks.
- Management of potential COVID-19 cases – in case, any workers develop the above symptoms, isolate them and immediately contact the respective District Health Officers (DHOs) to pick and transport the patients for treatment.

¹⁶ Ministry of Health-National Guidelines for Management of COVID-19, 2020

- Reduce site traffic – prohibit entry for any non-essential visitors. In addition, utilize staggered start and finish times for workers to limit site congestion and physical contact. Further, restrict the number of people in attendance at any site inductions, and consider holding them outdoors whenever feasible.
- Practice social distancing – Consistently monitor points of worker interactions such as dining areas to ensure social distancing guidelines (2-4 meters apart) are being met.
- Prioritize sanitation – Enforce workers to wash their hands with soap and water for at least 20 seconds or to use sanitizers before entering and after leaving the worksite, as well as before and after handling all goods, materials and equipment. Routinely clean any common contact surfaces on-site (e.g. scanners, turnstiles, screens, telephones and desks). Lastly, be sure to temporarily remove or disable any site entry systems that require skin contact (e.g. fingerprint scanners).
- Limit physical contact – Make sure that the contractor stagger break times to reduce congestion and physical contact in eating areas. Require workers to keep at least 2-3 metres of distance between one another while eating.
- Enhance whole-of-society coordination mechanisms to support preparedness and response, including the health, transport, travel, trade, finance, security and other sectors. Involve public health Emergency Operations Centres and other emergency response systems early.
- Continuously sensitize the workers and pass on any new guidelines by Government and the WHO.

8.2.1.15 DESTRUCTION OF PHYSICAL CULTURAL RESOURCES

There are currently no known archaeological sites within the immediate vicinity of the proposed project area. However, the proposed reservoir site in Alero B village is in close proximity to a graveyard. Certainly, PCR like graveyards and older-trees may be damaged during site clearance, laying of the transmission mains. Given the excavation works involved in the laying of the transmission and distribution system, the possibility that some cultural features being encountered along the alignment cannot be ruled out.

Owing to the importance of and sentiments attached to burial sites, the sensitivity of the receptors is considered to be 'high'. The impact intensity is considered to be 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
	3 Medium	3 Minor	6 Moderate	9 Moderate	12 Major
	4	4	8	12	16

		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
High		Minor	Moderate	Major	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 (**Section 9.3.13**) 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.

8.2.2 OPERATION AND MAINTENANCE PHASE

8.2.2.1 DEPLETION OF GROUNDWATER RESOURCES

The motorized abstraction of groundwater has the potential to deplete the groundwater resources if the abstraction rate exceeds the aquifer recharge rates. To alleviate this, test pumping was conducted to estimate the safe yields of the borehole. The recharge of the aquifer which depend on the rainfall regime of the area among others things and the infiltration of part of the same can be affected by human activities¹⁷ that impact the amount of rainfall received in the area and the amount of infiltration.

The sensitivity of the receptors is considered to be medium while the impact intensity is considered to be high. 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

¹⁷ Such activities include land use changes like deforestation, wetland drainage for agriculture

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

Mitigation measures

- To ensure that the ground water resources are not depleted, the abstraction rate should not exceed the rates determined during the test pumping exercise.
- The water levels should continuously be monitored to ascertain any impact on the water level.
- Water levels should be accompanied by monitoring of the water quality to ascertain any trend in water quality change with continued abstraction.
- The developer should apply /acquire the abstraction permits which will facilitate adherence to agreed rates of abstraction on one side and also guide the DWRM while issuing abstraction permits in the vicinity, to other competing users.
- MWE, the developer has undertaken a catchment management plan for the Victoria Nile in which the project lies and a source protection plan specific to the project water sources.

8.2.2.2 SOLID WASTE GENERATION

During the operation of the project, solid waste will be generated from the activities of the water office as well as activities of maintaining the water transmission and distribution lines. The wastes that will be generated include food remains, polythene bags, plastic bottles, papers, containers for treatment chemicals such as chlorine, wrappings for spare parts, etc. Wrappings/cylinders for treatment chemicals can be hazardous to humans and the environment if not safely disposed.

The sensitivity of receptors is assessed as 'low' given that the solid waste will be generated at already established sites with waste disposal facilities from the construction phase while the impact intensity is assigned 'low' rating since the impact of solid wastes, though localized, temporary and largely reversible, can be immense in magnitude and cumulative in effect. This ultimately results in a low impact significance.

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

Mitigation measures

- A Waste management plan for the operation phase of the project will be developed and implemented.

- Waste collection bins will be provided at strategic positions at the water offices, water source sites and reservoirs sites for temporary waste storage. The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes.
- The water supply system operator will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA.

8.2.2.3 RISK OF POLLUTION FROM MISMANAGEMENT OF SANITATION FACILITIES

The project will support construction of 2 VIP Latrines at institutions to be determined by the District LG and one waterborne public toilet to serve the residents in Gaspa trading centre. The area has no sewerage system and therefore the waterborne public toilet will have a septic tank system. The septic tanks shall be emptied and treated at a site (waste treatment plant) gazetted by NEMA such as the waste stabilization ponds at Kiryandongo Hospital. Therefore, the collection, transportation and disposal of sewage must be done correctly to minimise or 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 receptors is considered to be 'high' while the impact intensity is considered to be low given that the project will use septic tank technology for handling of sanitary wastes along with proper planning for emptying and disposal. 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 Periodic maintenance regime including emptying and desludging will be put in place and implemented to prevent sewage over flows.
- Use of manifest system to ensure that the wastes are disposed off 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 poses a danger to the community.

8.2.2.4 LOSS OF JOBS FOR WATER VENDORS

In Kiryandongo District and particularly in the proposed project area, due to the great distance to traditional water source waters, fetching water is done by water vendors. They often carry 20-litre jerry cans on motorcycles, bicycles, wheel barrows, any other bulk carriers. They sell jerry cans of 20 litre capacity and sell each between UGX 500 and 5,000 depending on prevailing circumstances (low in the rainy season and high in the dry season). The vendors are likely to have their livelihoods undermined following project implementation. By introduction of piped potable water supply, water vendors will lose their source of income within the project area as water will be accessible at homesteads and at nearby public posts.

The sensitivity of the receptors is considered to be medium since the vendors can put their effort and investments into other sources of income, while the impact intensity is considered to be low given that the water vendors can extend their services to areas not covered by the project. The overall impact significance is moderate.

		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

- MWE should sensitise existing water vendors in the area about adapting to the new developments in the area. This would eliminate their negative attitude towards the proposed project and result in total project support.
- The community Development officer (CDO) should mobilise the local people (including water vendors) and sensitise them about the opportunities that the proposed project would bring in the area and how they can take advantage of piped water in the area to create jobs (such as washing bays) and spur development in the area.
- Vendors would be encouraged to become scheme or kiosk operators; vendors would be encouraged to tender for public water points.
- Vendors should be encouraged to be involved in casual work in the course of the construction works.

8.2.2.5 INCREASED COST PER UNIT / REDUCED AFFORDABILITY

The cost per unit is likely to be higher than the prevailing level of water affordability. Currently, majority of the households pay less than UGX 1,000 per month as borehole fees. The new piped water will likely to charge per jerry can / per unit. This will hinder affordability and utilization, hence increased substitutability.

The sensitivity of the receptors is considered to be low since household can access alternative sources (deep boreholes, no matter the distance), while the impact intensity is considered to be low given that the project developer put into consideration the economic situation of the project area when developing the project and ultimately when setting water prices for the project beneficiaries. The overall impact significance is 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

- Alternative water sources such as the boreholes should continue to be maintained by the local government water user committees.
- MWE should support the district local government to continue funding construction / rehabilitation of alternative water sources such as shallow wells, boreholes, etc.
- UNHCR can provide subsidies for IDP / Refugee communities.
- NUWS under the guidance of MWE should put into consideration the project area's economic profile and vulnerability when setting affordable water prices.

8.2.3 PHASE CROSSCUTTING NEGATIVE IMPACTS

8.2.3.1 OCCUPATIONAL HEALTH AND SAFETY RISKS

Construction employees meet many occupational hazards at the workplace such as construction traffic, excavation machinery, working in water and trenches may pose accident risk to workers either when equipment is operated by inexperienced workers or when in a poor mechanical condition or falls into the trenches/ deep waters. Inadequate OHS risks or problems could also result from insufficient medical capability at the construction site; or neglect of safety equipment, precautions and procedures.

During operation and maintenance of the water treatment and supply facilities, occupational health and safety problems will arise. Workers at the facilities might experience negative health impacts, particularly during poor operation of the chemical equipment like chlorine gas or calcium hypochlorite powder. Fatal falls, suffocation and injury while working in confined places. Other causes of OHS problem include but not limited to:

- 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 receptor sensitivity is considered low given that although such impacts may be irreversible once they occur; the workers have done similar work and have knowledge on how to avoid such incidences. The impact intensity is considered to be low because MWE procures will procure a qualified contractor who is aware of OHS measures. Although workers do not follow OHS requirements and NUWS will be in charge of operating the facilities for which it has vast experience. Nevertheless, this gives rise to an impact of Minor 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 prepare and implement an occupational safety and health plan for all sites, approved by the developer.
- 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. To ensure occupational health and safety on construction sites, the Contractor shall be obliged to comply with all applicable Ugandan construction Health and Safety Standards as required by the Occupational Safety and Health Act of 2006. These include provisions of the Factories Act, Labour Unions Act and Workman’s Compensation Act.
- Training will be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape,

conduct and responsibility during such incidences. All must fully be aware and mentally prepared for potential emergency.

- Regular drills will be constantly 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 at all times wear appropriate PPE, 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.
- The Contractor shall ensure access to first aid kits.
- The Contractor shall ensure safe working heights through provision of work platforms, scaffolds and adequate supervision by ensuring regular inspection of formwork, false work and temporary supports before loading or pouring concrete.
- The Contractor shall secure site boundaries with fences or hoardings as appropriate.
- 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.
- 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.

8.3 CUMULATIVE IMPACTS

8.3.1 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 Gaspa 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, murrum, sand, rocks and among other products hence impacting on source areas.

b) Shared Land Corridors

Linear projects like roads and power lines 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 Gaspa may impact water sources especially during the dry season. The influx of refugees in the nearby Kiryandongo RSC may heighten the challenge since it will trigger demand for more available water sources.

d) Land

The project area has a number of mushrooming trading centres e.g. Gaspa, Ndoyo, Mirima, among others, which continue to expand due to the population growth as a result of refugee influx in Kiryandongo hence putting pressure on land (cultivation, settlements and sanitation facilities). Gaspa borehole are in a low lowlying area, which renders it prone to increased surface runoff in case of continuous and uncontrolled landuse activities e.g. clearing landcover and wetland degradation hence possibilities of groundwater contermination.

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 behaviours and further individual involved to harassment of women. There are several on-going projects and activities by GoU, NGOs and other development actors to support refugees. 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.

8.3.2 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 3 small and unplanned towns in Gaspa RGC e.g. Gaspa, Ndoyo, Mirima. 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 and groundwater (proposed borehole) may be altered. The impact of surface water on groundwater table will depend on the soil permeability as well as the agricultural practices and climate practiced in Gaspa 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.
- Over abstraction of water: The existence of the proposed water supply project may induce the establishment of other projects and/or increase in population within Gaspa RGC that may increase the demand for water beyond that anticipated, resulting in drawing large amounts water from the ground water sources

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

The Environment and Social Management and Monitoring plan (ESMMP) proposed here specifies mitigation measures and monitoring actions with time frames, specific responsibilities assigned, and follow-up actions defined in order to check progress and the resulting effects on the environment during construction and operation phases of the project. Monitoring will begin immediately and will continue through both the construction and operation phases. One important aspect of monitoring will be to assess the effectiveness of the mitigation measures suggested, where they are found lacking, appropriate new actions to mitigate any adverse effects will be undertaken.

9.1 PHASES OF IMPLEMENTATION

Implementations of these measures will be carried out at different stages of the construction and operation phases. During the design stage, the feasibility and design consultant will incorporate proposed mitigation measures in the design and tender documents. The contractual agreement will also include clauses to enforce the management of environmental and social aspects. Construction stage activities are mainly the responsibility of the contractor and that of the construction supervision consultant. The actual physical implementation works are carried out mostly at this stage. The execution of the civil works will also include the implementation of the relevant environmental and social mitigation measures.

9.2 INTEGRATION OF SAFEGUARDS INTO CONTRACTS

The key aspects to be included in the contracts for civil works are highlighted below.

9.2.1 BILL OF QUANTITIES

The BoQs must capture all relevant safeguards aspects. The indicative costs of implementing safeguards extracted from the ESMP budget should be clearly provided as provisional sums or billable items in the Bills of Quantities. These should include safeguards staffing, documentation (CESMP, etc.), waste management, HIV/AIDS, grievance redress, gender awareness, site clean-up and landscaping, monthly ESMP reporting among others. Laxity in the provision and use of personal protective equipment is a risk to the safety of workers. The BoQs should provide a sum for PPE and supervision be done to ensure that all workers undertake works while in full PPE.

9.2.2 PROCUREMENT OF THE CONTRACTOR

Implementation of mitigation measures during construction is key to managing short- and long-term impacts and risks. As a best practice, the contracts for the civil works should include clauses on management of environment and social aspects. Sometimes, the clauses are weak and cannot be used to hold the contractors accountable. There is need to strengthen the clauses and to tailor them to the specific project safeguards aspects and management needs. The contractual agreement will also include clauses to enforce the implementation of the relevant mitigations. The clauses should be included in technical specifications in all contract documents related to the civil works. Safeguards clauses should be prescriptive and specify: what needs to be done, where

it needs to be done, when and how the actions will take place, who is responsible, the monitoring and reporting requirements, and what sanctions or legal recourse are available for work that does not meet the required specifications.

9.2.3 STAFFING

It is common for contractors to recruit unqualified safeguards staff or to assign safeguards duties to site foremen or clerks with no prior safeguards experience. Staffing requirements should be spelt out in the contracts. In addition, it may be useful to include the minimum requirements in the contracts for the civil works. Therefore, MWE through the supervising consultants must approve the contractor's Environment Officer, Health and Safety Officer and the Sociologist.

9.2.4 ESMP MONITORING AND REPORTING

Laxity in implementation and reporting on safeguards issues is common amongst contractors largely because they do not take safeguards issues seriously. This can be addressed by requiring contractors to prepare monthly environment and social monitoring reports. These should either be pay items and clearly included in the BoQs or a condition for certification and payment approvals. Contractor safeguards reports are usually characterized by failure to include useful monitoring indicators such as safety statistics (fatalities, minor injuries, near misses, etc.), number of trees cut, and number replanted amongst others. The contractors will require training on safeguards monitoring and reporting. The contractors need to undertake proper recordkeeping of all safeguards activities. The contractors should liaise with District technical offices such as the DEO, DCDO and Physical Planner to ensure proper monitoring and timely implementation of project activities.

9.2.5 DECOMMISSIONING AND RESTORATION OF DISTURBED AREAS

At the end of the construction period, the Contractor must ensure restoration of all disturbed areas including materials sites through proper landscaping, backfilling and restoring topsoil, (re-) introduction of genetic species (e.g. natural re-grassing) similar to those destroyed in order to re-establish the natural local ecology. The final payment must be tagged to successful restoration activities.

9.3 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.

9.3.1 LABOUR FORCE MANAGEMENT PLAN

The Contractor is expected to have a clear plan for recruitment of workers to promote project ownership by the communities. The Contractor should give preference to local people by recruitment of unskilled and semi-skilled labour from project villages and this should be done through local areas councils from where those seeking employment should get letters of recommendations.

9.3.2 QUALITY MANAGEMENT PLAN

A quality management plan defines the quality policies and procedures relevant to the project for both project deliverables and project processes and who is charged with what responsibility to ensure compliance to set standards. Given the nature of this project, the contractor should have a quality management plan to guide the quality control and assurance processes to achieve the intended outcomes in terms of social, design, structural and investment outcomes in line with environmental and social safeguards policies.

9.3.3 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.

9.3.4 WASTE MANAGEMENT PLAN

The Waste Management Plan (WMP) shall be prepared to address waste management aspects associated with the construction of the markets in line with legal and regulatory requirements. The Contractor, all subcontractors, and vendors involved in the project shall have to adhere to this Plan. The Contractor is responsible for ensuring that waste is managed in accordance with this Plan by providing the necessary resources and by issuing instructions and guidance during project execution. The Contractor will implement waste management measures and practices throughout the construction period to mitigate the associated risks. The WMP will contain the following information:

- Relevant legislation and guidelines for waste management of the Project;
- The procedures and initiatives proposed to address the management of waste materials;
- Safeguards, mitigation measures and monitoring to manage waste impacts during construction;
- Roles and responsibilities of those involved in the implementation of waste management controls;
- An effective monitoring, auditing and reporting framework to assess the effectiveness of the controls implemented
- Checklists and forms for day-to-day waste management activities.

9.3.5 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.

9.3.6 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.

9.3.6.1 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.

9.3.6.2 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.

9.3.7 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

9.3.8 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 motivated persons;

2. Being prepared for insecurity incidents; and
3. Decisively responding to and managing the insecurity circumstances and incidents.

9.3.9 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.

9.3.10 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.

9.3.11 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.

9.3.12 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.

9.3.13 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 geotextile 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 2 nd 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
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9.3.14 DECOMMISSIONING/ SITE RESTORATION PLAN

At the end of construction activities, the Contractor shall ensure restoration of the disturbed natural sites through environmental rehabilitation, backfilling and restoring topsoils, (re-) introduction of genetic species (e.g. natural re-grassing) similar to those destroyed in order to re-establish the natural local ecology.

The decommissioning phase will focus on any of the following as applicable:

- a) Workers' camp
- b) The parking yards
- c) Material stockpile areas
- d) Makeshift roads within the site premises

- e) Immediate surroundings of the access roads whose vegetation will be cleared during construction

Specifically, the process of rehabilitating and restoring the site shall follow the following sequential approach:

1. All facility structures shall be demolished; the rubble/debris shall be used for fill purposes or taken to an approved disposal site;
2. All obsolete equipment, vehicles, trucks and machinery shall be removed from sites;
3. Makeshift access roads shall be closed, scarified and revegetated;
4. Backfilling all openings with soil and leftover overburden;
5. Planting fast-growing trees and grasses to stabilize excavated areas with native species; and
6. Fencing off the re-vegetated areas should be provided until the reinstated vegetation has reached maturity.

Joint site inspections will be conducted to ensure site restoration before handover of the project in order to assess the progress of restoration activities. They will constitute the Contractor, the Client (MWE), Supervising Engineer and the District Environment Officer.

9.3.15 GRIEVANCE REDRESS MECHANISM

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 issue of a particular project. The community grievance redress shall consist of grievance 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 10.

COMMUNITY GRIEVANCE MANAGEMENT COMMITTEE STRUCTURES

Considering the nature and extent of works, the following community grievances may arise during the construction phase of the project:

- Grievances related to Land acquisition
- Restrictions on land 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
- Complaints related to noise, dust, and traffic incidents
- Complaints on workers behavior or conduct specially towards women, girl and boy children
- Illicit behaviors like alcoholism, smoking, drug abuse etc. of the contractor's workers
- Disruption of social set up and security
- Disputes on compensation values
- Increased pressure on social services and infrastructure, including water supply
- Contractor failure to pay workers and suppliers

- Accidents arising out of contractor's negligence to provide necessary information, protective gears and supervision

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
- Chairperson,
- Vice Chairperson,
- Secretary,
- 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;

- The Resident Engineer/ Supervising Consultant (Chairperson)
- The Contractor's Contract Manager
- Sociologist for the Consultant
- Sociologist for Contractor (Secretary)
- Environmentalist for the Consultant
- Environmentalist for the Contractor
- Health and Safety Officer for the Contractor
- 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;

- Local Council III (chairperson);
- The Sub County Chief,
- Community Development Officer (Secretary)
- Environment focal person

- e) Representatives 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) Environmentalist for the Consultant
- f) Environmentalist for the Contractor
- g) Health and Safety Officer for the Contractor

9.3.16 STAKEHOLDER ENGAGEMENT PLAN AND MATRIX

9.3.16.1 STAKEHOLDER ENGAGEMENT PLAN

The Stakeholder Engagement Plan (SEP) is an instrument for mapping and prioritizing stakeholders across levels and regions; and for guiding planned consultations and disclosure of relevant project information to/with identified stakeholders.

