


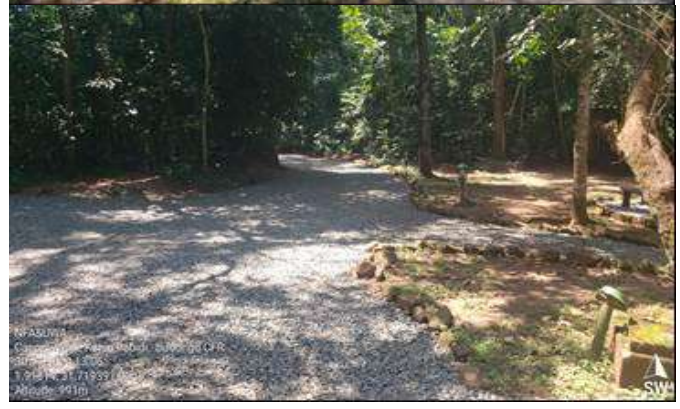
ENVIRONMENTAL SOCIAL IMPACT STATEMENT FOR THE PROPOSED TREE BASED CANOPY WALK IN KANIYO PABIDI BUDONGO CENTRAL FOREST RESERVE IN MASINDI DISTRICT

Submitted By	Submitted to
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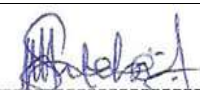

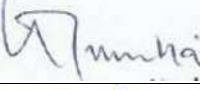

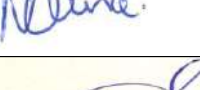
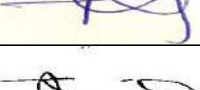


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We also wish to express our appreciation to key stakeholders for their insightful suggestions and for sharing their experiences with the SSC team. Special thanks go to the Ministry of Water and Environment (MWE), the Uganda Wildlife Authority (UWA), and the project team at the National Forest Authority (NFA) for their valuable guidance and for highlighting critical issues related to the proposed project. Furthermore, SSC acknowledges the significant guidance and expertise provided by the District Tourism Officer (DTO) – Masindi District, particularly regarding the integration of tourism and environmental considerations, as well as community linkages.

We also wish to extend our gratitude to the Department of Occupational Health and Safety within the Ministry of Labour, Gender, and Social Development (MLGSD) for their input on occupational health and safety concerns related to the project.

Lastly, SSC thanks all individuals and organizations that shared their views, suggestions, and insights regarding the proposed canopy walk project. Your contributions were instrumental in shaping the outcomes of this ESIA process.



ACRONYMS AND ABBREVIATIONS

AES	Audio Encounter Surveys
AM	Avoidance Measures
AOI	Area of Interest
BCFR	Budongo Central Forest Reserve
BFMPA	Budongo Forest Management Plan Area
CBD	Conservation on Biology Diversity
CFP	Chance Find Procedures
CFR	Central Forest Reserve
CHA	Critical Habitat Assessment
CM	Compensation Measures
DB	Bulb Temperature
DD	Data Deficiency
DMU	Direct Management Unite
DTO	District Tourism Officer
DTPC	District Technical Planning Committee
ESF	Environment and Social Framework
ESIA	Environment Social Impact Assessment
ESIS	Environment and Social Impact Statement
ESMP	Environment and Social Management Plan
FAO	Food and Agriculture Organization
FK	Fort Katsiha
GHG	Greenhouse Gases
GPS	Global Positioning Systems
H ₂ S	Hydrogen Sulphide
IBA	Important Bird Area
IFC	International Finance Cooperation
IUCN	International Union for the Conservation of Nature
K.P	Kainiyo-Pabidi
KBGS	Kachugiro Board Game Site
KUT	Kabalega Underground Tunnel
KW	Kabalega well
LC	Least of Concerns
LE	Lower Explosive Limit
LSA	Local Study Area
MHBS	Mparo Historical Burial Site
MLGSD	Ministry of Labor Gender and Social Development
MTWA	Ministry of Tourism Wildlife and Antiquities
MWE	Ministry of Water and Environment
NDP	National Development Plan
NEA	National Environment Act
NEMA	National Environment Management Authority
NGOs	Non- Government Organizations
NO ₂	Nitrogen dioxide
NT	Near Threatened
NTR	Non-Taxes Revenue
ODT	Omukama Duhaga Tombs
OHS	Occupation Health and Safety
OKBGS	Omukama Kabalega Board Game Site
OKM	Omukama Kabalege Museum
PCR	Physical Cultural Resources