- a) **Stakeholder categorization:** Three (3) categories of stakeholder to be mapped out (across three levels at the national, regional and community) as follows.
- b) **Primary level stakeholders** considered to have high influence and power in respect to the project, project area and potential impacts and project implementation. These require regular engagements and consultations throughout the project life. These include the beneficiary communities, Kiryandongo SCLG, Bweyale Town council, Kiryandongo DLG, OPM/UNHCR Kiryandongo Refugee Settlement

- c) **Secondary level stakeholder** considered to have either high influence but low power or high power but low influence. These will require to be initially consulted and regularly kept informed. These will require to be initially consulted and regularly kept informed. These include political leaders in area
- d) **Tertiary stakeholders** considered to have low power and low influence. These include neighbouring sub counties and town councils.

Information needs: The following information should be made available to all stakeholders, who are likely to be affected by positive and adverse environmental or social impacts from the project:

- a) Purpose, nature, objectives and scale of the project.
- b) Schedule and duration of proposed project activities.
- c) Potential project risks and impacts extracted from the ESIA.
- d) Proposed mitigation plans.
- e) Available grievance mechanisms.
- f) Envisaged consultation process, if any, and opportunities and ways in which the public can participate (via the SEP) and
- g) Time and venue of any planned public meetings.
- h) Benefits of project
- i) Possible risks and their consequences (non-technical) for public interest e.g. threats to water catchments production wells, contamination; threats to water infrastructural e.g. vandalism.

Disclosure mechanisms: A number of strategies can used to enhance public information disclosure and stakeholder consultations including:

- i) Scheduled public hearings at community level (village and parish) for initial disclosure, disclosure of draft reports and final reports including their implementation
- ii) Dedicated and select meetings with institutional stakeholders at the central regional, district and sub-county levels at different project phases
- iii) Dedicated meetings with select social groups like livelihoods groupings and vulnerable social groups including women, youth, PWDs and local leaders.
- iv) Project Background Information Document (PBID) summaries will be prepared, translated and shared alongside other strategies described herein
- v) Non-Technical Summaries (NTS) of the ESIA will also be developed for public disclosure through print media and info-shops for the regulators, funder and project proponent.

Stakeholder Map (Interest & Influence Grid)

The ESIA mapped categories of stakeholders that influence, and/or exert an influence on the water supply and sanitation project in terms of its success and/or failure. Their roles and interests were mapped. A stakeholder matrix was used to assess the stakeholder interests and ranked them using Influence and Power grid (High / Low; +ve / -ve), as well as showing relationship (linkages & synergies) with the planned project as shown in **Table 9-1**. The purpose of the stakeholder mapping was to identify and assess entry points.

Table 9-1: Stakeholder mapping (Interest, Power & Influence Grid)

Category of Stakeholders	Level of Interest, Influence & Power	Main Interests, Concerns & Contribution to Kiryandongo Water Distribution Phase 3)
Primary (high influence & power)		
GoU/Executive – Presidency	High +ve	Fulfilling government / presidential priorities. Has ability to influence scale of project in case of any advocacy from local leaders & outcry from community
GoU/ Parliament (Area MPs)	High +ve / High -ve	Some incumbent MPs played key role in lobbying for piped water project, and are eager to see water flowing in their constituencies. If not, they have expressed concern, others have threatened to sabotage the project. Have strong support from communities and can lobby GoU/ Executive / Presidency over the project
GoU/ OPM	High +ve	Control all operations in IDP/ refugee communities of ranch 18; own land / sites for water facilities e.g. reservoir site
MWE (incl. WSDF-W/ North Umbrella)	High +ve / High -ve	Oversee and manage existing piped water system managers (WSDF-W/North Umbrella; IRWMD; MWE)
MWE	High +ve	Owns the project, control and manage the operation plan for the same
UNHCR	High +ve	Oversees and directs operations of water supply services; appoint managers of water systems within Kiryandongo refugee settlement
World Bank	High +ve	Funding Kiryandongo piped water supply and sanitation / IWMDP
Beneficiaries (Host, IDPs/Refugees community)	High +ve / High -ve	They are the reason why Kiryandongo water supply and sanitation project is to be implemented, and government is accountable to them. They can support and/or downplay the project to make it a “White Elephant”. There is also a great section that don’t know / not aware about Kiryandongo water supply and sanitation project
Beneficiaries (Refugees)	High +ve / High -ve	They are additional reason why project is to be implemented. Through international conventions on refugees, government is mandated to take care of them. They can welcome the project. To a small extent, they can abandon water supply services in case it’s not user friendly and resort to cheap/ free alternatives. In end OPM/ UNHCR targets are not fully accomplished. There is also a great section that don’t know / not aware about Kiryandongo water supply and sanitation project
Water vendors	High +ve / High -ve	They are major players in current water supply value chains across the district especially in rural growth centres. Their major concern is about negative impact of project on their potential to continue selling water to communities.

Category of Stakeholders	Level of Interest, Influence & Power	Main Interests, Concerns & Contribution to Kiryandongo Water Distribution Phase 3)
Kiryandongo Higher DLGs	High +ve / High -ve	The technical managers, staff and local leaders are key influencers. A same time, they feel side-lined / not fully engaged in planning and implementing the project. They also have limited information.
Kigumba SC Lower LGs	High +ve / High -ve	They are near to the beneficiary communities, and have direct influence and power to enforce ordinances and bylaws that enhance project implementation esp. in ensuring environment and social safeguards.
Secondary stakeholders (high influence but low power or high power but low influence)		
GoU/ Parliament	High +ve	They allocate
GoU/ Other MDAs	High +ve	These implement several infrastructure and livelihood related projects e.g. OPM/DRDIP, NUSAF3 Protection of water catchments and natural resources where hosts and refugees use as open water source
MWE	Low +ve	They are the Implementing partners (IP) for Water supply in Kiryandongo refugee settlement and nearby Bweyale and Kigumba Town Councils
Other CSOs & Humanitarian Agencies	Low +ve	They are civil society organizations (CSOs); humanitarian, emergency and relief agencies. Their services supplement government role. Their work enhances the integrity of water utilization and management in areas not yet covered, WASH infrastructure at household and communities e.g. hand washing kits, pit latrine construction, water tank construction, etc. There is also a great section that don't know / not aware about Kiryandongo water supply and sanitation project
Property / Land Owners	Low +ve / Low -ve	They own the land where water facilities will be constructed. If they decline to offer the land, it can negatively affect the project. However, in case it happens alternative sites can be identified.
Local media (Radio, TV, Print) VCC Radio (FM 103.6) KIBANDA FM (FM 89.3) K FM (FM 103.2)	Low +ve / Low -ve	They influence public opinion about the project. However, they have limited information, which in end causes misinformation and public anxiety. There is also a great section that don't know / not aware about Kiryandongo water supply and sanitation project
Tertiary Stakeholders (low power and low influence)		
Corporate Clubs (Rotary Clubs, Lions Clubs, etc.)	Low +ve	They mobilise voluntary support for communities in need especially water, sanitation and hygiene.
Religious Institutions	Low +ve	They have direct and speedy mobilization of greater section of communities, and can be influential in shaping community roles towards the project, where need be.

9.3.16.2 STAKEHOLDER ENGAGEMENT PLAN (SEP) MATRIX

In relation to the above, a Stakeholder Engagement Plan (SEP) matrix has been prepared to guide on how specific stakeholder engagements could be undertaken by the contractor, MWE as well as other Government-Ministries, Departments and Agencies (MDAs) in future (construction, Operation phases).

Project phase & Activity	Objectives	Level and type of stakeholders	Methods	Materials
Pre- Construction phase				
Organize Stakeholder Awareness events	To mobilize community /public consciousness and preparedness in relation to required roles they are supposed to play	All stakeholders esp. beneficiary community; Kiryandongo DLG (Higher & Lower); Refugees; Institutions	District level meeting of Technical Managers	Workshop / Seminars; Site Visits IEC materials e.g. Leaflets, brochures, T-shirts
			District Level meeting of Local Leaders	Radio Talk Shows (monthly / quarterly)
			Use national & Local media	Newspaper Supplement / Pull out
Construction phase				
Organise Kick-off meetings	To disseminate information about design and how local areas will be affected, how to benefit and play a role	Beneficiary communities at Sub County, Town Council & Refugee Settlements (RWC 1, 2, 3)	Meeting of Sub County Technical Officers & Local Leaders Meeting Site Specific Communities (along distribution lines e.g. trading centres)	Community meetings IEC materials (in English, French / translated into 3 major local language and dialects – Runyakitara, Luganda, Lugisu, Alur, Sudanese Arabic, Swahili) Public display of design
Organise periodic meetings	To provide updates about the progress of the construction works, mitigate challenges and options.	Technical managers, staff & Local Leaders District (higher & Lower LGs) Beneficiary communities	Quarterly meetings Site Visits Radio programme	Radio talk shows; DJ Mentions; Radio Magazines / Features TV talk show / TV Feature / site visits
Provide jobs to water vendors	To mitigate the impact of project on job loss among water vendors	Water vendors	Shortlisting vendors through their representatives (also use contacts provided in ESIA report) Organize meeting	Community meetings Registration forms

Project phase & Activity	Objectives	Level and type of stakeholders	Methods	Materials
Project closure events	To sensitize about start of operations	All stakeholders	All media channels Official launch / commissioning	IECs on operations – radio, TV, print, community meetings
Operation & Maintenance (O&M)				
Customer friendly service provision to end users	To mobilise water users to pay / connect to water services	Beneficiaries (water users – new & old)	All media channels	IECs on operations – radio, TV, print, community meetings

9.3.17 Environmental and Social Mitigation Plan

Table 9-2: Environmental and Social Mitigation 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 labour-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
NEGATIVE IMPACTS – CONSTRUCTION PHASE			
Land use/cover change	• Restrict water transmission and distribution lines to road reserves.	• Contractor	-
	• Compensate for land as per Ugandan laws on Land Acquisition and in line with World Bank's OP 4.12.	• MWE	304,952,275 as determined in the RAP Valuation Report.

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
	<ul style="list-style-type: none"> • Movement of vehicles and equipment must follow designated pathways or agreed upon access roads. 	<ul style="list-style-type: none"> • Contractor 	-
Land acquisition and resettlement	<ul style="list-style-type: none"> • Implement the RAP in line with Ugandan laws and the World Bank's ESS5 	<ul style="list-style-type: none"> • 	221,960,000 Estimate from RAP for all 3RGCs in Kiryandongo
	<ul style="list-style-type: none"> • Engage local communities to provide land voluntarily especially for the distribution lines 	<ul style="list-style-type: none"> • MWE 	Covered in RAP implementation budget
	<ul style="list-style-type: none"> • Select land requiring minimal or no relocation at all 	<ul style="list-style-type: none"> • MWE 	
	<ul style="list-style-type: none"> • Use road reserves for pipe works 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • Provide a fair and prompt compensation to the affected people 	<ul style="list-style-type: none"> • MWE 	304,952,275 as determined in the RAP Valuation Report.
	<ul style="list-style-type: none"> • Determine the extent of property lost or destroyed and provide fair and prompt compensation to the effected people. 	<ul style="list-style-type: none"> • MWE 	Covered in RAP implementation budget
Deterioration of landscape and visual quality	<ul style="list-style-type: none"> • Obtain murrum and subsoil from a NEMA/ DLG licensed source. 	<ul style="list-style-type: none"> • Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> • Install berms and drainage channels to control surface water run-off during earthworks. 	<ul style="list-style-type: none"> • Contractor 	
	<ul style="list-style-type: none"> • Restore of borrow pits and revegetate with native species. 	<ul style="list-style-type: none"> • Contractor 	
	<ul style="list-style-type: none"> • Close monitoring of impact on natural resources with enforcement of contract or legislative options. 	<ul style="list-style-type: none"> • DLG/ MWE 	10,000,000
Soil Erosion	<ul style="list-style-type: none"> • Limit vegetation clearance to localities required for development. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • Hoard off construction sites and instate soil barriers before excavations to intercept any eroded material and any soil material. 	<ul style="list-style-type: none"> • Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> • Remove topsoil prior to carrying out excavations and stockpile separately so that it is used last in backfilling of the excavated areas. 	<ul style="list-style-type: none"> • Contractor 	

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
	<ul style="list-style-type: none"> • Backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation. 	<ul style="list-style-type: none"> • Contractor 	
Loss of Vegetation and degradation of Habitat	<ul style="list-style-type: none"> • Remove excess excavated soil material which will not be used for construction works in a timely manner and deposit at an approved site 	<ul style="list-style-type: none"> • Contractor 	
	<ul style="list-style-type: none"> • Ensure proper landscaping and vegetation restoration is carried out using native species to further reduce the possibility of soil erosion. 	<ul style="list-style-type: none"> • Contractor 	
	<ul style="list-style-type: none"> • Limit vegetation clearance to localities required for development. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • Avoid and minimise cutting of trees at all project sites. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • Movement of vehicles and equipment must follow designated pathways or agreed upon access roads. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • Remove and destroy any encountered invasive species 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • Sensitise all project workers to minimise damage to vegetation and fauna. 	<ul style="list-style-type: none"> • Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> • If wild animals are encountered, the Contractor shall notify UWA so that it is picked and taken to a secure place. 	<ul style="list-style-type: none"> • Contractor 	-
Disturbance and degradation of wetland ecosystems	<ul style="list-style-type: none"> • Use existing road corridors for construction and operational access wherever possible. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • Where the alignment requires the suspension points for the water pipes to be located in the swamp and in areas which cannot be easily accessed, build temporary access to wetland areas not easily accessible from existing roads or causeways, that will be removed after. 	<ul style="list-style-type: none"> • Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> • Obtain wetland user permits from NEMA before constructing across or along wetlands and follow all guidelines given. 	<ul style="list-style-type: none"> • MWE 	150,000
	<ul style="list-style-type: none"> • All project workers should be sensitized to minimize damage to flora and fauna. 	<ul style="list-style-type: none"> • Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • MWE 	-

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
Generation of waste	<ul style="list-style-type: none"> The Contractor shall develop and implement a Waste Management Plan 	<ul style="list-style-type: none"> Contractor 	15,000,000
	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Contractor 	10,000,000
	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Contractor 	
	<ul style="list-style-type: none"> 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 Kiryandongo for onward transmission to plastic recyclers. 	<ul style="list-style-type: none"> Contractor 	
	<ul style="list-style-type: none"> Human excreta shall be managed using a mobile toilet and then disposed at the waste stabilisation ponds at Kiryandongo Hospital. 	<ul style="list-style-type: none"> Contractor 	10,000,000
	<ul style="list-style-type: none"> The contractor will work with Kiryandongo 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. 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
Risk of contamination due to flooding of borehole DWD 77383	<ul style="list-style-type: none"> The production well should be constructed with a water tight casing above the water table 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> The design and construction of the pump house at source DWD 77383 should incorporate a raised apron slab above the ground by the required height for the predicted flood depth of the area. 	<ul style="list-style-type: none"> MWE 	Part of the Design Consultant's work
	<ul style="list-style-type: none"> Aprons should be constructed with deep foundation edges to avoid erosion 	<ul style="list-style-type: none"> MWE 	
	<ul style="list-style-type: none"> A water source protection plan has been developed to ensure sustained water quality and quantity for the project. 	<ul style="list-style-type: none"> MWE 	Part of ESIA, RAP & SPP Consultant's work

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
Noise and Vibrations	<ul style="list-style-type: none"> Workers should be provided with the necessary personal protective equipment (PPE) such as ear muffs. 	• Contractor	Within contractor's bid budget
	<ul style="list-style-type: none"> Periodic medical hearing checks should be performed on workers exposed to high noise levels. 	• Contractor	
	<ul style="list-style-type: none"> Sites must be hoarded to curb noise impacts to neighbouring communities. 	• Contractor	
	<ul style="list-style-type: none"> Works should be undertaken during day time i.e. from 8am to 6pm. 	• Contractor	-
	<ul style="list-style-type: none"> Works near schools or health centres should be done in periods like weekends in order for noise and vibrations not to interfere with learning environment. 	• Contractor	-
	<ul style="list-style-type: none"> Weekly monitoring of noise levels at active sites should be carried out by the contractor. 	• Contractor	Within contractor's bid budget
Air Pollution	<ul style="list-style-type: none"> 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	-
	<ul style="list-style-type: none"> 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	Within contractor's bid budget
	<ul style="list-style-type: none"> Workers will be provided with PPE and the use of PPE shall be enforced. 	• Contractor	
	<ul style="list-style-type: none"> 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	
	<ul style="list-style-type: none"> Stockpiles of friable material will be grassed in order to prevent wind erosion. 	• Contractor	-
	<ul style="list-style-type: none"> A maintenance programme for equipment and vehicles will be implemented, to ensure air emissions like particulates, SO2 and NO2 are minimised. 	• Contractor	Within contractor's bid budget
	<ul style="list-style-type: none"> The Contractor shall develop and implement a traffic management plan to be approved by the supervision engineer 	• Contractor	11,000,000

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
Reduced Traffic Safety	<ul style="list-style-type: none"> All road closures shall be separately notified and agreed with the subcounty administration. 	<ul style="list-style-type: none"> Contractor/ Subcounty Council 	-
	<ul style="list-style-type: none"> Vehicular access to and from hospitals, police stations, and other public institutions shall be maintained through the use of steel road plates over open trenches. Pedestrian access to schools, health facilities, and other premises frequently accessed by the public will be maintained with the use of walking boards. 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> To minimize interference with traffic, half of the road shall be closed to enable vehicles use one half as the other half is being excavated and installed with pipe work. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Road safety and site safety training should be done involving construction workers, police and local community. 	<ul style="list-style-type: none"> Contractor/ Police/ LC 	-
	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> All drivers to be employed by the Contractor shall be qualified, skilled with valid driving permits. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> The vehicle speed shall be limited to a maximum of 30km/hr areas near sensitive facilities. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Works near sensitive facilities like schools and health centres shall only be limited to day time (7am to 6pm). 	<ul style="list-style-type: none"> Contractor 	-
Risk of misinformation due to	<ul style="list-style-type: none"> Prepare a comprehensive Stakeholder Engagement Plan (SEP); 	<ul style="list-style-type: none"> Contractor 	5,000,000
	<ul style="list-style-type: none"> Community liaison activities; 	<ul style="list-style-type: none"> MWE 	20,000,000

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
failure to engage stakeholders	<ul style="list-style-type: none"> Undertake radio talk shows to communicate progress of the project to local stakeholders. 	<ul style="list-style-type: none"> MWE 	3,000,000
Conflicts due to influx of immigrant labour	<ul style="list-style-type: none"> The contractor will be required to develop a Labour Influx Management Plan and/or a Workers' Camp Management Plan. 	<ul style="list-style-type: none"> Contractor 	7,000,000
	<ul style="list-style-type: none"> contractors shall be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc.) to implement during project execution. 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> Create awareness local communities prior to start of construction works. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Efforts to be geared toward instilling attitudes of tolerance, support and understanding of labour immigrants by the local communities 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Sensitize workers on proper social behaviour and conduct with regard to community systems and the acceptable societal norms; 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Put in place a grievance redress committee or a Public Complaints Desk to receive any complaints about the construction activities; 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Implement a strict employment code of conduct. 	<ul style="list-style-type: none"> Contractor 	-
Risk of violence against children (VAC)	<ul style="list-style-type: none"> Develop a strict employment code of conduct to protect the girl child. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Sensitize employees on dangers of molestation of children, especially the girl child. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Sensitize the Contractor against child labour and implement the child labour act; 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Demand birth certificate or any identify that clearly shows the age of a job applicant; 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Issue each worker with an applicant letter with well spelt out terms of engagement. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Monitoring school attendance 	<ul style="list-style-type: none"> Contractor/ DLG 	-
	<ul style="list-style-type: none"> Sensitization in schools 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Reporting mechanisms in place such as a whistleblowing system. 	<ul style="list-style-type: none"> Contractor 	-

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
Risk of Sexual and Gender Based Violence (SGBV) - e.g. physical assault, Sexual abuse, and sexual harassment	<ul style="list-style-type: none"> The Contractor should have a sexual harassment policy and mainstream it to ensure strict adherence to established mechanisms to avoid the emergence of these challenges; 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> MWE should ensure that social safeguards personnel are recruited as part of the project implementation personnel to supervise contractors and to continuously engage communities; 	<ul style="list-style-type: none"> MWE 	-
	<ul style="list-style-type: none"> Put SGBV reporting mechanisms in place; 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Community sensitization among men and women. 	<ul style="list-style-type: none"> Contractor 	-
HIV/AIDS risks	<ul style="list-style-type: none"> Sensitize workers on proper social behaviour and conduct with regard to community norms, HIV/AIDS and other sexually transmitted diseases. HIV/AIDS policies should be developed at the workplace. Free HIV/AIDS testing, counselling and condom distribution be encouraged for both workers, sex workers and local community. The pathways for transmission of HIV/AIDS and STIs are well known, foreseeable and can be mitigated. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Social bonds are not readily controlled, and the permanence of HIV/AIDS transmission makes this particular impact of social bonding both negative and also positive. Social bonds leading to lasting marriages and children occur in such situations; early pregnancies and sexual exploitation can also occur. It is therefore important to tackle the issue of social bonding with firmness and fairness, forbidding powerful relationships, which lead to exploitation of mostly women and children, while encouraging relationships that may lead to permanent situations. 	<ul style="list-style-type: none"> Contractor/ DLG 	-
Risk of Contracting and Spreading COVID-19	<ul style="list-style-type: none"> Sensitize all project employees about the signs and symptoms of COVID-19 as well as the ways to control its spread. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Screen local employees/contractors for COVID-19 during recruitment. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Screen all visitors to construction sites using a temperature gun and enforce washing of hands before entry and wearing of approved masks. 	<ul style="list-style-type: none"> Contractor 	-

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • 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). 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Contractor 	-
	<ul style="list-style-type: none"> • Continuously sensitize the workers and pass on any new guidelines by Government and the WHO. 	<ul style="list-style-type: none"> • Contractor 	-
Risk of not engaging stakeholders in project monitoring	<ul style="list-style-type: none"> • Bring onboard the relevant stakeholders including Kiryandongo DLG to participate in routine project monitoring. 	<ul style="list-style-type: none"> • MWE 	-

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
Decommissioning of auxiliary facilities	• Demolish all auxiliary facilities	• Contractor	-
	• Remove all obsolete equipment, vehicles, trucks and machinery shall be removed from sites	• Contractor	-
	• Backfilling all openings with overburden soil	• Contractor	-
	• Planting fast-growing trees and grasses to stabilize the excavated areas	• Contractor	-
	• Fencing off the re-vegetated areas is recommended until the reinstated vegetation has reached maturity	• Contractor	-
	• Clean-up of the site and safe disposal of any construction waste.	• Contractor	-
NEGATIVE IMPACTS AND RISKS – OPERATION PHASE			
Depletion of Groundwater Resources	• The water levels should continuously be monitored to ascertain any impact on the water level.	• NUWS	-
	• Water levels should be accompanied by monitoring of the water quality to ascertain any trend in water quality change with continued abstraction.	• NUWS	Per NUWS' operation budget
	• The developer should apply /acquire the abstraction permits which will facilitate adherence to agreed rates of abstraction on one side and also guide the DWRM while issuing abstraction permits in the vicinity, to other competing users	• MWE	450,000
Solid Waste Generation	• A Waste management plan for the operation phase of the project will be developed and implemented.	• NUWS	-
	• Waste collection bins will be provided at strategic positions at the water	• NUWS	Per NUWS' operation budget
	• offices, water source sites and reservoirs sites for temporary waste storage. The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes	• NUWS	Per NUWS' operation budget
	• The water supply system operator will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA	• NUWS	Per NUWS' operation budget

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
Risk of Pollution from mismanagement of sanitation facilities	<ul style="list-style-type: none"> A Periodic maintenance regime including emptying and desludging will be put in place and implemented to prevent sewage over flows 	<ul style="list-style-type: none"> NUWS 	Per NUWS' operation budget
	<ul style="list-style-type: none"> Use of manifest system to ensure that the wastes are disposed off at a site (waste treatment plant) gazetted by NEMA 	<ul style="list-style-type: none"> NUWS 	-
	<ul style="list-style-type: none"> 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 causes a danger to the community 	<ul style="list-style-type: none"> NUWS 	-
Loss of livelihood for water vendors	<ul style="list-style-type: none"> Provide paid employment to water vendors who will lose their livelihood 	<ul style="list-style-type: none"> NUWS 	Per NUWS' operation budget
NEGATIVE IMPACTS AND RISKS – PHASE CROSSCUTTING			
Occupational Health and Safety Risks	<ul style="list-style-type: none"> The Contractor shall prepare and implement an occupational safety and health plan for all sites, approved by the developer. 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> The Contractor shall provide safety guidelines to all operations prior to start of work. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> 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. To ensure occupational health and safety on construction sites, the Contractor shall be obliged to comply with all applicable Ugandan construction Health and Safety Standards as required by the Occupational Safety and Health Act of 2006. These include provisions of the Factories Act, Labour Unions Act and Workman's Compensation Act. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Training will be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences. All must fully be aware and mentally prepared for potential emergency. 	<ul style="list-style-type: none"> Contractor 	-

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
	<ul style="list-style-type: none"> Regular drills will be constantly 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. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Personnel on duty shall at all times wear appropriate PPE, such as safety glasses with side shields, face shields, hard hats/helmets, and safety boots be required for all site staff. 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> The Contractor shall establish emergency entrances, exits and amenities. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> The Contractor shall ensure access to first aid kits. 	<ul style="list-style-type: none"> Contractor 	3,000,000
	<ul style="list-style-type: none"> The Contractor shall ensure safe working heights through provision of work platforms, scaffolds and adequate supervision by ensuring regular inspection of formwork, false work and temporary supports before loading or pouring concrete. 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> The Contractor shall secure site boundaries with fences or hoardings as appropriate. 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Contractor 	Within contractor's bid budget
	<ul style="list-style-type: none"> The Developer through the Construction Supervisor will continually monitor Contractors' compliance with Health and Safety measures. 	<ul style="list-style-type: none"> MWE 	Within supervision consultant's bid budget
	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Contractor 	-
	<ul style="list-style-type: none"> Work force shall be subjected only to standard work shifts/hours. Overtime allowances, if applicable/warranted shall be paid with ceiling limits. Working 	<ul style="list-style-type: none"> Contractor 	-

Impact/Risk	Mitigation /Enhancement commitments	Responsibility	Estimated Cost (UGX) & Remarks
	beyond such ceiling limits shall be discouraged, even if, so desired workforce or contractor.		

9.4 ENVIRONMENTAL AND SOCIAL MONITORING PROGRAMME

9.4.1 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. The Ministry has established a monitoring mechanism for supervision, monitoring and enforcement of E&S requirements. The mechanism includes the MWE teams (including the PST), the supervising consultants and contractors. Furthermore, the Ministry will procure a dedicated consultant for undertaking stakeholder engagement activities and formation, training and tooling of GRMs as well as other E&S Risk management activities and the ministry has allocated separate budget for this consultancy.

9.4.2 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.

9.4.3 MONITORING ACTIVITIES AND PROCESSES

9.4.3.1 WEATHER FORECASTS

Weather monitoring and forecast is important to ensure that the Contractor plans for activities and provides mitigation where weather especially rainfall may pose challenges. This will be critical during excavation works.

9.4.3.2 SITE INSPECTION

Routine inspections will be carried out to cover all aspects of environmental and social management on the site. Daily inspection aims to identify any environmental issues and rectify them without delay whereas weekly, monthly and quarterly inspections will verify that the daily inspections are identifying any maintenance requirements and that these requirements are being completed in an appropriate time frame. Site inspections will be carried out by the Contractor with instructions from the Supervision Consultant.

9.4.3.3 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.

9.4.3.4 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”.

9.4.3.5 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 protection and GBV (SEA & SH) prevention 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.

9.4.3.5.1 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.

9.4.3.5.2 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
<p>The project will track and report severe GBV/SEA-SH incidents, breaches and allegations, by clearly establishing the following:</p> <ul style="list-style-type: none"> • 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)
<p>The GBV Service Provider (contracted to project) shall ensure continuous monthly reporting is done on following:</p> <ul style="list-style-type: none"> • 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
<p>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:</p> <ul style="list-style-type: none"> • 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) 	Contractor	MWE	Monthly / Quarterly

<ul style="list-style-type: none"> • Community awareness meetings done on GBV/SEA-SH prevention and response / reporting and community feedback (minutes of the community meetings can also be shared) • Performance of GRM- how correctly for receiving and resolving complaints; GRM indicators • 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 perpetrator
- Producing a comprehensive report to enable duty bearers assess and take appropriate actions
- Submitting the report to Duty Bearers like Uganda Police, State Attorneys and Courts
- Follow up of GBV Cases and victims to ensure appropriate services are accessed by the Victim

9.4.4 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.

9.4.5 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.

9.4.6 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.

9.4.7 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.

9.4.8 OPERATION PHASE MONITORING

9.4.8.1 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.

9.4.8.2 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 9-3**) are as follows:

Table 9-3: 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

Characteristic	Unit	US-201: 2008 Requirement	WHO 2011 Requirement
Chromium (as Cr 6+)	mg/l	0.05	0.05
Fluoride (as Fl)	mg/l	1.0	1.5
Iron (as Fe)	mg/l	<0.30	No Guideline
Manganese (as Mn)	mg/l	0.1	0.1
Nitrates (as 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 ₆ H ₅ OH)	mg/l	0.001	No Guideline
Mercury (as Hg)	mg/l	0.001	0.001
Cyanide	mg/l	0.01	0.07
Poly nuclear aromatic substances	mg/l	nil	No Guideline
Residual free chlorine	mg/l	0.2	0.2
Mineral oil	mg/l	0.01	No Guideline
Anionic detergents	mg/l	0.2	No Guideline
Pesticides		Trace	Trace
Carbon chloroform 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 9-4** below:

Table 9-4: 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).

9.4.8.3 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.

Table 9-5: Environmental and Social Monitoring Plan

Environmental and Social Aspect	Indicators	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
Positive Impacts – Construction Phase								
Employment opportunity	Percentage of local construction labourers	Quarterly	Project site	Percentage of local people employed in the project	Employment Records, inquiries and observation	50% local construction labourers (men) 30% Women	MWE, LC-1 Contractor	Proj. Sup. Contract
Negative Impacts - Pre-construction Phase								
Air Quality	Dust (PM ₁₀)	Once before commencement	Project site	ppm	<i>Micro-dust Pro</i>	National Stds	MWE/ ESIA Consultant	ESIA Contract
Noise Baseline	Noise level	Once before commencement	Project site	dba	<i>Noise Level Meter</i>	National Stds	MWE/ ESIA Consultant	ESIA Contract
Water Quality	Turbidity, TSS, Oil, PH	Once before commencement	Project site/ wetland	ppm	<i>Mobile Lab</i>	National Stds	MWE/ ESIA Consultant	ESIA Contract
Land acquisition/ displacement of land uses	PAPs	Before commencement & continuous throughout implementation	BH areas & along TL	No. of PAPs Compensated	<i>RAP Implementation Report/ Grievance Log</i>	100% compensation	MWE/ RAP Consultant	Proj. Sup. RAP Budget

Environmental and Social Aspect	Indicators	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
				Land consent agreements				
Negative Impacts - 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	<i>RAP Implementation Report/ Grievance Log</i>	100% compensation	MWE/ RAP Consultant	Proj. Sup. RAP Budget
Land use/ cover change	Area cleared; Species type	Monthly	Along the TL and DL	Ha No. species	<i>Progress Reports</i>	Restricted to TL & DL Restored	MWE Contractor	12,000,000 Contract
Wetland Pollution	Siltation Turbidity	Once per month (daily inspection to be made to detect and remedy soil deposition)	Wetland	TSS	<i>Sample & lab test</i>	Ntl Stds Baseline	MWE Consultant	12,000,000 Contract

Environmental and Social Aspect	Indicators	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
		during works in wetland area).					Contractor	Contract
Waste Management	Amount of Solid waste generated	Once a week	Project site	Kg for Solid waste, Litres for Liquid waste	Observations and Measurements	0 Legal disposal	MWE DLG Contractor	4,000,000 MWE Budget Contract
Water Quality	All	Monthly	BHs, Wetland	All	Lab. Analysis	Ntl Stds	MWE Contractor	40,000,000 Contract
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 8,000,000
Noise pollution	Noise level	Once a week	Project site	dBA	Noise Level Meter	Ntl Stds		8,000,000

Environmental and Social Aspect	Indicators	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)	
Safety and health risks	Health and sanitation facilities in site.	Daily by contractor, weekly by Consultant and Quarterly by MWE.	Project site	Number of safety measures provided	Incidents/Acc. Log, injuries and inspection	0	MWE Consultant Contractor	12,000,000	
	Documentation of instructions			Check for documentation					Contract
	Record of PPE provided and staff; use of PPE on site			Site inspection					Contract
	Supervision record			Check procedures and interview workers whether they are aware about the procedures					
	Presence of signage								
	Records of workers' orientation								

Environmental and Social Aspect	Indicators	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
				Review of records of training				
GBV Cases	Nature of GBV Case	Daily by contractor, weekly by Consultant and Quarterly by MWE.	Project site	No. Reported Cases	Grievance Log Police Case Files	0	MWE Consultant Contractor	36,000,000 Contract Contract
Negative Impacts - Operation stage								
Water Quality & Quantity	All	Monthly At least once in 3 years	BHs	All	Lab. Analysis Hydrogeological analysis	Ntl Stds	MWE	40,000,000
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
Total monitoring costs								178,000,000

Environmental and Social Aspect	Indicators	Monitoring frequency	Sampling Area	Measurement Units	Method	Target level/ Standard	Responsibility	Annual costs estimate (UGX)
								(Equivalent to 48,108 USD)

9.4.9 ROLES AND RESPONSIBILITIES IN THE ESMP IMPLEMENTATION

Ministry of Water and Environment will coordinate with NEMA on ensuring that environmental and social issues are addressed effectively throughout the lifecycle of the Project. Implementation of the different environmental issues is done through the relevant government institutions (Lead Agencies) within whose mandate the respective issues lie. Implementation of the ESMP will involve multiple institutions at all levels as detailed out below in **Table 9-6**.

Table 9-6: Institutions involved in safeguards management of the project

Institution	Mandate/ Responsibilities
Ministry of Water and Environment (MWE)	MWE will be responsible for the implementation of the Project through contractors, Supervising Engineers, and consultants for Stakeholders Engagement, Environment and social risk managements. MWE will be responsible for contract management and will ensure that the contactors adhere to their contractual obligations and that they are compliant with the environmental and social standards as spelt out in their contracts. However, to augment the capacity of the Project Coordination Team, it is proposed some short-term technical assistance to back this capacity be provided for in the project.
National Environment Management Authority (NEMA)	NEMA will review and if acceptable approve this environment and social impact assessment as well as undertake compliance monitoring as per the National Environment Act 2019 Section 9 and to approve external environmental compliance audits as per the Environmental Audit Regulations (2020) section 19.
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.
Department of Museums and Monuments, Ministry of Tourism, Wildlife and Antiquities	This will provide support in preserving the physical cultural resources within the project area and managing any chance finds encountered.
OSH Department, Ministry of Gender, Labour and Social Development	The OHS Department will undertake registration of the construction site as well as participate in periodic supervision visits to assess and monitor management of occupational health and safety issues. The Department will also undertake checks on all equipment used by the contractor.
Kiryandongo District Local Government	Kiryandongo district environment and natural resource committee will be involved in periodic monitoring of the project both during construction and operational phases. Kiryandongo District Local Government including Bweyale Town Council and Kiryandongo sub county will be vital in implementation of the project in terms of mobilizing political goodwill and sensitizing communities about the project as well as the District Environment Officer (DEO) and District Community Development Officer (DCDO) who will participate the review of environmental and social impact assessment reports, environmental audit reports and other reports to be submitted to NEMA on a regular basis as provided for under Section 30 of the National Environment Act 2019. The DEO and DCDO will monitor environmental and social aspects of the project at district level to ensure mitigation measures are adequately implemented. It is highly

	<p>recommended that the DEO and DCDO attend the monthly site meetings for the project and be able to point out issues of concerns. Other duties will include:</p> <ul style="list-style-type: none"> • Support project as necessary as possible including community mobilisation and sensitization • Advise on compliance to law, policy & strategies (e.g. labour, women & child rights, environment, etc) • Participate in grievance redress • Prioritize and allocate funds to supplement source protection • Participate in demarcations of buffer zone • Seek support for preservation of cultural sites for tourism (Council Resolution) • Address political issues e.g. interferences (esp. District Council, RDC, Police, etc)
<p>The Local Council Leaders</p>	<p>The local council leaders in the project area will have a role on matters of helping the contractors settle in the project area and to support identification of raw materials sources. They will be key in aspects of labour identification and endorsements as well as safeguarding the cultural sites. The local leaders will support law enforcement agencies in curbing crime during project implementation.</p>

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.

9.4.9.1 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).

9.4.9.2 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.

9.4.9.3 STAFFING REQUIREMENTS

The following personnel are proposed for each ESMP implementing stakeholder: -

Table 9-7: Personnel required to implement and monitor the ESMP

Stakeholder	Personnel required
Ministry of Water and Environment (Project Coordination Unit)	Project Support Team (PST) Specialists 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.

10 CONCLUSIONS AND KEY RECOMMENDATIONS

This Environmental and Social Impact Assessment evaluated the environmental and social impacts associated with the proposed water supply system and sanitation facilities in Gaspa RGC, Kiryandongo District. The proposed project will improve the capacity to deliver effective Water, Sanitation and Hygiene services to the communities of Kiryandongo sub county, Kiryandongo Refugee Settlement and Bweyale Town Council. The no project scenario would see continuation of the hardships faced by residents of Gaspa RCG who are in severe need of clean and safe water, and existing sources are not enough to serve the increasing population and, in some cases, not protected. The benefits to the local economy will be in addition to reduced morbidity, increased enrolment of children in educational institutions, increased productivity of households and reduced incidences of domestic violence. The positive outcomes of implementing the project will infer positive change to the climate change, gender, health and educational vulnerabilities associated to water supply in the area.

The key negative impacts that will arise during the construction phase include influx of immigrants, labour land acquisition that will trigger displacement of livelihood activities and road crossings. Compensation and community health and safety are the key fears raised by the communities. Land acquisition and resettlement impacts and risks are expected to be managed through preparation and implementation of a Resettlement Action Plan. The transmission and distribution lines are expected to mainly utilize the road reserves which will significantly minimize resettlement risks. Road crossings of the transmission line especially within Gaspa trading centre are expected to pose traffic safety risks but implementation of a robust Traffic Management Plan will address such impacts. The ESMP emphasizes the need to immediately restore excavated/ disturbed areas as soon as the pipes have been laid. In general, all potential major impacts can be effectively mitigated..

The project is an intervention of the Central government (MWE) with support from the World Bank that will require collective action from stakeholders such as the Local government and regional actors in the WASH sector for its effective implementation. The critical aspect is meaningful stakeholder mobilization and engagement as well as recruitment of an experienced team to manage the safeguards risks. MWE will spear head the supervision of the construction contractor and the operator to ensure negative impacts from the project are minimised. This should entail among others, undertaking of annual audits following provisions of the ESMP to ensure continuous improvement of the project's processes and products. MWE should use its vast experience in implementing similar water supply projects to effectively manage these potential risks.

Key Recommendations from this assessment for enhancement of the project include:

- The distribution line should be extended to provide water supply to the areas hosting the water sources. This is aimed at promoting social equity and sustainability of the project;
- The Contractor should develop and implement a Contractor ESMP for the project's construction phase, encompassing the auxiliary footprint;
- Construction material for the project should be sourced from legally authorised sites;

- Extension of the hydroelectric power lines at the water source sites should strictly follow the access route alignment to ensure that the set-out land requirements suffice; and
- During the operation phase, the recommended number of pumping hours and abstraction rates should be maintained in order not to compromise the existing ground water sources.