PCs	Point Counts
PEL	Permissive Exposure Limits
PM	Particulate Matter
PWDs	Persons with Disabilities
RM	Restoration Measures
SSC	Strategic Sustainable Consults
TBCW	Tree Based Canopy Walk
TOR	Terms of Reference
TSCs	Time Specie Counts
UNESCO	United Nations Education, Scientific and Cultural Organization
UNFCCC	Uganda National Frame work Conservation of Climate Change
UNY	Uganda National Youths
UWA	Uganda Wildlife Authority
VES	Visual Encounter Surveys
VOC	Volatile Organic Carbon
VOCs	Volatile Organic Compounds
VU	Vulnerable
WBG	Wet bulb Global Temperature
WCS	Wildlife Conservation Society



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PROJECT GEOREFERENCED COORDINATES

Tree survey species and coordinates for the proposed TBCW (Kaniyo Pabidi)

S/N	Datum & Zones 36N	(x)-Eastings	(y)-Northings UTM
1	<i>Mahogany spp</i>	0358421	0211612
2	<i>Mahogany spp</i>	0358404	0211561
3	<i>Iron wood</i>	358366	211533
4	<i>Iron wood</i>	358442	211520
5	<i>Mahogany spp</i>	358438	211485
6	<i>Mahogany spp</i>	358464	211471
7	<i>Iron wood</i>	358475	211558
8	<i>Mahogany spp</i>	358465	211512
9	<i>Iron wood</i>	358484	211603
10	<i>Mahogany spp</i>	358447	211620



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EXECUTIVE SUMMARY

Project Overview

The National Forestry Authority (NFA) has initiated the implementation of a Tree-Based Canopy Walk (TBCW) at Kaniyo Pabidi in Budongo Central Forest Reserve as part of an ecotourism development project in the tourism zone of the Albertine Rift region, Uganda. In preparation for this investment, an Environmental and Social Impact Statement has been prepared to ensure compliance with National Environmental and Social safeguards along the Environmental and Social Standards of the World Bank among other relevant international ratifications ranging from treaties, charters, conventions etc. The investment is financed under the Investing in Forests and Protected Areas for Climate Smart Development (IFPA-CD) Project, for which the Government of Uganda secured funding from the World Bank. A portion of these funds has been allocated specifically for the canopy walk development by NFA. The project is being executed under the leadership of the Ministry of Water and Environment, in collaboration with the Uganda Wildlife Authority (UWA) and NFA. Additionally, the Ministry of Tourism, Wildlife, and Antiquities is overseeing tourism-related activities, while the Office of the Prime Minister is managing interventions in refugee-affected areas.

The proposed TBCW project is planned for implementation within the Kaniyo Pabidi Research and Tourism Zone, located in Kaniyo Pabidi, Labong Sub-County, and Budongo Sub-County, in Bujenje County, Masindi District. The site is strategically positioned along the Masindi–Pakwach Road, with access through the Kichumbanyobo Gate, leading into Murchison Falls National Park. Access to the project site is via the Kichumbanyobo Tourism Gate, followed by an estimated 6-7 km drive to Budongo Café. From there, visitors undertake a 1 km walk northeast of the Conservation Center at Budongo Café, deep into the forest interiors, where the TBCW will be located. The project area could be in the several villages in Kasenyi Parish, including Katuka 1 & 2, Tatanara, Alimugonza, and Jumba. The nearest trading centers to the site are Kigaragara (6 km away) and Kasenyi (7 km away) before the Kichumbanyobo Gate, which serve as important hubs for local economic and social activities in relation to the project.

Rationale

The Kaniyo Pabidi Research and Tourism Zone within Budongo Central Forest Reserve (CFR) has been designated to enhance and diversify NFA's tourism revenue streams by introducing new ecotourism products. As part of this initiative, the TBCW has been selected as a design-build project, with an implementation timeline estimated between 6 to 12 months. The TBCW construction is categorized as a low-risk, minimal-impact development, strategically planned within an area that already has existing tourism infrastructure, including tourist tracks and trails, which serve as natural access routes to the site. Additionally, the project has been designed with impact avoidance and mitigation measures to minimize disruptions to sensitive biodiversity and natural resources within the CFR, ensuring sustainable and environmentally responsible tourism development during its operation.