REFERENCES

- Beentje, H., Adamson, J., and Bhanderi, D. 1994. Kenya Trees, Shrubs, and Lianas. National Museums of Kenya, Nairobi, Kenya.
- Bibby, CJ, Burgess, ND, Hill, DA and Mustoe, S. H. 2000. Bird census techniques. Academic Press, London.
- BirdLife International. 2016. *Terathopius ecaudatus*. The IUCN red list of threatened species [Internet]. Version 2018-1; e.T22695289A93501191 [species assessed 2016 Oct 01; page accessed 2018 Aug 21].<http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22695289A93501191.en>
- 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.
- Busena Ajoba, 2020; Intertribal tension in Kiryandongo Refugee Settlement; How do we avoid tribalism in our communities? 2020 Africa <https://globalhistorydialogues.org/projects/intertribal-tension-in-kiryandongo-refugee-settlement/>
- CITES Appendix II of the IUCN Red Category, 2019.
- Child Poverty and Deprivation in Refugee-Hosting Areas Evidence from Uganda <https://www.poverty.ac.uk/sites/default/files/attachments/ChildPoverty-and-Deprivation-in-Refugee-Hosting-Areas-Uganda.pdf>
- 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.
- DeVries, P.J., Murray, D., Lande, R. 1997. Species diversity in vertical, horizontal, and temporal dimensions of a fruit-feeding butterflies from two Ecuadorian rainforests. Biological Journal of the Linnean Society 62, 343-364.
- 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.

Ferguson-Lees J, Christie D. 2001. *Raptors of the world*. Boston (MA): Houghton Mifflin. 992 p.

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.

Howard P. C., Davenport, T. R. B. and Baltzer, M, (Eds). 1996. *Forest Biodiversity Reports*, vol. 1–33, Forest Department, Kampala, Uganda.

<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*.

Khan, M. S. 1990. The impact of human activities on the Status and distribution of amphibians in Pakistan. *Hamadryad*. 15: 21-24.

Kingdon, J. (1971-74). *East African Mammals: An Atlas of Evolution*, Vols. I, IIA and IIIB. Academic Press, London.

Kingdon, J., Happold, D., Butynski, T., Hoffmann, M., Happold, M. & Kalina, J. (eds). 2013. *Mammals of Africa (6 vols)*. London: Bloomsbury Publishing.

Kingdon., J. 2015. *The Kingdon Field Guide to African Mammals*. Second edition. Bloomsbury Publishing Plc.

Kiryandongo District Multi-hazard, Risk and Vulnerability Profile 2016

Kiryandongo District Development Plan, 2015-2020; <https://kiryandongo.go.ug/sites/default/files/2ND%20FIVE%20YEAR%20DISTRICT%20%20DEVELOPMENT%20PLAN%20%20FOR%20THE%20FY%202015.2016-2019.2020-KIRYANDONGO%20DLG-min%20%281%29.pdf>

- Larsen, B. 1991. *The Butterflies of Kenya and Their Natural History*, Oxford University Press, Oxford, UK.
- MWE. 2013. *Water Supply Design Manual Second Edition*. Ministry of Water and Environment, Government of Uganda. Kampala, Uganda.
- MWE. 2018a. *Environmental and Social Management Framework for the Integrated Water Management and Development Project*. Ministry of Water and Environment, Government of Uganda. Kampala, Uganda.
- MWE. 2018b. *Resettlement Policy Framework for the Integrated Water Management and Development Project*. Ministry of Water and Environment, Government of Uganda. Kampala, Uganda.
- MWE. 2021. *Grievance Management Guidelines for the Integrated Water Management and Development Project*. Ministry of Water and Environment, Government of Uganda. Kampala, Uganda.
- MWE. 2022. *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.
- Pellet J .2007. Seasonal variation in detectability of butterflies surveyed with Pollard walks. *J Insect Conserv* 1: 01-08
- Pollard, E. 1977. A method for assessing changes in the abundance of butterflies. *Biol. Conserv.* 12:115-124.
- Rödel, M. O. .2000. *Herpetofauna of West Africa, Vol. I. Amphibians of the West African Savanna*. Edition Chimaira, Frankfurt, Germany.
- SARI Consulting Ltd & SGAPI. 2021. *Consultancy services for Feasibility Study, Detailed Engineering Design and Construction Supervision of Solar Powered Piped Water Supply Systems and Sanitation Facilities in Refugee Settlements and Host Districts in West Nile and Northern Uganda in Kiryandongo District: Final Feasibility and Preliminary Design Report for Proposed Gaspa RGC*. Ministry of Water and Environment, Government of Uganda. Kampala Uganda.
- 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.
- Spieler, M. and Linsenmair, K.E. 1997. Choice of optimal oviposition site by *Hoplobatrachus occipitalis* (Anura: Ranidae) in an unpredictable and patchy environment. *Oecologia* 109:184–199.
- 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>

UNBS. 2003. Seismic code of practice for Structural designs, First Edition. Uganda National Bureau of Standards. Kampala, Uganda.

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>

World Conservation Society. 2016. Uganda national redlist. www.nationalredlist.org/nationally-threatened-species-for-uganda-2016.

ANNEX 1: NEMA APPROVAL OF TOR



NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

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E-mail: info@nemaug.org

Website: www.nemaug.org

NEMA/4.5

17th January, 2022

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

RE: REVIEW OF TERMS OF REFERENCE AND SCOPING REPORT FOR UNDERTAKING AN ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED LARGE SOLAR POWERED PIPED WATER SUPPLY SYSTEMS AND SANITATION FACILITIES IN KIRYANDONGO DISTRICT - EIATOR 8140

This is in reference to the Terms of Reference (TORs) for the above-mentioned project which was submitted to this Authority for review and consideration for approval. The review has been finalized and formal **APPROVAL** granted to undertake the Environmental and Social Impact Assessment (ESIA).

Please note that the **approval of the TORs does not constitute permission to start implementing any of the proposed project activities** as this is not a certificate of approval.


- (i) The project involves three solar powered systems in Nyakabaale, Gaspa and Mutunda Rural Growth Centers. The ESIA should therefore detail each system and its components including the GPS coordinates for the infrastructure under each system clearly indicating the boundary and delineation of the different components, the coverage (spatial and administrative boundaries), and the layout of key infrastructure. The capacity of the reservoir and booster tanks should be included, and for linear components, the length should be clearly indicated.
- (ii) The water sources should be clearly detailed in terms of location, GPS coordinates and comprehensive hydrological studies and baseline analyses of water quality undertaken of the water sources and the catchment, to determine potential impacts of the project on the area hydrology and other baseline characteristics.

Assess cumulative impacts from the three systems on the area hydrology and incorporate key findings from such studies in the report.

- (iii) Develop a comprehensive water source protection plan that shall be implemented to ensure that the water sources are protected during both construction and operation of the project. Append the plan to the ESIA report.
- (iv) Taking into account the Standard Operating Procedures (SOPs) in respect of the COVID-19 pandemic, undertake comprehensive consultations with all relevant stakeholders, especially the local communities (both host and refugee communities in the rural growth centres of Nyakabaale, Gaspa, Mutunda, and the Kiryandongo District Local Government Authorities, Ministry of Gender Labour and Social Development, including persons potentially affected by the project in the respective rural growth centres. The views/concerns of stakeholders consulted should be well documented and appended in the ESIA report.
- (v) Append clear and legible, **authentic copies of land acquisition and ownership** documents.
- (vi) Indicate the actual project (investment) cost including **cost of works, machinery/equipment and land where applicable and a certificate of valuation issued by a qualified and certified valuer in accordance with schedule 5(3f)** of the National Environment (Environmental and Social Assessment) regulations, S.I 143/ 2020, all attached to the ESIA report.
- (vii) In accordance to regulation 49 (2) of the National Environment (Environmental and Social Assessment) regulations, S.I 43/ 2020 you will be required to pay a non-refundable administration fee of thirty percent (30%) of the total fees payable on submission of the Environmental and Social Impact Statement to the Authority.

This is therefore, to recommend that you proceed with carrying out the ESIA for the proposed Large Solar Powered Piped Water Supply Systems and Sanitation Facilities in Kiryandongo District.

Looking forward to your cooperation and the receipt of a comprehensive ESIA report, for further action and consideration.

 17/1/2022
Patience Nsereko
FOR: EXECUTIVE DIRECTOR

ANNEX 2: WATER SUPPLY DESIGN PARAMETERS

Borehole Pumping Mains

Borehole Number	Gaspa WSS	
	DWD 77380	DWD 77381
Borehole Yield (m³/hr)	37.0	85.7
Abstracted Yield (m³/hr)	30.0	50.0
Hours of Pumping (hr)	14	10
Total Daily Delivery (m ³ /day)	420	500
Pumping Main Section No. 01 (From Pump Installation Point to Ground Level at Borehole)		
Ground Level at Borehole (m AMSL)	1057.555	1059.555
Pump Installation Depth in Borehole (m BGL)	85.000	90.000
Static Lift (m)	85.000	90.000
Cwh	120	120
Pipe Details	DN 100 Steel Pipe PN10	DN 150 Steel Pipe PN10
Pipe Diameter ND (mm)	100.00	150.00
Pipe Diameter ND (m)	0.100	0.150
Flow in Pipe (m ³ /hr)	30.000	50.000
Flow in Pipe (m ³ /s)	0.008	0.014
Velocity (m/s)	1.06	0.79
Length of Pipe Section No. 01 (m)	85.00	90.00
Friction Loss (m)	1.34	0.51
Fittings losses - 10% (m)	0.13	0.05
Total Head in Section 01 (m)	86	91
Pumping Main Section No. 02 (From Ground Level at Borehole to Inlet level of Reservoir)		
Reservoir Tank inlet level (m AMSL)	1129.569	1129.569
Ground Level at Borehole (m AMSL)	1057.555	1059.555
Static Lift (m)	72.014	70.014
Cwh	140	140
Pipe Details	OD 160 uPVC PN10	OD 160 uPVC PN16
Pipe Diameter ND (mm)	144.60	136.20
Pipe Diameter ND (m)	0.145	0.136
Flow through pipe section 02 (m ³ /day)	30.000	50.000
Flow through pipe section 02 (m ³ /s)	0.008	0.014
Velocity (m/s)	0.51	0.95
Chainage at Borehole	0+000	0+000
Chainage at Reservoir	6+617	6+552
Length of Pipe Section No. 02 (m)	6,617.00	6,552.00
Friction Loss (m)	13.02	44.43
Fittings losses - 10% (m)	1.30	4.44
Total Head in Section 02 (m)	86	119
Total Head from Borehole to Reservoir (m)	173	209
Summary of the Design		
Capacity of pump in each borehole		
Head (m)	173	209
Flow (m ³ /hr)	30	50
Flow (l/s)	8	14
Efficiency (%)	60%	60%
Power (kVA)	28	57
Source: Project estimates		

Distribution Network Pipes

Distribution Network Pipe Details							
Pipe Number	Start Node	End Node	Length	Pipe Details	Diameter	Roughness	Velocity at Peak Flow
Pipe 1	Gaspa_Rsvr	N01	33	OD 160 uPVC PN10	144.6	140	0.55
Pipe 2	N01	N02	506	OD 160 uPVC PN10	144.6	140	0.49
Pipe 3	N02	N03	1,141	OD 160 uPVC PN10	144.6	140	0.49
Pipe 4	N03	N04	1,012	OD 160 uPVC PN10	144.6	140	0.49
Pipe 5	N04	N05	243	OD 160 uPVC PN10	144.6	140	0.48
Pipe 6	N05	N06	24	OD 110 uPVC PN10	99.4	140	0.81
Pipe 7	N06	N07	1,561	OD 90 HDPE PN10	79.2	140	0.5
Pipe 8	N07	N08	2,280	OD 90 HDPE PN10	79.2	140	0.28
Pipe 9	N08	N09	1,300	OD 90 HDPE PN10	79.2	140	0.18
Pipe 10	N09	N10	1,007	OD 50 HDPE PN10	44	140	0.59
Pipe 11	N10	N11	1,145	OD 63 HDPE PN10	55.4	140	0.36
Pipe 12	N11	N12	594	OD 50 HDPE PN10	44	140	0.25
Pipe 13	N12	N13	2,021	OD 63 HDPE PN10	55.4	140	0.67
Pipe 14	N13	N14	495	OD 50 HDPE PN10	44	140	0.36
Pipe 15	N14	N15	1,991	OD 63 HDPE PN10	55.4	140	0.45
Pipe 16	N15	N16	2,567	OD 63 HDPE PN10	55.4	140	0.65

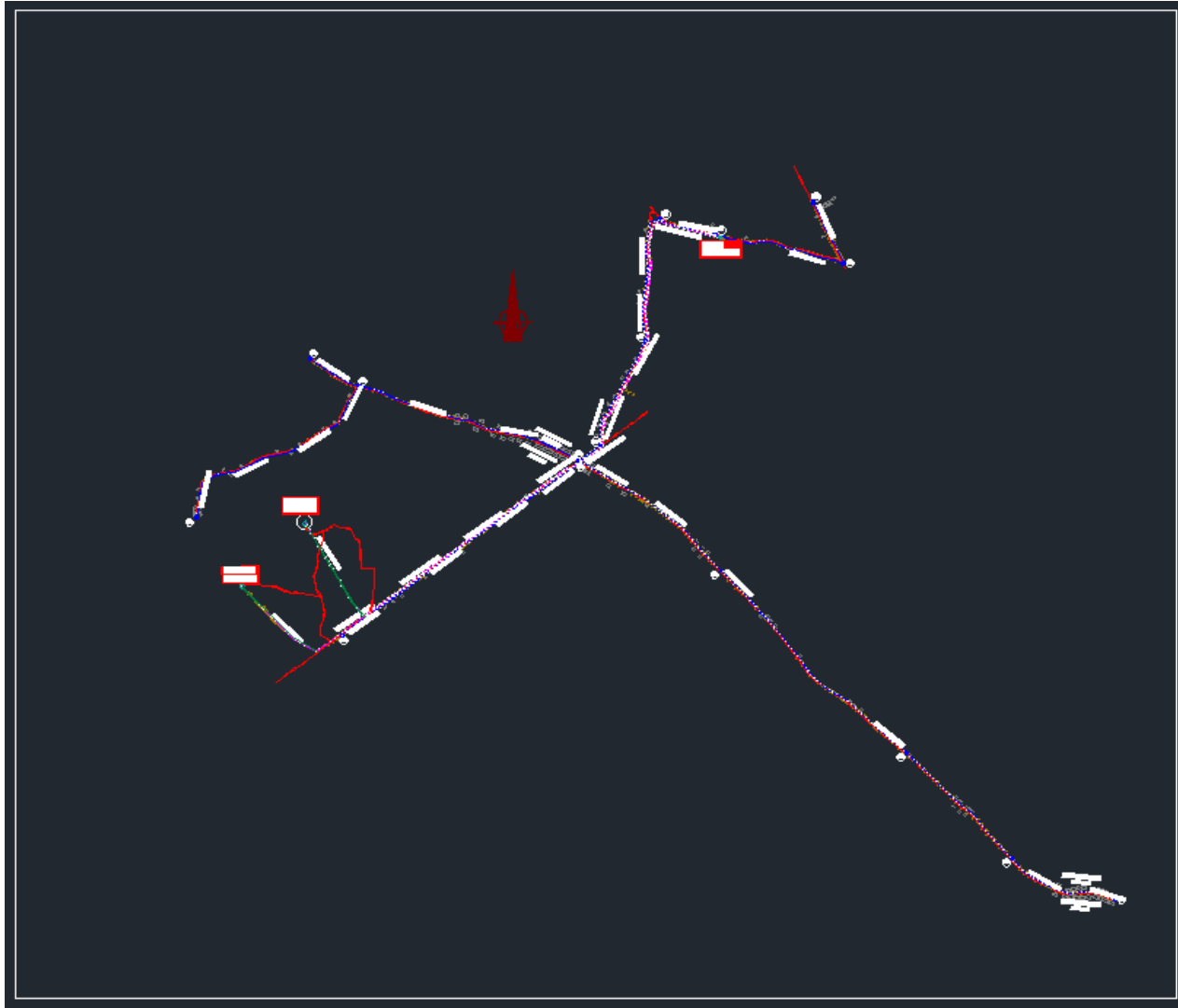
Source: Project Estimates

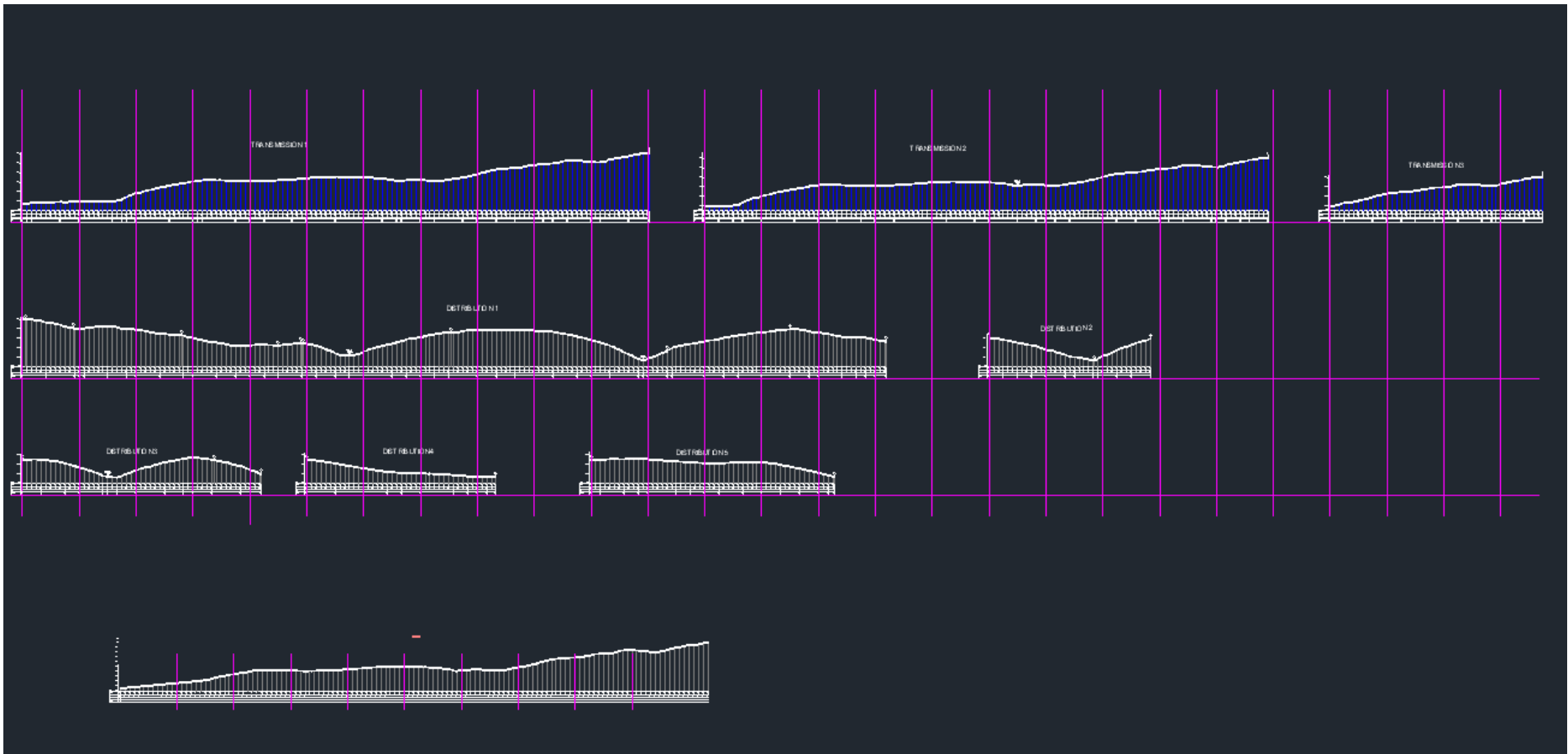
Distribution Network Nodes

Node ID	Elevation (m.a.s.l)	Base Demand (lps)	Off Peak Flows (Peak Factor=0.5)			Normal Peak Flows (Peak Factor=1.0)			Peak Flows (Peak Factor=2.0)		
			Demand (lps)	Hydraulic Gradient (m.a.s.l)	Residual Pressure (m)	Demand (lps)	Hydraulic Gradient (m.a.s.l)	Residual Pressure (m)	Demand (lps)	Hydraulic Gradient (m.a.s.l)	Residual Pressure (m)
Junc N01	1110.595	0	0	1125.9	15.31	0	1125.89	15.29	0	1125.83	15.24
Junc N02	1100.905	0	0	1125.83	24.93	0	1125.63	24.72	0	1124.89	23.99
Junc N03	1093.684	0	0	1125.67	31.98	0	1125.04	31.35	0	1122.76	29.08
Junc N04	1082.37	0.08	0.04	1125.52	43.15	0.08	1124.51	42.14	0.16	1120.88	38.51
Junc N05	1085.584	0	0	1125.49	39.91	0	1124.39	38.81	0	1120.44	34.85
Junc N06	1085.116	1.16	0.58	1125.48	40.36	1.16	1124.34	39.23	2.32	1120.26	35.14
Junc N07	1096.382	0.54	0.27	1125.02	28.64	0.54	1122.7	26.32	1.08	1114.34	17.96
Junc N08	1076.754	0.23	0.12	1124.8	48.04	0.23	1121.89	45.14	0.46	1111.41	34.65
Junc N09	1099.941	0	0	1124.74	24.8	0	1121.68	21.74	0	1110.63	10.69
Junc N10	1087.501	0.24	0.12	1125.63	38.13	0.24	1124.89	37.39	0.48	1122.24	34.74
Junc N11	1085.005	0	0	1123.92	38.91	0	1118.72	33.72	0	1099.96	14.96
Junc EP1	1087.045	0.45	0.23	1123.93	36.88	0.45	1118.75	31.71	0.9	1100.07	13.03
Junc EP2	1109.792	0.19	0.09	1125.53	15.74	0.19	1124.54	14.75	0.38	1120.98	11.19
Junc EP3	1070.377	0.27	0.14	1123.76	53.39	0.27	1118.16	47.79	0.54	1097.95	27.57
Junc EP4	1067.592	0.54	0.27	1123.19	55.6	0.54	1116.08	48.49	1.08	1090.44	22.85
Junc EP5	1067.074	0.78	0.39	1123.61	56.54	0.78	1117.62	50.55	1.56	1096	28.93
Resvr Gaspa_Rsvr	1125.909	#N/A	-2.24	1125.91	0	-4.48	1125.91	0	-8.96	1125.91	0

Source: Project Estimates

ANNEX 3: PROJECT LAYOUT DRAWINGS





ANNEX 4: STAKEHOLDER ENGAGEMENT RECORD

ANNEX 4A: Institutions



ATTENDANCE LIST

Project Name: IWMOP Kiryandongo WS/S ESIA, RAP and SPP

Location: Kiryandongo District, HQ Date: 21/10/21

No.	Name	Gender M/F	Designation	Contact	Email	Signature
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10.	Dacan Denis	M	PACAO	0182339114	dacandenis@yoh.co.ug	
11.						



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ATTENDANCE LIST

Project Name: Kiryandongo IWMOP ESIA, RAP, SPP HOSPITAL

Location: KIRYANDONGO POLICE STATION Date: 11/11/2021

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	APP WAZIYODA MORRIS	M	C.I -	0779471304	
	D/CPN OKURUT PAUL	M	CID ^{DANY ABOO PIPOST}	0772361779	
	D/C ARONO SAMUEL	M	C.I	0773749790	
	Drileba Semmy	M	Nursing officer	0784046802	
	Ayigi Josephine	F	DNO	0788013247	
	SRYEKA APOLLO	M	OPC	0782889093	
	MUBESHA CHARLES	M	PC	0777294269	
	OPW Godfrey	M	EN	0773468869	



ATTENDANCE LIST

Project Name: KIR-FANSONCO IWMOP ESIA, RAP, SPP

Location: ARNOLD PRIMARY SCHOOL Date: 12/11/2021

No.	Name	Gender M/F	Designation	Contact	Signature
01	OKIDI QUIRIMO	M	S.M.T	0775007707	
02	KOMAKELI JIMMY	M	A TEACHER	0777126467	
03	KUTESA SUSAN	F	A TEACHER	0771354233	

Name	Community	Sex	Watershed	Contact
1. Rukundo	Jane A.	F	Rwankunga	0780604260
2. Waman	Brago		Rwankunga	0787359450
3. Okwonyi	Willred F		Panyadolli	0784809507
4. Nabusiga	Christine F		Kinyomozzi	0788459459
5. AYESIGA	HARRETI F		NYAKINOMBE	0787188135
6. BIRUKU	VIOLFI F		KARUMBU	0776519999
7. Kamanyire	James		NYAKWENZI	0782009466
8. BIRUKU	Christine F		Kyabakura	0778257923
9. Apio	Brenda F		Panyadolli	0789346952
10. OUKWANYI	WALTER		PIANYADOLLI	
D. Achiro	ELIZABETH F		KINURA	0780626841
1. BIFERAMUNDA	FUSIUS		NYAKWENZI	0784000430 / 78635091
2. NAMALIJA	PROSSY F		KYABAKURA	0776807380
3. BIGABWA	EAGER		NYAKASANYI	0785408314
4. ABIEGEKA	JOSEPA		NAKINOMBE	0779078741
mwambu	JOEL		KINURA	0780626841
NAKASWADE	LEYA F		NYAKAKITHI	0773782056
ALIMBIWE	DAVID		NYAKAKINOMBE-KINYOMOZI	0777689723

ANNEX 4B: Community



ATTENDANCE LIST

Project Name: KIR-TANDONUGO IKM DP ESIA RAP SPP

Location: Doyo - Masore

Date: 21/10/2021

	Name	Gender M/F	Designation	Contact	Email	Signature
1.	SIMON JACK			0774091138		
2.	NDIKUBWAYO		EVARISTI	0781808766		
3.	NYABIYA		SIRASI			
4.	NYANDWI		DERIBE			
5.	TUMUSIME		EMANUUL			
6.	HAGUMA		FELISIAN	077879406		
7.	SASIRA HOZIEL	M	BUILDER	0771285782		
8.	ACHAZU HENRY	M				
9.	NAMANYA ALEX	M				
10.	MASIKA ABRAHAM	M		0781977170		



ATTENDANCE LIST

Project Name: Kiryandongo IKM DP ESIA RAP SPP

Location: Ndayo Village, Kibuka Parish, Kiryandongo S/C

Date: 22/10/2021

	Name	Gender M/F	Designation	Contact	Email	Signature
1.	WASKA SHEDRACK	M	CHAIRMAN YOUTH	0770784056		
2.	MASIKA ELIJAH	M	CHAIRMAN	07780502178		
3.	SAPARI ALEX	M	peasant	0782351694		
4.	KUSUMADAN	M	peasant	0783600890		
5.	NASIMITH MERCY	F	peasant	0778873390		Mercy
6.	MANGILAS HASEM	M	Peasant	0760314186		
7.	APIO GHASTIS	F	MURER	0785614083		
8.	GLADIA HAMUZA	F	peasant	-		
9.	ABOMATI NICKSON	M	peasant	-		Nickson
10.	NEOSHUT GUMARUZA	M	peasant	-		
11.	ABDUL JAFAR	M	peasant	-		
12.	SIKUKU BRIAN	M	peasant	-		
13.	BASHIR FATHO	M	peasant	0786644604		
14.	SEYONGA MUTAFA	M	peasant	-		
15.	IDIRLI SERI	M	peasant	-		

ATTENDANCE LIST

Project Name: Kiryandongo IWMDP ESIA RAP SPP

Location: Mirima, Gaspa, Kiryandongo

Date: 8/11/2021

No.	Name	Gender M/F	Designation	Contact	Signature
1	KARANI SEBASTIAN	M	LCI CHAIR	0774 220011	
2	BWATO RICHARD	M	MAYOR GASPA DC	0772 232593	
3	OMUSUGU KATHOFA	M	Mobiliser	0784111430	
4	OBONGO MORIS	M	Sec Mirima Village	0774184163	

ATTENDANCE LIST

Project Name: Kiryandongo IKM DP ESIA RAP SPP

Location: CAROMA PRIMARY SCHOOL

Date: 12/11/21

No.	Name	Gender M/F	Designation	Contact	Signature
1	APALI CHRISTINE	F	class teacher	0777993932	
	AUM JUDITH NIGITI	F	DOS	0784701252	
	OKUNGA BERNARD	M	ASS DOS		
	MUNGIERE WILSON	M	DPHT	0785394313	
	AFINANGO SARA ACAYO	F	CLASS TEACHER	0786220302	
	Head Teacher	F		0772863005	
	AKELLO JOYCE	F	TEACHER	0719172186	

ATTENDANCE LIST

Project Name: Kiryandongo IWM DP ESIA RAP SPP

Location: MIRIMA VILLAGE / GASPA

Date: 12/11/2021

No.	Name	Gender M/F	Designation	Contact	Signature
1	BWATO RICHARD	M	MAYOR GASPA DC	07722323	
2	OMUSUGU KOROFAS	M	Mobiliser	0784111430	
3	NZJA JOHN	M	Partner	0772991622	
4	MORIS obongo	M	Secretary LCI	0774184163	
5	SEBASTIANO KARANI	M	LCI CHAIRMAN	0774220011	
6	ASUMAN CHAMANDA	M	ENVIRONMENT	0772505564	
7	NADUNGA ROSEMARY	F	W. representative	0772418801	
8	WAHICAH FRANCIS		C/P	078343459	

KIRYANDONGO IWMMP, ESIA, RAP, SPP
ATTENDANCE LIST

Project Name: TECWA VILLAGE

Location:

Date: 12/11/2021

No.	Name	Gender M/F	Designation	Contact	Signature
1	CP OIM CHARLES	M	CP	07968115856	
2	Sec OKOT DAVID	M	SEC	0781185363	
3	Mob KOMA DAVID		Mob	0774499591	

ATTENDANCE LIST

Project Name: KIRYANDONGO IWMMP ESIA RAP SPP

Location: KITONGOZI VILLAGE

Date: 12/11/2021

No.	Name	Gender M/F	Designation	Contact	Signature
1	BENYONGA BONI	M	KITONGOZI	0786723874	
2	BASSIRIMA KENNETH	M	KITONGOZI	0774293829	
3	BITAJUNE PATRICK	M	KITONGOZI		
4	ISINGOMA JAMES	M	KITONGOZI		
5	BAIRA ROGAS	M	KITONGOZI		



ATTENDANCE LIST

Project Name: KIRYANDONGO IWMMP, ESIA, RAP, SPP

Location: TECWA HEALTH CENTRE II, KIRYANDONGO S/C

Date: 13th NOV 2021

No	Name	F/M	Designation	Contact/ Email	Signature
01	BYEGARAZO Jimmy (incharge)	M	ENROLLED EIA NURSE	0773898402	
02	ELIMASIA PRISCA	F	EIM (incharge)	0781003173	

ATTENDANCE LIST

Project Name: KIRIANDONGTO IKMAD, ESIA, RAP, SPP

Location: Grass Pad

Date: 22/10/2021

	Name	Gender M/F	Designation	Contact	Email	Signature
1.	CP KARANI SREASIMAKO M		CP LC1	0974220011		
2.	ODONED MOELIS	M	SEC	0974144163		
3.	SIMIYU DAVID	M	V/CP	0982-894421		
4.	KILEDFAS OMUSUQU	M	MOBILISER	0981414436		
5.	KITAMANTWA NSUMAN	M	HEALTH	0972007873		
6.	BWAYO RICHARD	M	TRATOR	0972-233593		
7.	AMAI DANIEL	M	TOUCH CP	0988219382		
8.	OTUNDU	M	SIC	0985984349		
9.	TADEO NAKACHA	M	VHS	0987050496		
10.	ROSE MARY NABUNGA	F	WOMEN COUNCILOR	0972418801		
11.	SUGUME WILSON	M	LC III KISIC	0978419955		
12.						

ATTENDANCE LIST

Project Name: KIRIANDONGTO IKMAD, ESIA, RAP, SPP

Location: Dango Village

Date: 21st 10/2021

	Name	Gender M/F	Designation	Contact	Email	Signature
1.	MAKIZA Anastazi	M	FARMER	077294639		
2.	JUMKESIGYE JOHN	M	FARMER			
3.	MUGERKA PAUL	M	FARMER	0782954588		
4.	DOMINICO MUKUNDA	M	FARMER			
5.	CHABO ALEX	M	FARMER			
6.						
7.						

ATTENDANCE LIST

Project Name: KIRIANDONGTO IKMAD, ESIA, RAP, SPP

Location: Dango Village -

Date: 21st 10/2021



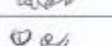
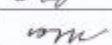
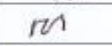

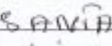
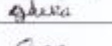

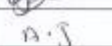
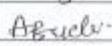


	Name	Gender M/F	Designation	Contact	Email	Signature
1.	MANGILAS HOSEA	M	FARMER	0760814186		
2.	NTUNGIRE NATHAN	M	FARMER	0778616036		
3.	o JARA DENISU		FARMER	-		
4.	ABDULL IHABIR		ENG	0789712398		
5.	MASIKA ABRAHAM	M	FARMER	0781977170		
6.						

ATTENDANCE LIST

Project Name: KIR-TANDONUGO IKIMAP, ESIA, RAP, SPP

Location: Dojo Village

Date: 21/10/2021

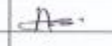

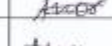

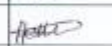
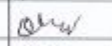
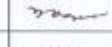
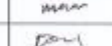

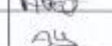
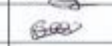




	Name	Gender M/F	Designation	Contact	Email	Signature
1.	ALOBO ROSE	F				
2.	AKELLO EVALWE	F	0775471622			
3.	APIO EVALWE	F				
4.	AWOD ESTHER	F				
5.	MURASA EVALIN	F				
6.	CHRISTINE OKWIGO	F				
7.	AKELLO SUSAN	F		0788593319	-	Susan
8.	ADOR SANTA	F				
9.	Awelo Gloria	F				
10.	SANTA OKOT	F	0788493435			
11.	OYELLA ROSELINE	F	0771339305			
12.	ACEY JUDITH	F				
13.	OWOR ABUDU	M		0782671975		
14.	OPIO ISMAEL	M				
15.	OPIO HENRY			0782887248		

ATTENDANCE LIST

Project Name: KIR-TANDONUGO IKIMAP, ESIA, RAP, SPP

Location: Dojo Village

Date: 21/10/2021


	Name	Gender M/F	Designation	Contact	Email	Signature
			WAMARE Group			
1.	APIYO MARTINA	F	Wamare B	0779841263		
2.	KIDAGA JANE	F		0774335972		
3.	AKOR SUSAN	F		078658635		
4.	LAKAREBER PROSSY	F		0784525779		
5.	AKKO DILISH	F		0		
6.	ACEN EVALINE	F		0782447965		
7.	AMWA EUNICE			0777490936		
8.	ACEY MAGURET	F		-		
9.	FATIMA ABUDLA	F		-		
10.	ADONG ESTHER	F		-		
11.	AWOR ROSELINE	F		0760632421		
12.	AYUGI JOYCE	F		-		
13.	ANGOM COLLWE	F		-		
14.	AKELLO SHARA	F		-		
15.	AKECH JUDISH	F				

ATTENDANCE LIST

Project Name: KIRHANDONGCO IWMDP, ESIA, RAP, SPP

Location: Agro Village

Date: 21/10/2021

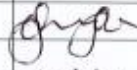
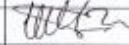
	Name	Gender M/F	Designation	Contact	Email	Signature
1.	OKUMU PATRICK	M				
2.	OKOT MATINE	M				
3.	SISIDIA OKOT	F		0779175082		
4.	AYANYA ISHA	F				
5.						
6.						

ATTENDANCE LIST

Project Name: KIRHANDONGCO IWMDP, ESIA, RAP, SPP

Location: Dayo kel Committee

Date: 21/10/2021

	Name	Gender M/F	Designation	Contact	Email	Signature
1.	OLIVIA NICHOLAS	M	LCI C/PERSON	0774842560		
2.	NJIARUKOSE CRACE	F	VIC/PERSON			
3.	ESSIA CALLEBI	M	GENERAL S			
4.	YUSUF WABIJO	M	PUBLICITY S	078713747		
5.	ALLU FRED	M	S/DEFENCE			
6.	WUJIBI SIMON	M	S/OLDERS			
7.	ACHAUO JASCA	F	S/WOMEN AFF			
8.	BOGERE ALEX	M	S/DISABILITY			
9.	ALINATWE MILTON	M	INFORMATION			
10.	MWATANA ELLIAS	M	FINANCE/S			
11.						

LIST OF HCI MEMBERS MIRIMA/TECWA
17th/11/2021

1- Karani Sabasitiano Cp 077 422011

2- Simigo David Ul Cp 0782-894421

3- ODONGO MORIS SEC 0774144163
0787055511-
~~07870555~~

4- Akello Rose Treasurer 0787055511

5- Kikofas Omusugu mobilizer 0781-414430

6- Environmental Kyamanywa Asuman 077-2007673

7- Watanga David Juma

8- Nadunga Rose Mary Women Councilor 0992-418801

9- Lazaro

10 VHT Nakacha Tades 07870-50470.

JBN
Solutions that last

ATTENDANCE LIST

Project Name: IWMDP - ESIA, RAP & SPP.

Location: TECWA - MIRIMA Date: 17/11/2021

No.	Name	Gender M/F	Designation	Contact	Signature
01	NAKACHI TADEO	M	VHT	0787050470 078	
02	KYAMANYWA ASUMANI	M	SEC. IV	0772007673	
04	OMUSUGU KIKOFAS	M	Mobilizer	0781414430	
5	AKELLO ROSE	F	Treasurer	078055511	
6	KITESI MAGNET	F	Member	-	
7	ODONGO MORIS	M	SECRETARY	0774144163	

ATTENDANCE LIST

Project Name: IWM DP

Location: Kalwala LCI Committee

Date: 17/11/2021

No.	Name	Gender M/F	Designation	Contact	Email	Signature
1.	IDINGI THOMAS	M	LCI KALWALA	0772375827		<i>[Signature]</i>
2.	OKAPESI JACKSON	M	SECRETARY	0772017854		<i>[Signature]</i>
3.	NYAMUSANA MARGRET	F	ENVIRONMENT	0782932827		<i>[Signature]</i>
4.	KACHAM ALICE	F	L.C.I. v/person	0774293590		<i>[Signature]</i>
5.	OBWALINGA ROBERT	M	L.C.I. Diffance	0783222099		<i>[Signature]</i>
6.			HTI Diffance	0783222099		
7.						

ATTENDANCE LIST

Project Name: IWM DP - ESIA RAP SPP

Location: Kalwala

Date: 17/11/2021

No.	Name	Gender M/F	Designation	Contact	Email	Signature
1.	Aditi Jean Mercy	F	Nurse	0789287423		
2.	Sano Franko	M	Former/Shopkeeper	0784532622		
3.	Okapesi Jackson	M		0772017854		
4.	Kisembo Sayuni	F	Shop attendant	0778585314		
5.	Mugwina Nambaya	F	Vendor	0740206889		
6.	Nabifana Peace	F	Hotel	0788207684		
7.	Sembisi Robert	M	Farmer	0784204049		
8.	Mulyathi Simon	M	Merchandise	0789833193		
9.	Wabwira Wabwira	M	Farmer			
10.	Oyo Dickson	M	Farmer	0785511943		
11.	Wasika Dan	M	Farmer	0771579277		
12.						