Project Objective

The IFPA-CD project aims to enhance the sustainable management of forests and protected areas while maximizing community benefits from forest resources in targeted landscapes. It aligns with the government's efforts to increase forest cover through afforestation and reforestation while mitigating forest loss and degradation. By adopting a landscape approach, the project seeks to improve both the management and economic productivity of forest ecosystems. It will integrate investments in forest management across state-managed and community-managed lands, ensuring



balanced conservation and utilization of forest resources. The project's key focus areas include strengthening forest governance, increasing revenue streams for sustainable forest management, and enhancing resilient livelihoods for communities dependent on forest resources.

ESIA Requirement

To ensure sustainability and meet national requirements (NEA, Cap 181-Schedule 5 (10-e), an Environmental and Social Impact Assessment (ESIA) is required whose primary objective is to assess and analyze the potential effects of the proposed TBCW development in Kaniyo Pabidi, Budongo CFR. The assessment aims to identify, predict, and evaluate impacts on the social, economic, and ecological aspects. To ensure project sustainability and minimize adverse effects, the proposed mitigation and enhancement measures will be integrated into the project's design, construction, operation, and decommissioning processes.

Alternatives

During the initial site visit, an assessment was conducted between late November and early December 2021 to evaluate potential locations for the project. Based on the site selection criteria, the Budongo Eco Lodge site was identified as the most suitable option due to its established infrastructure, accessibility along the main tourism route to Murchison Falls, and the availability of research data from chimpanzee trekking activities and the opportunity of integrating the chimpanzee tourism with the canopy experience.

While multiple sites, including Royal Mile, were considered, the 464-metre route in Kaniyo Pabidi was ultimately delineated. During the 2021 site assessment, all selected tree species were found to be in healthy condition, with GPS coordinates recorded. It was understood that the Environmental and Social Impact Assessment (ESIA) would further assess these trees and recommend mitigation measures to minimize risks to threatened or endangered species and the physical safety of the canopy walk. Following recent discussions, the site and route have been confirmed as suitable. The next step involves the design and development of an Environmental Monitoring and Management Plan (EMMP) to ensure sustainable construction and long-term operational management of the project. The alternatives and various required technological options have been considered.

Overview of the existing environment

The underlying geology of Budongo Central Forest Reserve (BCFR) is predominantly of Pre-Cambrian origin, composed of gneiss, schists, and granulites. In the southern Siba region, the substrate includes Bunyoro-Kyoga series rocks, consisting of metamorphosed mudstones, shales, phyllites, quartzites, and pluvial glacial conglomerates. The soils of BCFR are ferrallitic, representing the final stage of tropical weathering. They are deep, with minimal horizon differentiation, and contain little to no reserves of weatherable minerals. The dominant clay mineral is kaolinite, a low-lattice type, which is commonly associated with high concentrations of iron oxide and, in some cases, hydrated aluminum oxides.

The Kaniyo Pabidi section, a northeastern extension of Budongo Central Forest Reserve, is situated at the southernmost boundary of Murchison Falls National Park, where it transitions into the wooded savanna of the park. The forest, lying at an altitude of approximately 1,100–1,200 meters above sea level, remains in a relatively pristine condition and has been designated for ecotourism, ensuring minimal human disturbance through non-consumptive forest use. In this area no permanent stream or river passes through it.



Biologically Budongo CFR is a Key Biodiversity Area due to the considered presence of globally threatened species as some of these have been recorded in the relevant sections. The proposed canopy walk will be installed within an area of the forest that already features well-developed trails supporting various tourism activities, adjacent to Budongo Café at Pabidi. The vegetation is predominantly tropical high-forest, with about 50% covered by medium-altitude semi-deciduous *Cynometra-Celtis* forest, which provides habitat for a diverse range of flora and fauna. In the drier regions, the landscape transitions into Combretum-dominated savanna woodlands, which are well-adapted to seasonal moisture variations.