3000 Soyab Rice maize

ATTENDANCE LIST

Project Name: ESIA RAP SPP - IWM DP

Location: Kalwala

Date: 17/11/2021

No.	Name	Gender M/F	Designation	Contact	Email	Signature
1.	Idingi Thomas		Chairman	0772375827		
2.	Nangir Susan	F		0773538034		
3.	Apio Brenda	F				
4.	Kusulanga Aguthe	M	Farmer/peasant	0782256159		
5.	Richard Stephan	M	Mechanic	0782409496		
6.	Mukubwa Gerald	M	Boda	0760593316		
7.	Matoi Steven	M	Boda			
8.	Him Miniam	F	house wife	0777856826		
9.	Nekesi Sylvia	F	Farmer			
10.	Mucunguzi Henry	M	Teacher/former	0794678202		
11.	Francis Kiya	M	Farmer	0778614301		
12.	Aye baka Stella	F	tailor	07795429171		
13.	Kusemererwa Mary	F	Shopkeeper	075167330		

CSA

3 Jan. cans 100t at first.

ANNEX 5: WATER QUALITY TEST CERTIFICATES



MINISTRY OF WATER AND ENVIRONMENT NATIONAL WATER QUALITY REFERENCE LABORATORY - ENTEBBE

Certificate of Analysis

Client Name : JBN Consults and Planners Ltd
 Client Address : Plot 48 Mbago Road, Najjera 1
 Sample Location : Kiryandongo District
 Date Sampled : 15th November 2021
 Date received : 2nd December 2021
 Analysis Completion data : 11th December 2021

TEST RESULTS

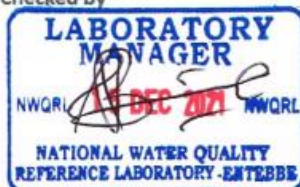
Source Name		GGW1 - M1	GGW2 KITONZI LINE MOJA	Drinking water standards (DEAS12:2018 Maximum permissible for Natural potable Water)
Sample Location and Source		Gaspa Ground Water	Gaspa Ground Water	
Sub County		Gaspa	Gaspa	
Lab Identifier code		E50111	E50108	
Turbidity (NTU)	NTU	0.3	6.7	25
pH	units	8.24	8.35	5.5-9.5
Electrical Conductivity	µS/cm	1130	988	2500
Total dissolved solids	mg/l	723	632	1500
Total Hardness as CaCO ₃	mg/l	450	345	600
Fluoride	mg/l	0.36	0.32	1.5
Sulphates	mg/l	26	22	400
Chlorides	mg/l	85	75	250
Nitrates as N	mg/l	0.32	0.24	10
Nitrites as N	mg/l	<0.002	<0.002	0.003
Manganese	mg/l	<0.01	<0.01	<0.01
Total Iron	mg/l	0.21	0.58	<0.5
E.Coli	CFU/100ml	<1	2	<1

Notes;

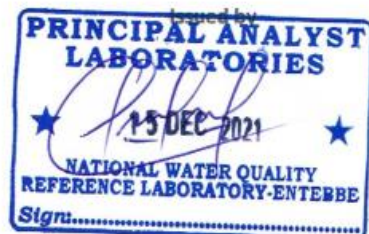
Samples are analyzed on as received basis.

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



Water Quality Management Department
 Directorate of Water Resources Management
Waterquality_laboratory@mwe.go.ug
 P.O Box 19, Entebbe
 Tel: 041-321342





**NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY-BUGOLOBI.**

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

CERTIFICATE OF ANALYSIS

Client: Sumadhura Technologies

Serial No: ES/ RF/2021/1588

Address : Kampala

Sampled by: Clients Staff

Date Sample received: 28- 7-2021

Date of Report: 30-7-2021

Table of analytical results

Parameters	Units	V- Mirima P- Kyembera S/C- Kiryandongo C- Kibanda North D- Kiryandongo DWD:77380	National Standards for Natural portable water
<i>Sample Number</i>	-	<i>K898/2021/C</i>	
Alkalinity: Total	mg/l	56	500
Bicarbonate	Mg/l	98	500
Calcium ;Ca ²⁺	mg/l	12.60	150
Chlorides-Cl ⁻	mg/l	5	250
Colour	Ptco	16	50
Conductivity	µs/cm	288	2500
Fluoride :F ⁻	Mg/l	0.3	1.5
Hardness: total as CaCO ₃)	mg/	60	600
Iron:total	mg/l	0.095	0.3
Magnesium : Mg ²⁺	mg/l	5.80	100
Manganese	Mg/l	0.0	0.1
Nitrate-N	mg/l	4	45
Ph(Physical-Chemical)	-	6.62	5.5- 9.5
Sulphates:SO ₄ ²⁻	mg/l	0	400
Total dissolved solids(TDS)	mg/l	267	1500
Total suspended solids(TSS)	mg/l	0	0.0
Turbidity	NTU	2.30	25

Remarks;

The water sample showed complying physiochemical characteristics compared to the National Standards for natural potable water .

AUTHORISED BY: Manager , Central Laboratory Services..... *IM*

APPROVED BY: Senior Manager, Water Quality Management Department..... *UM*

The NWSC certificate of analysis by no means constitutes a permit to any person or undertaking to conduct business. This report reflects results of the sample as received at the laboratory premises





**NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY-BUGOLOBI.**

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CERTIFICATE OF ANALYSIS

Client: Sumadhura Technologies
Address :Kampala

Serial No:ES/ RF/2021/1651

Sampled by: Client's Staff

Sample received: 6- 8-2021

Date of Report:9-8-2021

Table of analytical results

Parameters	Units	V- Mirima 2 P- Kyemba S/C- Kiryandongo C- Kibanda South D- Kiryandongo DWD:77381	National Standards for Natural portable water
<i>Sample Number</i>	-	<i>K906/2021/C</i>	
Alkalinity: Total	mg/l	56	500
Bicarbonate	Mg/l	92	500
Calcium ;Ca ²⁺	mg/l	8.50	150
Chlorides-Cl ⁻	mg/l	4	250
Colour	Ptco	21	50
Conductivity	μs/cm	286	2500
Fluoride :F ⁻	Mg/l	0.7	1.5
Hardness: total as CaCO ₃)	mg/	62	600
Iron:total	mg/l	0.069	0.3
Magnesium : Mg ²⁺	mg/l	5.40	100
Manganese	Mg/l	0.0	0.1
Nitrate-N	mg/l	0	45
Ph(Physical-Chemical)	-	6.68	5.5- 9.5
Sulphates:SO ₄ ²⁻	mg/l	0	400
Total dissolved solids(TDS)	mg/l	232	1500
Total suspended solids(TSS)	mg/l	0	0.0
Turbidity	NTU	2.40	25

Remarks;

The water sample showed complying physiochemical characteristics compared to the National Standards for natural potable water .

AUTHORISED BY: Manager , Central Laboratory Services.....

APPROVED BY: Senior Manager, Water Quality Management Department.....

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This report reflects results of the sample as received at the laboratory premises*



ANNEX 6: FLORA SPECIES ECOUNTERED IN THE ASSESSMENT



N/S	Family	Species	Millima-Gaspa-Ndoyo	Mirima-Gaspa-Siriba Cell	Water Source 1 & 2	Status
1	Acanthaceae	<i>Acanthus pubescens</i>	1	X	X	Least Concern
2		<i>Dyschoriste radicans</i>	3	1	X	Least Concern
3		<i>Justicia schimperiana</i>	1	X	X	Least Concern
4		<i>Thunbergia mildbraediana</i>	1	X	X	Least Concern
5	Amaranthaceae	<i>Alternanthera sessilis</i>	X	2	X	Least Concern
6		<i>Amaranthus hybridus</i>	2	X	1	Least Concern
7		<i>Amaranthus lividus</i>	X	1	1	Least Concern
8	Anacardiaceae	<i>Anacardium occidentale</i>	X	X	1	Least Concern
9		<i>Mangifera indica</i>	1	X	X	Least Concern
10		<i>Rhus natalensis</i>	X	1	X	Least Concern
11		<i>Rhus vulgaris</i>	X	1	X	Least Concern
12	Annonaceae	<i>Annona senegalensis</i>	1	2	X	Least Concern
13	Asclepiadaceae	<i>Gomphocarpus fruticosus</i>	X	X	1	Least Concern
14		<i>Mondia whitei</i>	1	1	X	VU
15	Asparagaceae	<i>Asparagus africanus</i>	1	X	X	Least Concern
16	Asteraceae	<i>Acanthospermum hispidum</i>	1	X	X	Least Concern
17		<i>Ageratum conyzoides</i>	3	1	X	Least Concern
18		<i>Bidens pilosa</i>	1	1	1	Invasive
19		<i>Chromolaena odorata</i>	1	2	X	Invasive
20		<i>Conyza sumatrensis</i>	X	X	1	Least Concern
21		<i>Emilia coccinea</i>	X	X	1	Least Concern
22		<i>Guizotia scabra</i>	1	X	X	Least Concern
23		<i>Lactuca schweinfurthii</i>	X	X	1	Least Concern
24		<i>Microglossa densiflora</i>	X	1	X	Least Concern
25		<i>Parthenium hysterophorus</i>	2	6	X	Invasive
26		<i>Synedrella nodiflora</i>	3	1	1	Least Concern
27		<i>Tagetes minuta</i>	X	1	X	Invasive
28		<i>Vernonia amygdalina</i>	2	3	X	Least Concern
29		<i>Vernonia glabra</i>	1	X	X	Least Concern
30	Bignoniaceae	<i>Stereospermum kunthianum</i>	X	1	1	Least Concern
31	Caricaceae	<i>Carica papaya</i>	1	X	X	Least Concern
32	Celastraceae	<i>Maytenus senegalensis</i>	X	2	X	Least Concern
33	Combretaceae	<i>Combretum adenogonium</i>	X	1	X	Least Concern
34		<i>Combretum collinum</i>	1	4	X	Least Concern
35		<i>Combretum molle</i>	1	1	X	Least Concern
36		<i>Terminalia glaucescens</i>	X	2	1	Least Concern
37		<i>Terminalia mollis</i>	X	1	X	Least Concern
38	Commelinaceae	<i>Commelina africana</i>	X	2	X	Least Concern
39	Convolvulaceae	<i>Cuscuta kilimanjari</i>	1	X	X	Invasive




N/S	Family	Species	Millima-Gaspa-Ndoyo	Mirima-Gaspa-Siriba Cell	Water Source 1 & 2	Status
40		<i>Ipomoea obscura</i>	X	X	1	Least Concern
41	Cucurbitaceae	<i>Diplocyclos palmatus</i>	X	1	X	Least Concern
42		<i>Kedrostis hirtella</i>	1	X	X	Least Concern
43		<i>Mukia maderaspatana</i>	1	X	X	Least Concern
44	Cyperaceae	<i>Mariscus dubius</i>	X	1	X	Least Concern
45		<i>Mariscus sumatrensis</i>	1	X	X	Least Concern
46	Euphorbiaceae	<i>Acalypha ciliata</i>	X	1	X	Least Concern
47		<i>Acalypha cordata</i>	X	1	X	Least Concern
48		<i>Euphorbia hetrophylla</i>	X	1	1	Least Concern
49		<i>Euphorbia hirta</i>	X	1	X	Least Concern
50		<i>Euphorbia tirucalli</i>	X	1	X	Least Concern
51		<i>Flueggea virosa</i>	2	2	3	Least Concern
52		<i>Jatropha curcas</i>	X	1	X	Least Concern
53		<i>Phyllanthus amarus</i>	X	1	X	Least Concern
54		<i>Phyllanthus pseudoniruri</i>	X	1	X	Least Concern
55		<i>Ricinus communis</i>	3	X	X	Least Concern
56	Fabaceae	<i>Acacia abyssinica</i>	2	X	1	Least Concern
57		<i>Acacia hockii</i>	1	1	1	Least Concern
58		<i>Acacia polyacantha</i>	2	1	2	Least Concern
59		<i>Acacia sieberiana</i>	2	3	1	Least Concern
60		<i>Albizia coriaria</i>	1	1	1	Least Concern
61		<i>Albizia versicolor</i>	X	1	X	Least Concern
62		<i>Albizia zygia</i>	3	3	X	Least Concern
63		<i>Alysicarpus glumaceus</i>	1	X	X	Least Concern
64		<i>Alysicarpus rugosus</i>	1	X	X	Least Concern
65		<i>Cajanus cajan</i>	X	1	X	Least Concern
66		<i>Cassia hirsuta</i>	4	7	X	Least Concern
67		<i>Cassia obtusifolia</i>	1	1	X	Least Concern
68		<i>Cassia siemea</i>	1	X	X	Least Concern
69		<i>Crotalaria spinosa</i>	1	X	X	Least Concern
70		<i>Erythrina abyssinica</i>	1	1	2	Least Concern
71		<i>Glycine wightii</i>	1	2	1	Least Concern
72		<i>Indigofera arrecta</i>	X	1	X	Least Concern
73		<i>Indigofera trachyphylla</i>	1	X	X	Least Concern
74		<i>Lonchocarpus laxiflorus</i>	X	1	X	Least Concern
75		<i>Millettia versicolor</i>	X	X	1	Least Concern
76		<i>Mimosa pigra</i>	X	X	1	Invasive
77		<i>Piliostigma thonningii</i>	X	3	1	Least Concern
78		<i>Senna spectabilis</i>	1	X	X	Least Concern
79		<i>Sesbania microphylla</i>	1	X	X	Least Concern

N/S	Family	Species	Millima-Gaspa-Ndoyo	Mirima-Gaspa-Siriba Cell	Water Source 1 & 2	Status
80		<i>Tamarindus indica</i>	2	1	X	Least Concern
81		<i>Vigna membranacea</i>	X	1	X	Least Concern
82	Lamiaceae	<i>Hoslundia opposita</i>	1	1	X	Least Concern
83		<i>Hyptis suaveolens</i>	1	X	X	Least Concern
84		<i>Leonotis nepetifolia</i>	X	1	X	Least Concern
85		<i>Leucas deflexa</i>	1	X	X	Least Concern
86		<i>Ocimum citriodorum</i>	1	X	X	Least Concern
87		<i>Tinnea aethiopica</i>	X	1	X	Least Concern
88	Malvaceae	<i>Grewia similis</i>	X	1	X	Least Concern
89		<i>Grewia trichocarpa</i>	X	X	1	Least Concern
90		<i>Sida acuta</i>	6	3	X	Invasive
91		<i>Sida alba</i>	X	1	X	Least Concern
92		<i>Urena lobata</i>	3	5	1	Least Concern
93		<i>Waltheria indica</i>	1	X	X	Least Concern
94		<i>Wissadula amplissima</i>	X	X	1	Least Concern
95	Meliaceae	<i>Ekebergia capensis</i>	X	1	X	Least Concern
96	Menispermaceae	<i>Cissampelos mucronata</i>	1	X	X	Least Concern
97	Moraceae	<i>Antiaris toxicaria</i>	X	1	X	Least Concern
98		<i>Artocarpus heterophylla</i>	2	2	X	Least Concern
99		<i>Ficus conraui</i>	1	X	X	Least Concern
100		<i>Ficus exasperata</i>	1	X	X	Least Concern
101		<i>Ficus sycomorus</i>	1	X	1	Least Concern
102	Myrtaceae	<i>Eucalyptus grandis</i>	2	1	X	Exotic
103	Nymphaeaceae	<i>Nymphaea muculata</i>	X	X	1	Least Concern
104	Pinaceae	<i>Pinus patula</i>	X	1	1	Least Concern
105	Poaceae	<i>Brachiaria decumbens</i>	1	5	X	Least Concern
106		<i>Chloris pycnothrix</i>	1	X	X	Least Concern
107		<i>Cynodon dactylon</i>	1	2	2	Least Concern
108		<i>Cynodon nlemfuensis</i>	1	1	2	Least Concern
109		<i>Dactyloctenium aegypticum</i>	1	X	X	Least Concern
110		<i>Digitaria abyssinica</i>	X	1	1	Least Concern
111		<i>Digitaria ciliaris</i>	X	X	1	Least Concern
112		<i>Digitaria gazensis</i>	X	X	1	Least Concern
113		<i>Digitaria horizontalis</i>	X	X	1	Least Concern
114		<i>Digitaria longiflora</i>	X	X	1	Least Concern
115		<i>Digitaria velutina</i>	X	1	X	Least Concern
116		<i>Echinochloa hapoclada</i>	X	X	1	Least Concern
117		<i>Echinochloa pyramidalis</i>	X	X	1	Least Concern
118		<i>Eleusine indica</i>	1	1	1	Least Concern
119		<i>Eragrostis tenuifolia</i>	2	X	X	Least Concern

N/S	Family	Species	Millima-Gaspa-Ndoyo	Mirima-Gaspa-Siriba Cell	Water Source 1 & 2	Status
120		<i>Eriochloa fatmensis</i>	X	1	X	Least Concern
121		<i>Hyparrhenia collina</i>	X	X	3	Least Concern
122		<i>Hyparrhenia filipendula</i>	1	X	X	Least Concern
123		<i>Imperata cylindrica</i>	X	X	1	Least Concern
124		<i>Leersia hexandra</i>	X	X	1	Least Concern
125		<i>Panicum maximum</i>	5	3	2	Least Concern
126		<i>Paspalum scrobiculatum</i>	X	1	X	Least Concern
127		<i>Pennisetum polystachion</i>	1	1	X	Least Concern
128		<i>Phragmites mauritianus</i>	X	X	1	Least Concern
129		<i>Setaria sphacelata</i>	2	4	1	Least Concern
130		<i>Sorghum arundinaceum</i>	2	X	2	Least Concern
131		<i>Sorghum bicolor</i>	1	1	X	Least Concern
132		<i>Sporobolus pyramidalis</i>	1	X	1	Least Concern
133		<i>Sporobolus stapfianus</i>	1	X	X	Least Concern
134		<i>Saccharum offi</i>	1	X	X	Least Concern
135		<i>Zea mays</i>	1	X	X	Least Concern
136	Ranunculaceae	<i>Clematis hirsuta</i>	X	1	X	Least Concern
137	Rhamnaceae	<i>Ziziphus mucronata</i>	X	2	X	Least Concern
138	Rubiaceae	<i>Gardenia ternifolia</i>	1	X	X	Least Concern
139	Rutaceae	<i>Clausena anisata</i>	1	X	X	Least Concern
140	Sapindaceae	<i>Allophylus africanus</i>	1	1	X	Least Concern
141	Sapotaceae	<i>Mimusops kummel</i>	X	1	X	Least Concern
142	Simaroubaceae	<i>Harrisonia abyssinica</i>	1	2	X	Least Concern
143	Solanaceae	<i>Solanum incanum</i>	4	1	1	Least Concern
144		<i>Solanum nigrum</i>	X	1	X	Least Concern
145	Verbenaceae	<i>Clerodendrum capitatum</i>	1	X	X	Least Concern
146		<i>Clerodendrum umbellatum</i>	1	1	X	Least Concern
147		<i>Lantana camara</i>	3	5	1	Least Concern
148		<i>Stachytarpheta indica</i>	1	X	X	Least Concern
149		<i>Tectona grandis</i>	1	X	X	Least Concern
150	Vitaceae	<i>Cyphostemma adenopodum</i>	X	1	X	Least Concern

ANNEX 7: SELECTED SENSITIVE RECEPTORS FOR AIR QUALITY AND NOISE MEASUREMENTS

Location details	Land use	Photo
<p>Gaspa Trading Centre (Proposed Gaspa Market)</p>	<p>Built up area with a number of retail businesses including merchandise shops, salons, bars and agricultural produce road side market.</p> <p>Trading centre bisected by a marrum road from connecting the trading centre to Gulu-Kampala Highway at Bweyale.</p>	
<p>Goshen Primary School</p>	<p>Primary school located near a marrum road from Bweyale to Gaspa TC within the project footprint. The school will most likely be impacted on the by the project due to its location near the proposed alignment of the transmission and distribution lines.</p>	

<p>Tecwa Primary School</p>	<p>Rural School environment with two classroom blocks and eight latrines.</p> <p>Largest part of the compound is bare without grass but planted with a number of mature trees.</p> <p>School proposed for construction of a boy's latrine as a sanitation intervention.</p>	
<p>Panyadoli HC III</p>	<p>Built up area with several buildings including treatment rooms, patient wards, laboratory.</p> <p>Compound planted with several trees that trap some dust particles in moving air.</p>	
<p>Canrom Primary School</p>	<p>School compound fenced with chain-link.</p> <p>planted with several trees, flowers and grass.</p>	

ANNEX 8: BASELINE SPL MEASUREMENTS AT SELECTED SITES

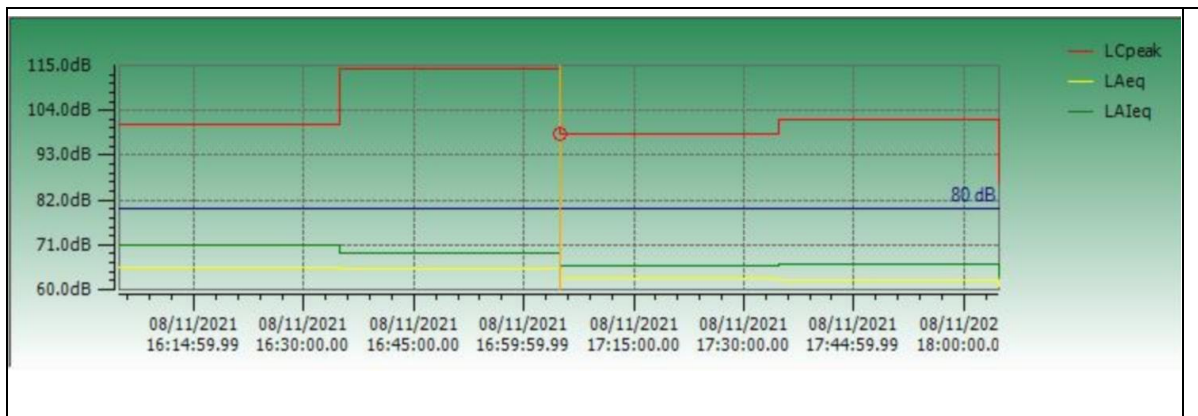
ENVIRONMENT AND SOCIAL IMPACT
ASSESSMENT (ESIA) FOR LARGE SOLAR
POWERED PIPED WATER SUPPLY SYSTEMS
AND SANITATION FACILITIES IN REFUGEE
SETTLEMENT AND HOST COMMUNITIES OF
KIRYANDONGO DISTRICT

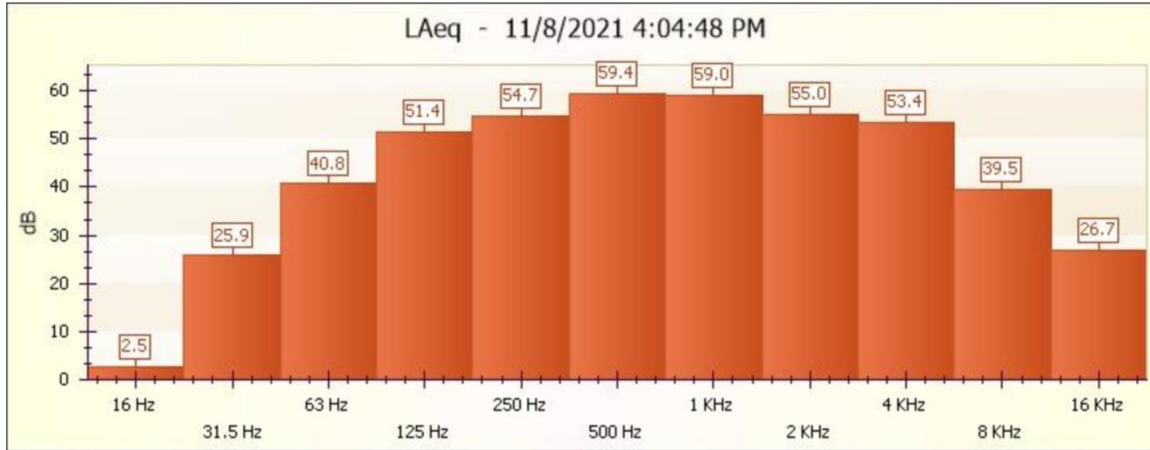
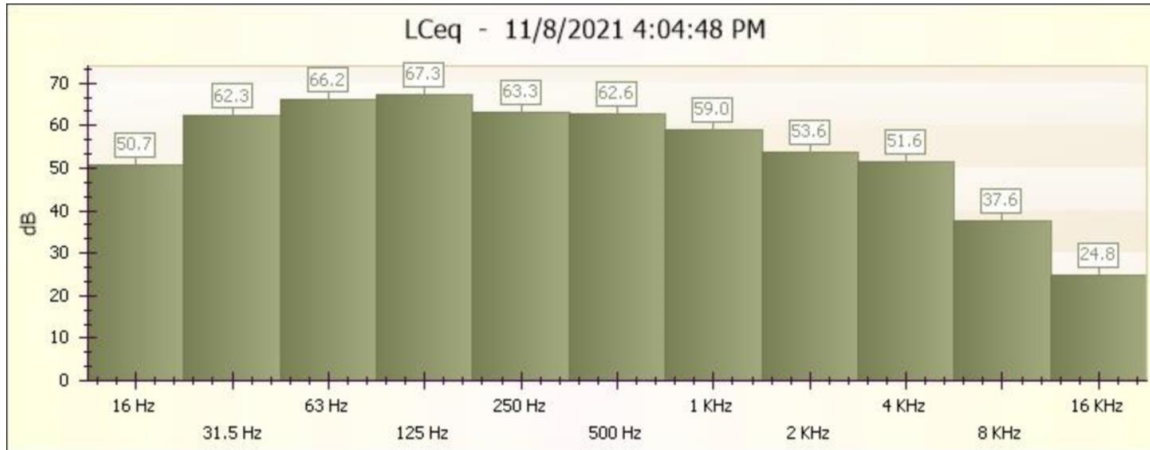


Gaspa Trading Centre

Instrument Model CEL-633B

LAFmax	89.4 dB	LAeq	64.2 dB
LAFmin	51.3 dB	End Date & Time	11/8/2021 6:05:43 PM
LAFmin with Time	51.3 dB (11/8/2021 4:05:26)	Calibration (Before)	11/8/2021 4:01:43 PM
LCpeak with Time	114.4 dB (11/8/2021 4:45:54)	Calibration (Before)	114 dB
LAleq	68.5 dB	Calibration (After) Date	11/8/2021 6:06:21 PM
Run Number	15	Calibration Drift	-0.1 dB
LAFmax with Time	89.4 dB (11/8/2021 4:45:54)	Result	Cumulative
Start Date & Time	11/8/2021 4:04:48 PM		
Duration	02:00:55 HH:MM: SS		
LCeq	72.2 dB		





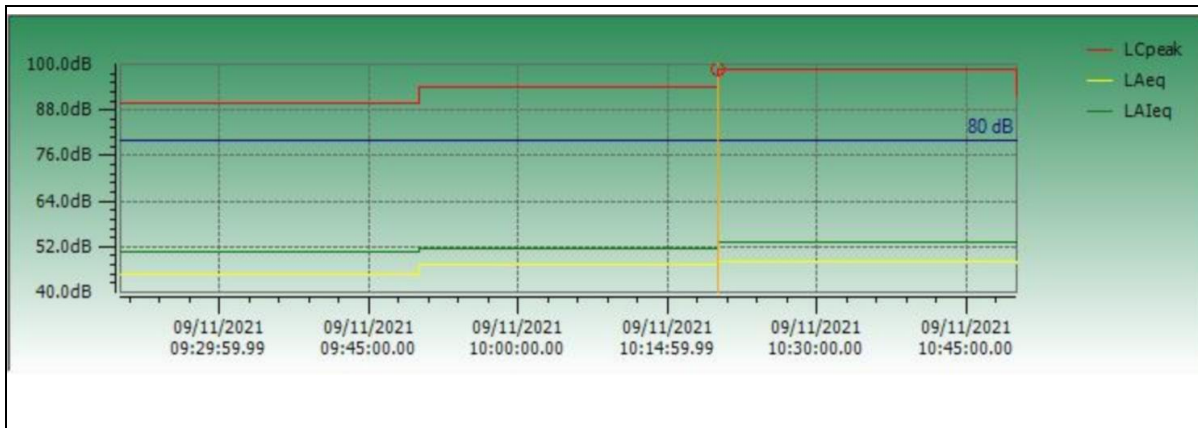
Report generated by Insight CEL-63x - Casella CEL Ltd - on 11/24/2021 at 11:00:12 AM

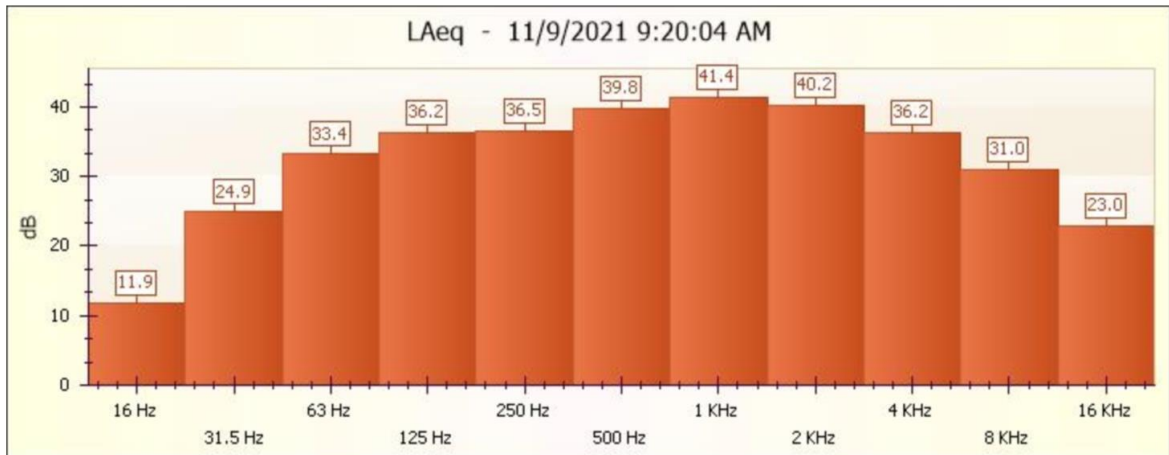
**ENVIRONMENT AND SOCIAL IMPACT
ASSESSMENT (ESIA) FOR LARGE SOLAR
POWERED PIPED WATER SUPPLY
SYSTEMS AND SANITATION FACILITIES IN
REFUGEE SETTLEMENT AND HOST
COMMUNITIES OF KIRYANDONGO DISTRICT**



Goshen Primary School

Instrument Model	CEL-633B		
LAFmax	75.3 dB	L_{Aeq}	46.9 dB
LAFmin	31.8 dB	End Date & Time	11/9/2021 11:03:04 AM
LAFmin with Time	31.8 dB (11/9/2021 11:02:23)	Calibration (Before)	11/9/2021 9:15:14 AM
LCpeak with Time	98.6 dB (11/9/2021 10:47:24)	Calibration (Before)	114 dB
L _{Aeq}	52.1 dB	Calibration (After) Date	11/9/2021 12:00:45 PM
Run Number	17	Calibration Drift	0.1 dB
LAFmax with Time	75.3 dB (11/9/2021 10:48:50)	Result	Cumulative
Start Date & Time	11/9/2021 9:20:04 AM		
Duration	01:43:00 HH:MM:SS		
LC _{eq}	65.3 dB		





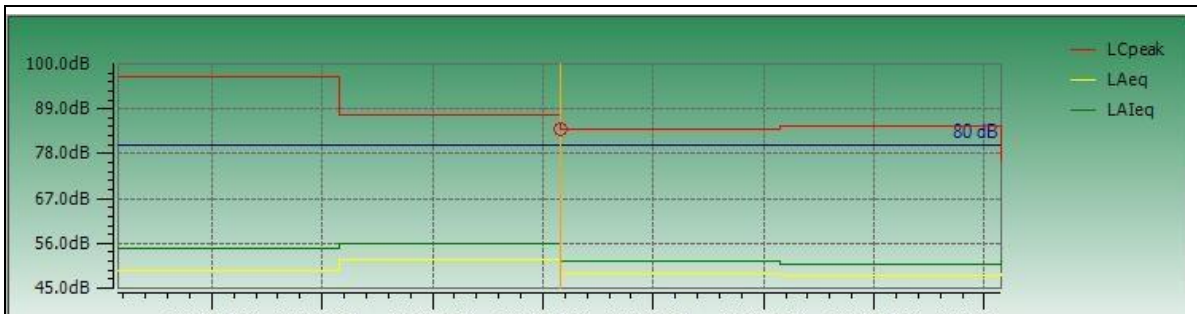
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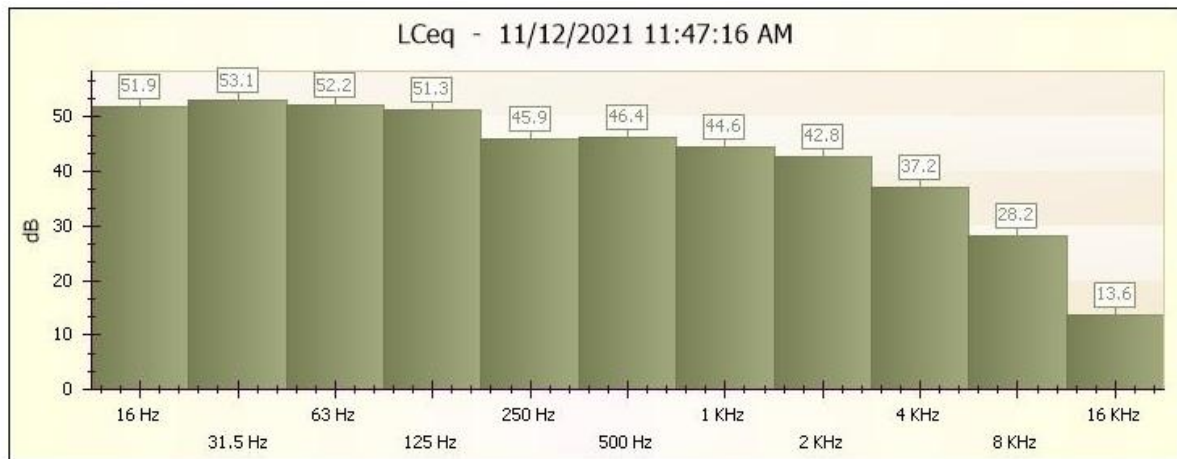
**ENVIRONMENT AND SOCIAL IMPACT
ASSESSMENT (ESIA) FOR LARGE SOLAR
POWERED PIPED WATER SUPPLY
SYSTEMS AND SANITATION FACILITIES IN
REFUGEE SETTLEMENT AND HOST
COMMUNITIES OF KIRYANDONGO DISTRICT**



Panyadoli Health Centre III

Instrument Model	CEL-633B		
LAFmin	43.5 dB	LAlmax	78.8 dB
LAFmin with Time	43.5 dB (11/12/2021	LCpeak	96.8 dB
LCpeak with Time	96.8 dB (11/12/2021	LAF 10%	51.5 dB
Run Number	29	LAF 50%	48 dB
LAFmax with Time	76.5 dB (11/12/2021	LAF 90%	46 dB
Start Date & Time	11/12/2021 11:47:16 AM	LAF 95%	45.5 dB
Duration	02:01:00 HH:MM:SS	End Date & Time	11/12/2021 1:48:16 PM
LCeq	59.2 dB	Calibration (Before)	11/12/2021 11:45:28 AM
LAeq	49.8 dB	Calibration (Before)	114 dB
LAFmax	76.5 dB	Calibration (After)	11/12/2021 3:43:14 PM
Serial Number	2670936	Calibration Drift	0.1 dB





ANNEX 9: SOCIOECONOMIC SURVEY RESULTS

Beneficiary Village Population

Villages	Male	Female	Total	Households
Siriba Cell	1,251	1,728	2,979	608
Cluster O	2,381	3,289	5,670	961
Nyabukoni	559	772	1,331	256
Mirima	535	739	1,274	245
Kinyomozi	341	470	811	156
Kalwala	406	561	967	186
Tecwa	264	365	629	121
Ndoyo	1,525	2,105	3,630	825
Kitongozi	636	878	1,513	291
Kitwara	308	425	733	141
Total	8,206	11,332	19,538	3,790

Common Diseases OPD Utilization (2020-2021) at Kitwara HC II and Tecwa HC II

Common Diseases OPD Utilization (2020-2021)	Yr 2020						Yr 2021						OVERALL TOTAL	
	Kitwara HC II		Tecwa HC II		Total- Yr 2020		Kitwara HC II		Tecwa HC II		Total - Yr 2021			
	No.	%	No.	%	No.	%	No	%	No	%	No.	%	No.	%
Diarrhea	115	8.7	135	10.8	250	9.7	115	15.9	141	15.5	256	15.7	506	12
Urethral discharges	13	1	9	0.7	22	0.9	0	0	5	0.6	5	0.3	27	0.6
Genital ulcers	0	0	16	1.3	16	0.6	0	0	0	0	0	0	16	0.4
STIs due to SGBV	18	1.4	0	0	18	0.7	45	6.2	2	0.2	47	2.9	65	1.5
Other STIs	96	7.3	28	2.2	124	4.8	23	3.2	17	1.9	40	2.4	164	3.9
Urinary Tract Infections (UTI)	66	5	133	10.6	199	7.7	42	5.8	80	8.8	122	7.5	321	7.6
Intestinal Worms	12	0.9	319	25.5	331	12.9	5	0.7	132	14.5	137	8.4	468	11.1
Cough or cold - No Pneumonia	980	74.2	293	23.4	1,273	49.5	463	64.0	387	42.6	850	52.1	2,123	50.5
Skin Diseases	12	0.9	133	10.6	145	5.6	14	1.9	25	2.8	39	2.4	184	4.4
Pelvic Inflammatory Disease (PID)	5	0.4	8	0.6	13	0.5	17	2.3	2	0.2	19	1.2	32	0.8
Pneumonia	4	0.3	9	0.7	13	0.5	0	0.0	2	0.2	2	0.1	15	0.4
Anaemia		0	23	1.8	23	0.9	0	0.0	18	2	18	1.1	41	1
Gastro-Intestinal Disorders (non- Infective)	0	0	144	11.5	144	5.6	0	0.0	98	10.8	98	6	242	5.8

TOTAL	1,321	100	1,250	100	2,571	100	724	100	909	100	1,633	100	4,204	100
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Common diseases affecting households in Gaspa RGC (

Common diseases	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Cough & Flu	27	25	64	37.0	3	42.9	2	25	96	32.4
Dysentery	2	1.9	2	1.2	0	0	0	0	4	1.4
Typhoid	2	1.9	8	4.6	0	0	1	12.5	11	3.7
Malaria	68	63.0	91	52.6	2	28.6	4	50	165	55.7
Bilharzia	5	4.6	3	1.7	0	0	0	0	8	2.7
Diarrhea	4	3.7	5	2.9	2	28.6	1	12.5	12	4.1
Grand Total	108	100	173	100	7	100	8	100	296	100

HIV Prevalence in Gaspa RGC

Period	HIV PREVALENCE 2015-2021						
Sub County & Town Council	Yr2015	Yr2016	Yr2017	Yr2018	Yr2019	Yr2020	Yr2021
Kiryandongo SC	2%	8%	2%	2%	5%	4%	2%
Bweyale TC	8%	6%	3%	5%	4%	3%	4%
Gaspa RGC (Average)	5%	7%	2%	4%	4%	4%	3%
Kiryandongo District	5%	5%	3%	4%	4%	3%	3%

STI and related Conditions

OPD Utilization (2020-2021)	2020						2021						OVERALL TOTAL	
	Kitwara HC II		Tecwa HC II		Total 2020		Kitwara HC II		Tecwa HC II		Total 2021			
	Fre q	%	Fre q	%	Fre q	%	Fre q	%	Fre q	%	Fre q	%	Fre q	%
Urethral discharges	13	1	9	0.7	22	0.9	0	0	5	0.6	5	0.3	27	0.6
Genital ulcers	0	0	16	1.3	16	0.6	0	0	0	0	0	0	16	0.4
STIs due to SGBV	18	1.4	0	0	18	0.7	45	6.2	2	0.2	47	2.9	65	1.5
Other STIs	96	7.3	28	2.2	124	4.8	23	3.2	17	1.9	40	2.4	164	3.9
Urinary Tract Infections (UTI)	66	5	133	10.6	199	7.7	42	5.8	80	8.8	122	7.5	321	7.6
Pelvic Inflammatory Disease (PID)	5	0.4	8	0.6	13	0.5	17	2.3	2	0.2	19	1.2	32	0.8