Historically, Kaniyo Pabidi was designated as a production forest during the colonial period, but it has since transitioned into an ecotourism and nature reserve. The proposed canopy walk site is progressing toward a primary forest ecosystem, featuring an outstanding emergent and canopy layer, along with a well-established understory and forest floor vegetation. The area supports a rich diversity of wildlife, including mammals from four major orders: *Insectivora*, *Chiroptera*, *Rodentia*, and *Primates*. Some species recorded may also inhabit the savanna woodland section of Kaniyo Pabidi, further highlighting the ecological significance of the site. Forest interior species of birds were recorded and the checklist is annexed. In brief there were 32 species of mammals, 39 bird species, herpes, were as well included in the assessment. Some of the recorded species contribute to indication that Kaniyo Pabidi in Budongo is a HCVF and regarded as IUCN species of conservation concern.

Socio-economics

The project is located in Masindi District, which has an estimated population of 342,496 people, comprising 170,972 males and 171,524 females, with approximately 340,271 households (NHPC, 2024). The district population trend is being seen by many as a potential for local tourism in the area. Since the 2014 NHPC census, when the population stood at 64,820, the district has experienced steady growth. Between 2015 and 2020, the population was projected at 66,300, 68,200, 70,100, 72,100, 74,100, and 76,100, respectively. The main economic hub, Masindi Town, is located about 29 km southeast of the project area. The local communities primarily depend on agriculture, with many engaged in subsistence farming and employment in sugar plantations and factories. However, only a small number participate in tourism-related activities. A key challenge faced by the community is wildlife raids, especially the primates which destroys crop, eat poultry, and sometimes break homes looking for food. A survey of the project area confirmed that there are no socio-economic facilities, such as water sources, health centers, schools, or markets, within a 1 km radius of the site. As the proposed development is within a protected area, no private land acquisition will be required. The project is expected to generate direct positive impacts for the local community, particularly in terms of livelihood opportunities and economic benefits.

Stakeholder Engagement

A number of stakeholders were engaged and these included UWA (head office and Kichumbanyobo gate), NFA (head office and Masindi office), MWE, NEMA, MoGLSD, UTB, Masindi District Local Government and Department of Museums and Monuments in the MTWA. Other stakeholders engaged included local community in Kasenyi and Kigaragara villages, Budongo Café staff and different groups of Tour operators and guides associations. The engagements were undertaken between November 2024 and January 2025.

Table 0.1 below highlights the key points / issues / concerns raised by various stakeholders, including national authorities, district local governments, and the local community.



Table 0-1: Key points / issues / concerns raised by various stakeholders

No	Meeting date	Stake holder/ entity	Number Participants	Key concerns/ issues
1	27th of Jan, 2025	NFA	05	<ul style="list-style-type: none">✓ Clarification is needed regarding NFA's legal mandate in relation to UWA and other stakeholders, with references made to Cap 160 and Chapter 7 of the SFR. Issues such as access rights, licensing agreements, and inter-agency coordination were raised as areas of concern and potential conflict.✓ Key project documents like the updated Forest Management Plans, biodiversity reports, and maps must be reviewed and shared. There were also calls for proper stakeholder consultations, including with Great Lakes Safaris, and the need to align all activities with NEMA-approved Terms of Reference.
2	20 th Jan 2025	UWA	05	<ul style="list-style-type: none">✓ Developer should consider the poor network that hinders communication in that area✓ Operator of this proposed project is subjected to local taxes and licenses at all levels✓ Should boost tourism in the ecological area and create job for the local people
3	27 th Jan 2025	Mw&E	08	<ul style="list-style-type: none">✓ sustainability and safety for measurements for the tourists✓ concern of noise to affect these animals
4	28 th Jan 2025	MOGLSD	01	<ul style="list-style-type: none">✓ Health, Safety, and Welfare of Workers✓ Compliance with Occupational Health and Safety Regulations✓ Environmental Monitoring and Impact Management
5	20 th Jan 2025	Masindi district	15	<ul style="list-style-type: none">✓ Access to the proposed project as local dears✓ Employment of local tour operators and laborers✓ Safety of potential customers✓ Waste management while operating
6	23 rd Jan 2025	UTB	01	<ul style="list-style-type: none">✓ Standard Operational Procedures (SOPs). Of UTB✓ owners of the facility and also the visitors are protected✓ protect the environment while operating
7	24 th Jan 2025	USAGA	03	<ul style="list-style-type: none">✓ Waste management while construction and operational✓ Employment for mostly local people✓ Preferred royal mile for the location of the proposed project because it has more tourism activities
8	30 th Jan 2025	ESTOA	01	<ul style="list-style-type: none">✓ Waste management✓ Noise and air quality while construction and operating✓ waste management✓ concern of night works
9	21 st Jan 2025	Kasenyi community	01	<ul style="list-style-type: none">✓ UWA to give more support in community tourism✓ Women should be supported in the activities they carry out



No	Meeting date	Stake holder/ entity	Number Participants	Key concerns/ issues
		tourism association		
10	30 th Nov 2024	Budongo café	03	✓ Waste management while construction ✓ Avoid working past working hours
11	30 th Nov 2024	UWA office kamchumbayobo Gate MFNP	01	✓ Employment of local people
12	20 th Jan 2025	Kasenya community	52	✓ Access in the forest for fire wood ✓ They need social inclusion ✓ Increase wildlife attack ✓ Locals for employment opportunities
13	20 th Jan 2025	Kigaragara	17	✓ Increase of animal attacks ✓ Limitation of access to the forest ✓ Social inclusion of the locals

Potential environmental and social impacts:

Findings indicate that implementation of the TBCW walk project will lead to direct and indirect positive impacts which shall be accrued by the country as a whole through increased revenue as a result of increase in number of tourists. Some of the positive impacts anticipated include;

- Increased opportunities for employment and other economic activities linked to TBCW construction
- Benefits to the local economy resulting from opportunities to provide goods and services for the operation near Kichumbanyobo gate
- Benefits to national economy arising from increased revenue generation from increase in the number of tourists and employment opportunities to Ugandans (different tourism sector stakeholders).
- The direct negative bio-physical impacts anticipated are mostly on Kaniyo Pabidi as a forest ecosystem. Some of the risks and negative bio-physical and safety impacts identified and assessed are; Disruption of ecological processes,
- Noise pollution,
- Disruption of wildlife activities which might lead to migration,
- Disturbance of nesting sites,
- Visual impacts,
- Impacts on wildlife associated with increased human presence in the forest and poor management of solid waste.

The potential impacts of the project have been assessed, categorized, and rated across the different project phases, with corresponding mitigation and enhancement measures proposed for implementation by the relevant stakeholders.

To ensure effective environmental and social management, a comprehensive plan has been developed to guide the National Forestry Authority (NFA), contractors, and operators throughout the construction and operational phases. This plan outlines:

- The nature and significance of each potential negative impact
- The specific project phase in which the impact is likely to occur
- Proposed mitigation measures to minimize or eliminate adverse effects
- Key performance indicators for tracking the implementation of these measures



- The timeline for execution and monitoring
- The responsible parties for implementation, oversight, and compliance

A summarized plan is presented in Table 0-2 below;

Table 0-2: Summarized Environmental and Social Management Plan

Identified Impact	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation
Mitigation of impacts associated with the construction phase			
Change in species and habitat diversity	-Habitat restoration -Species monitoring and invasive species control -Implement adaptive management -Collaboration with Conservation Organizations	NFA/Operator	Throughout the project cycle
Wildlife harassments	-Observe speed limits as per protected area management rules -Adhere to the time of construction -Abide to Budongo CFR regulation	NFA/Operator	During construction
Change in scenic quality	-Proper waste management -Confine to the core area -Adhere to the time of construction -Blend canopy walk structures with the forest environment -Adhere to Budongo CFR - FMP and regulations	NFA/Operator	During construction
Incompatibility with BUDONGO CFR's - FMP and policies	-Adhere to Budongo CFR- FMP and policies - Look for an alternative site for the lodge	NFA/Operator	Before construction
Noise pollution	-Adhere to the time of construction -Use noise dampening equipment -Some building materials and components to be processed off-site and fixed on-site	NFA/Operator and contractor	During construction
Dust pollution	-Adhere to the time of construction -Use water howitzers to dampen dust in case a new access route will be opened -Confine to core area	NFA/Operator and contractor District Community Development Office NGOs/CBOs	During construction
Change in population size, values, and norms	- Provide awareness to the public on local norms and values - Budongo CFR management to strengthen security and anti-poaching - Budongo CFR to participate in screening workers to weed out known poachers in case there are;	District Community Development Office NGOs/CBOs	During construction