Number of Persons who had ever taken HIV / STIs Test in past 12 months

Ever taken an HIV test in the past 12 months	Kibeka		Kikube		Ranch 37		Southern Ward		OVERALL	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
I CAN'T DO IT / FEAR	4	3.7	4	2.3	0	0	0	0	8	2.7
<i>Female</i>	4	3.7	4	2.3	0	0	0	0	0	2.7
<i>Male</i>	0	0	0	0	0	0	0	0	0	0
NEVER	61	56.5	86	49.7	3	42.9	2	25	152	51.4
<i>Female</i>	24	22.2	38	22.0	2	28.6	0	0	64	21.6
<i>Male</i>	37	34.3	48	27.7	1	14.3	2	25	88	29.7
NOT AWARE ABOUT SERVICE PROVIDER	0	0	9	5.2	2	28.6	1	12.5	12	4.1
<i>Female</i>	0	0	6	3.5	2	28.6	0	0	8	2.7
<i>Male</i>	0	0	3	1.7	0	0	1	12.5	4	1.4
YES	43	39.8	74	42.8	2	28.6	5	62.5	124	41.9
<i>Female</i>	30	27.8	44	25.4	1	14.3	1	12.5	76	25.7
<i>Male</i>	13	12.0	30	17.3	1	14.3	4	50	48	16.2
Grand Total	108	100	173	100	7	100	8	100	296	100

Covid19

In your opinion, how do you rate community readiness towards prevention of COVID-19?	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Highly Satisfactory	26	24.1	26	15.0	0	0	0	0	52	17.6
Not satisfactory	9	8.3	43	24.9	3	42.9	5	62.5	60	20.3
Not sure	8	7.4	10	5.8	2	28.6		0	20	6.8
Satisfactory	65	60.2	94	54.3	2	28.6	3	37.5	164	55.4
Grand Total	108	100	173	100	7	100	8	100	296	100
In your opinion, do you think piped water supply will improve community response to COVID-19?	Kibeka		Kikube		Ranch 37		Southern Ward		Grand Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Fairly agree	17	15.7	66	38.2	4	57.1	5	62.5	92	31.1
Highly agree	89	82.4	96	55.5	1	14.3	2	25.0	188	63.5
Not sure	2	1.9	11	6.4	2	28.6	1	12.5	16	5.4
Grand Total	108	100	173	100	7	100	8	100	296	100

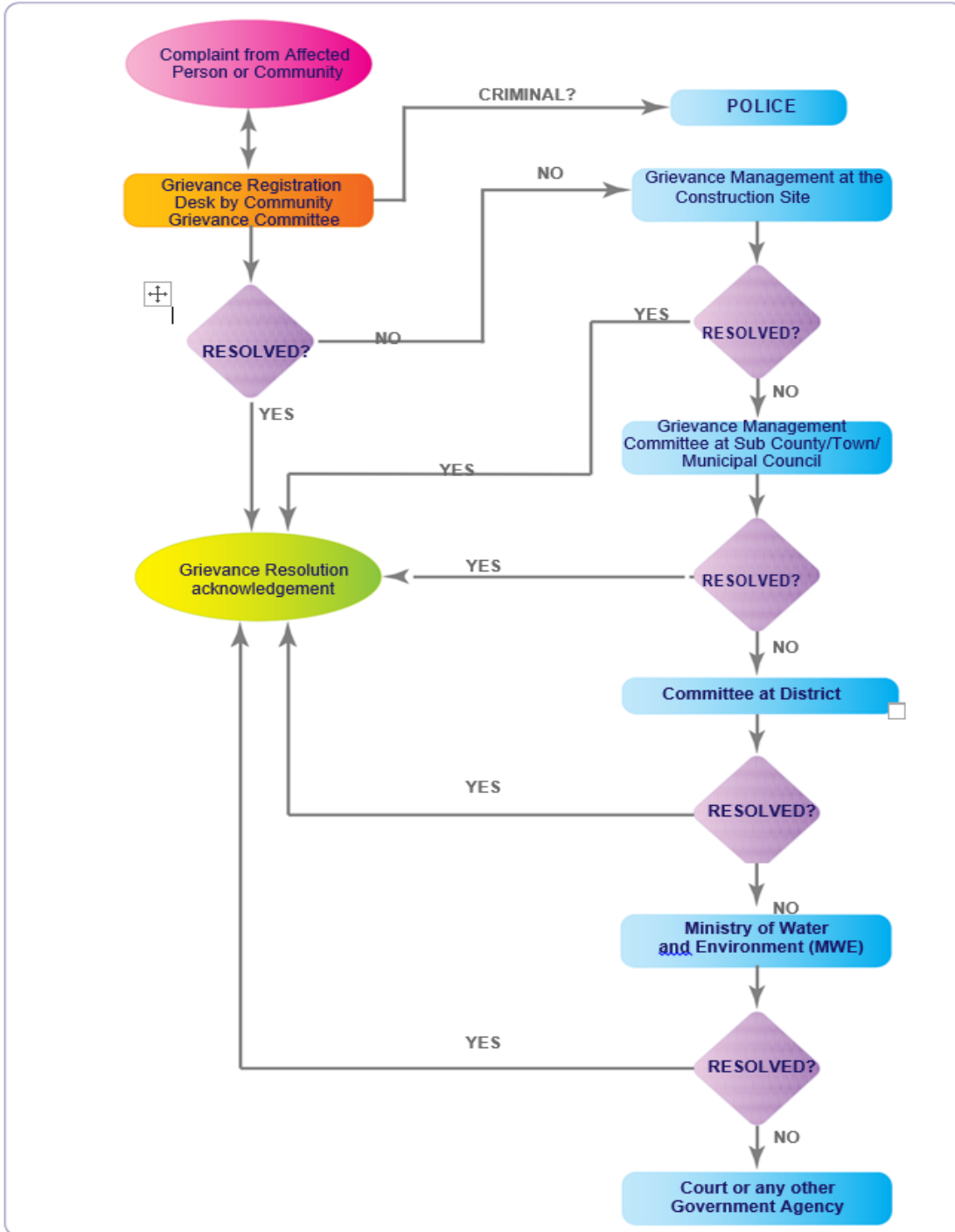
GBV Perpetrator – Victim Relationship

Perpetrator - Victim Relationship	KIKUBE	KITWARA	SOUTHERN WARD	TOTAL
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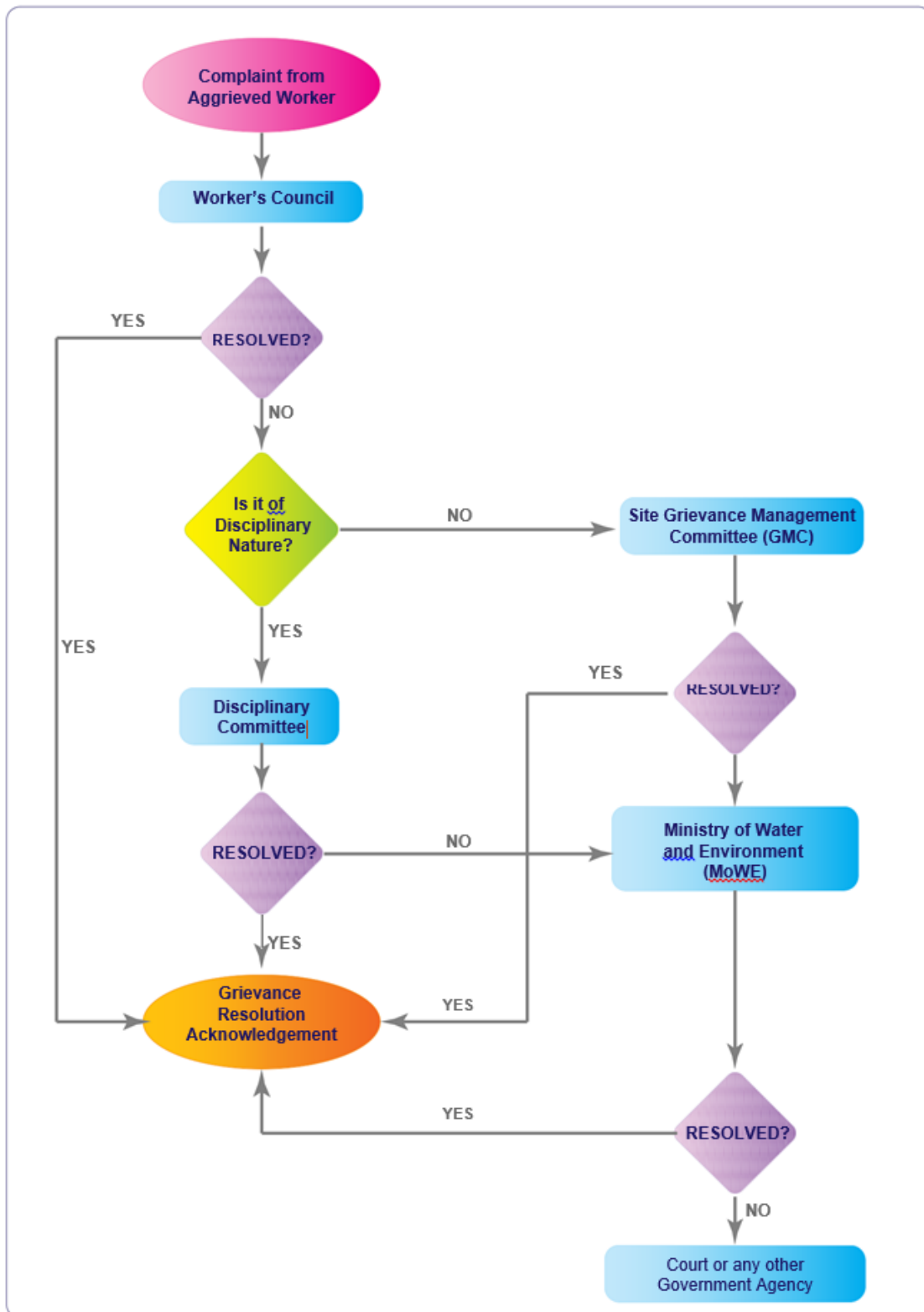
	Freq	%	Freq	%	Freq	%	Freq	%
Daughter	0	0	1	1.0	0	0	1	0.2
Someone at work	1	0.4	0	0	0	0	1	0.2
Teacher	1	0.4	0	0	0	0	1	0.2
Police	1	0.4	1	1.0	0	0	2	0.5
Local Council	3	1.3	1	1.0	1	0.9	5	1.1
Son	0	0	1	1.0	5	4.6	6	1.4
Former Partner	3	1.3	4	3.8	2	1.8	6	1.4
Brother	3	1.3	4	3.8	0	0	7	1.6
Mother	6	2.6	0	0	7	6.4	13	3.0
Other Relative	9	4.0	5	4.8	5	4.6	19	4.3
Neighbor	8	3.5	6	5.8	8	7.3	22	5
Father	11	4.8	12	11.5	2	1.8	25	5.7
None	58	25.6	27	26.0	27	24.8	112	25.5
Current Partner (IPV)	123	54.2	45	43.3	53	48.6	221	50.2
Grand Total	227	100	104	100	109	100	440	100

ANNEX 10: GRIEVANCE REDRESS MECHANISMS 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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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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**ANNEX 11: REPORTING AND REFERRAL OF VAC, GBV AND OTHER SEXUAL RELATED
CASES ON THE PROJECT**

Stakeholder	Action and support is to be provided	Where the case should be Referred?
VAC /GBV Victim	<p>Reports to immediate persons like relatives, friends, peers, and other resourceful persons such as teacher, religious leaders, CSOs, LC, Police</p> <p>Makes a statement providing details on what happened, form of violence, perpetrator, any witnesses.</p>	Immediately refer the case to LC and Police for recording and further investigation.
<p>Community Persons including LCs, parents, guardians, Roads Committees, Project Management Committees, contractors' management teams, Grievance committees, Contractor's worker, Faith based member like church members, CSOs</p> <p>Police</p>	<p>Reports the case and perpetrator immediately to nearby Local Council, Contractor's supervisor, Probation Officer/ CDOs and Police for further action.</p> <p>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.</p> <p>Follow-up the case with LCs, Police, health services and courts of law.</p> <ul style="list-style-type: none"> • 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. 	<p>Refers the case to Police for further investigation.</p> <p>Refers the case to State Attorney for committing the perpetrator to courts of Law for hearing and sentencing</p>
Designated Medical Centre	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Assess the needs of the survivor/victim and refers the victim to services providers for appropriate support services, Collects data and information on the victim for processing and management 	Reports to Police

Stakeholder	Action and support is to be provided	Where the case should be Referred?
<p>Courts of law</p> <p>Prison</p>	<ul style="list-style-type: none"> • 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. • Ensures that the person found guilty serves his/her sentence, • Person is rehabilitated. 	<p>Commits the person found guilty to serve his/her sentence and orders for any care and support to be provided to the victims</p> <p>Freed at the end of serving the sentence.</p>
Contractors	<p>Ensure workers are well screened for VAC&GBV before employment with involvement of LC and Police</p> <p>Ensure workers files and background information is on file for future references</p> <p>Ensure workers are trained in company policies specifically on VAC & GBV</p> <p>VAC & GBV Tool box meetings organized</p> <p>Ensure that there is a site clinic and medical service provider for workers and other victims on referral by the site clinic</p> <p>Have MoU with Police to expedite any investigations and trainings</p> <p>Create awareness to the communities on VAC & GBV risks and referral pathways</p> <p>Cooperate with law enforcement agencies and officials in detecting, investigations and managing VAC & GBV cases</p> <p>Provide any other relevant support to victims</p>	<p>Refer all allegations of VAC & GBV to the Supervising Consultant, VAC&GBV Consultant for independent investigations and reporting to Uganda Police</p>
Local Government (CDOs and other relevant Officials)	<p>Monitors cases of any GBV/VAC allegations on the project</p> <p>Participate in GBV&VAC sensitizations to project workers and communities</p>	<p>Refers to Uganda Police and existing service providers to victims and survivors of VAC & GBV</p>

Stakeholder	Action and support is to be provided	Where the case should be Referred?
	<p>Provides technical guidance to contractors and communities on any referral pathway for a specific incident</p> <p>Maintains a directory of services providers (Government and Civil Society Organizations) for survivors and victims</p> <p>Links victim and survivors for more support to existing service providers</p> <p>Follows up on the progress of judicial processes for the suspects</p>	
MWE	<p>Ensure that the Civil works contracts have strong penalties for contractors and workers involvement in VAC & GBV</p> <p>Provides effective orientation of contractors and their staff on safeguards management on the project</p> <p>Deploys dedicated service provider for VAC& GBV on the project sites</p> <p>Monitors VAC & GBV cases in the community and assesses any cases involving the contractors and their workers</p> <p>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)</p> <p>Make follow up to ensure that all cases are judiciously managed</p> <p>Liaise with other MDAs to ensure appropriate actions to the VAC & GBV victims and offenders</p>	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 perpetrator

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 12: PROJECT INVESTMENT COST VALUATION

OUR REF: GMT|102|MWE
YOUR REF:

03th October, 2022

The Executive Director
National Environmental Management Authority
P. O. Box 22255, Plot 17/ 19/21 Jinja Road,
KAMPALA.

INVESTMENT APPRAISAL OF THE PROPOSED LARGE SOLAR POWER WATER SUPPLY AND SANITATION SYSTEM IN GASPA RGC, KIRYANDONGO DISTRICT.

1. 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 (PDO) is to improve access to water supply and sanitation services, capacity for integrated water resources management and the operational performance of service providers in project areas. The project will also contribute to the achievement of National Development Plan III objectives, Vision 2040 and Sustainable Development Goals. Under the IWMDP, funds have been provided for Environmental and Social Impact Assessment (ESIA), Resettlement Action Plan (RAP) and Source Protection Plans (SPP).

Component 1.2 Support to Refugee and Host Communities, this sub component will, with financing from the IDA 18 Refugees Sub-Window, support activities designed to improve the sustainable provision of water supply and sanitation services to refugee settlements and host communities. The sub-component will target the districts of Yumbe, Arua, Moyo (including Obongi district newly created from Moyo), Adjumani in West Nile, Lamwo in Northern and Kiryandongo in Central Uganda, where about 70 percent of the refugees in Uganda are being hosted.

In order to address the water supply and sanitation gap in Kiryandongo District, 3 solar powered piped water supply systems and 10 toilets have been proposed. These water supply and sanitation infrastructure will be implemented as part of the strategy to improve access to clean water, improved sanitation and hygiene in the refugee settlements and host communities.

The main components of the Large Solar piped water systems will include; a production well as a water source, a raw water pumping main to a reservoir, an elevated storage reservoir on a steel tower, Solar Pumps, Solar Panels, chlorine dosing unit, pump motor, pump house, distribution network, and service connections.

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2. TERMS OF REFERENCE

We received Instructions from M/S Ministry of Water and Environment to prepare a Valuation Brief advising on the Project Investment Estimate RAP for the proposed project in Gaspa Rural Growth Centres (RGCs)

3. LIMITING CONDITIONS

This Valuation Brief is subject to the following limiting conditions: -

- i. It is advisable that our approval of the form and context of this Brief Report should be sought if any altered or rephrased part of it is to appear in any published documents or circulars.
- ii. Where it is stated in the report that information has been supplied by another party, this information is believed to be reliable but we can accept no responsibility if this should prove not to be so. Where information is given without being attributed directly to another party, this information has been obtained by our own search of records and examination of documents or by enquiry from Government or other appropriate departments.
- iii. The responsibility of the firm in connection with this Valuation Brief is limited to **M/S National Environment Management Authority** to whom the Brief is addressed.
- iv. The values in this Brief are for the project described and any allocation of values between parts of the project apply only in the terms of reference and for the purpose of this Brief. The values assessed should not be used in conjunction with any other project, as they may prove incorrect if so used.
- v. This Brief is only valid if in original and without alteration and signed and sealed by us. We do not guarantee the validity or authenticity of any copies that may be presented to by any other person, organization or entity as being made from the original.
- vi. During the preparation of the Brief, we did consider the necessity of relying upon the work of a specialist, specifically an Engineer. The appropriateness and reasonableness of the assumptions and methods used by the specialist Engineer in arriving at some of the project estimates are the responsibility of the specialist. We do accept the specialist's judgment and work in this regard and believe that the specialist's assumptions or methods are unreasonable in the circumstances.

4. GENERAL DESCRIPTION

Gaspa RGC in Kiryandongo Sub County

Gaspa Rural Growth Center is located in Kiryandongo Sub County at coordinates 36N 214546N 404385E. Administratively, it is found in Mirima village, Kikube Parish. The RGC has roughly 260 households with an average household size of 5.1, the community population is approximately 1,326 people. The area also possesses one primary school with an approximate enrolment of 700 pupils and one health center II. Additionally, the center also

attracts refugees from Kiryandongo Refugee Settlement, located approximately 3km away, who come for trading. The settlement consists of refugees from South Sudan, Kenya and Congo. The area is served by three boreholes, but only two are functional. The area is also supplied by water vendors that sell a 20-liter jerry can at 500 – 1000 UGX during the dry season.

5. BASES OF VALUE & VALUATION METHODOLOGY

In arriving at the figure in this valuation brief, we have adopted the following Basis of Value and Methodology as defined by the International Valuation Standards and in accordance with the terms of reference: -

- i. Investment Value. The value of an asset to the owner or a prospective owner given individual investment or operational objectives (may also be known as worth). As a basis of Value, Investment value is an entity-specific basis of value thus reflecting the circumstances and financial objectives of the entity for which the valuation is being produced.

6. VALUATION

In accordance with our terms of engagement and having regard to the contents of this Brief, we certify that the investment cost for the Gaspa RGC Solar Power Water Supply and Sanitation System Project in Kiryandongo District is approximated at **UGX 3,375,000,000/- (Three Billion Three Hundred Seventy-Five Million Ugandan Shillings only)** as detailed in the Engineer's Estimate contained in the Bills of Quantities (BOQ) for this project.

On behalf of
GMT Partners



ALOZIUS GONZA FISURU
REGISTERED VALUER