Identified Impact	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation
	<ul style="list-style-type: none"> - Budongo CFR management to raise awareness among workers in the values of conservation - Adhere to construction time - Budongo CFR to enforce entry regulations -Consider adding conducting community outreaches to the adjacent community 		
Increased incidences of diseases and ill health	<ul style="list-style-type: none"> -Medical Support and Sanitation Facilities -Health education per new fleet of visitors -Vector Control: Implement measures to control vectors of disease transmission -Monitoring and Surveillance to track incidences of diseases among visitors and staff -Staff training: on visitor screening 	NFA/Operator	Throughout the project cycle
Incidences of risks, hazards, and accidents	<ul style="list-style-type: none"> -Adhere to construction time and schedule - Limit the number of vehicles to the site to those for construction only -Avoid construction during the high season -Process some of the materials outside for fixing on-site - Establish a speed limit. Enforcement will be key. 	NFA Contractor Tourist vehicles	Throughout the project cycle
Pressure on utilities	<ul style="list-style-type: none"> -Project workers should ensure they pay fairly and timely for services consumed. -Workers may practice water harvesting, and the community is encouraged to do so. 	Contractor	During construction
Effects of social cohesion	<ul style="list-style-type: none"> -Recruit project workers from within the project area as a strategy of reducing the influx of people. -Sensitize project workers against unnecessary interactions and ensure following the area's cultural norms. -Support the existing health centers in the project area to enhance the provision of services to the increasing population. -Popularize the community grievance mechanism. 	Contractor NFA	During construction
Mitigation of impacts associated with the operation phase			



Identified Impact	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation
Waste management	<ul style="list-style-type: none"> -Developer to treat all generated waste biologically -Put in place specific personnel to collect, sort, and manage at a generation point within the canopy walk and dispose of following NEMA standards of waste treatment and practices respectively properly all solid waste -Adhere to Budongo CFR waste management regulations and practices. 	NFA/Operator	During operation
Change in habitat and species diversity	<ul style="list-style-type: none"> -Treat all waste biologically and as relevant to the site to avoid any species to feed on them -Collect, sort, treat/dispose of waste generated properly -Abide to NFA waste management regulations -Conduct a detailed assessment of the impact of waste on the species and habitat diversity along the Canopy Walk 	NFA/Operator	During operation
Wildlife harassment	<ul style="list-style-type: none"> - Budongo CFR management to consider planned canopy walks based on understood specific wildlife species behavior - Budongo CFR to enforce its LAU on roads - Budongo CFR to revise fees upwards for penalties for offenses regarding off-road driving - Budongo CFR to limit the number of vehicles to the crater - Budongo CFR should consider alternative products apart from game viewing 	NFA/Operator	During operation
Change in scenic value	<ul style="list-style-type: none"> -Collect, sort, treat/dispose of solid/liquid waste properly -Abide to Budongo CFR waste management regulations & design a specific solid and human waste management plan in the Canopy Walk 	NFA/Operator	During operation
Increased incidences of diseases and ill health	<ul style="list-style-type: none"> -Provide awareness to the public on referral pathways for HIV/AIDS and other diseases such as ebola, cholera, etc., - Provide VCT centers 		During operation



Identified Impact	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation
Change in the level of population	<ul style="list-style-type: none"> - Budongo CFR to enforce entry regulations -Conduct campaigns on environmental education - Budongo CFR to limit the number of vehicles to the Kaniyo-Pabidi zone -Masindi District Local Government to enforce by-laws on conservation -Develop & encourage workers to form SACCOS -Housing of workers on the Canopy Walk to be managed under NFA accommodation guidelines 	NFA	During operation
Increased traffic levels	<ul style="list-style-type: none"> - Budongo CFR management to revise upward penalties for protected area offenses - Budongo CFR management forecasts tourist numbers on the Canopy Walk - Budongo CFR management to commission detailed study on factors causing overcrowding in case of business picking up 	Budongo CFR management	During operation
Increased human-wildlife conflicts	<ul style="list-style-type: none"> -Compensate locals who were affected by animal raids in previous years. -Encourage and sensitize locals to have diverse livelihood sources to minimize reliance on agriculture. -Train locals to create and maintain community tourism to benefit from the increasing number of tourists in the area. 	NFA Masindi District Local Government	High
Failure of the local community to benefit	<ul style="list-style-type: none"> -Encourage and sensitize locals to have diverse livelihood sources. -Train locals in creating and maintaining community tourism so that they benefit from increase in number of tourists to the area. -Support existing community tourism activities. -Advertise at different fora community tourism activities in the area. 	NFA Masindi District Local Government	High
Insecurity	<ul style="list-style-type: none"> -Encourage community policing to identify the culprits and to ensure the safety of tourists and project materials; -NFA should develop a security plan in liaison with the LCs and the police to curb cases of theft especially of construction materials; 	NFA Uganda Police/UPDF Masindi District Local Government	Low



Identified Impact	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation
	-Collaborate with the local security organs to curb insecurity and theft.		
Incidences of risks and hazards	-Proper disposal of solid waste -Stakeholder-engagement -Regulatory compliance -Regular inspections and maintenance -Data sharing on the safety of the Canopy Walk with management -Emergency preparedness and Response towards wildlife behavior, -Risk Assessment & Management Plan -Visitor monitoring and Capacity management: -Visitor education and interpretation -Staff training and certification	-NFA/ Operator -UTB -Waste handler -MTWA -MGLSD	Once in three months
Compliance with the NEMA approval conditions	Undertake Environmental & Social Audits as per Regulation 3 sub-regulation 1 – 2 Ensure implementation of approval conditons	NFA/Operator	Annually throughout the project life cycle
Mitigation of impacts associated with decommissioning			
Change in scenic quality	-Proper waste management -Confine to the core area -Adhere to the time of construction -Blend canopy walk structures with the forest environment -Adhere to Budongo CFR - FMP and regulations	NFA/Operator	During decommissioning
Loss of employment	- Proper and timely payments of pension/terminal benefits of workers after services	NFA/Operator	During decommissioning
Dust pollution	Contractors during construction will use existing roads and there will be no additional access route that will be added	NFA/Operator Contractor	Throughout project cycle
Change in lifestyle and quality of life	-Proper and timely payments of pension/terminal benefits of workers after services	NFA	During the Operation
Reduced benefits to communities and the local economy	-Provide on-job training for various trades and skills -Awareness about investment opportunities (e.g. SME activities	-NFA -UTB -MTWA -NGOs -CBOs	Before decommissioning

This structured approach ensures that all mitigation measures are systematically implemented, monitored, and evaluated to enhance the project’s sustainability and compliance with environmental and social safeguards.



Conclusion & Recommendations

The proposed development is anticipated to have minimal negative impacts, which can be effectively managed through the implementation of the recommended mitigation measures, given the project site's characteristics. The project also presents significant environmental, social, and economic benefits, as outlined in various sections of this assessment. To ensure environmentally and socially responsible development and operations, a comprehensive Management and Monitoring Plan has been established. The National Forestry Authority (NFA) must take the lead in implementing and enforcing these plans to maintain compliance with environmental and social safeguards.

Should any unforeseen impacts arise that were not identified in this Environmental and Social Impact Assessment (ESIA), NFA must promptly engage the National Environment Management Authority (NEMA) and other relevant lead agencies to address them appropriately. Strict adherence to the proposed mitigation measures throughout the project lifecycle will minimize potential risks, enhance sustainability, and ensure that restoration measures are effectively implemented at the project's end.



CHAPTER 1

1. INTRODUCTION

1.1. Background

The Government of Uganda (GoU), with financing from the World Bank, is implementing the Investing in Forests and Protected Areas for Climate Smart Development (IFPA-CD) Project to address the increasing vulnerability of economic productivity, biodiversity, and livelihoods to climate change. The project is a joint effort led by the Ministry of Water and Environment (MWE), in collaboration with the National Forestry Authority (NFA), Uganda Wildlife Authority (UWA), and the Ministry of Tourism, Wildlife and Antiquities (MTWA). The project aims to improve sustainable management of forests and protected areas and increase benefits from forests and protected areas in the target landscapes.

A key aspect of the IFPA-CD project is diversifying tourism packages in protected areas to boost revenues and jobs. The NFA, under Component 2, will develop eco-tourism infrastructure, including the construction of a Canopy Walk at Kaniyo Pabidi in the Budongo Central Forest Reserve (CFR). This Canopy Walk, designed as a tree-based system to minimize environmental disruption, will be located in a high-biodiversity area, offering visitors a unique experience and promoting conservation, particularly for the native chimpanzee population that relies on the forest for survival.

The NFA's decision to invest in this project aligns with its mission to sustainably manage CFRs while enhancing tourism opportunities. The Canopy Walk will complement ongoing forest conservation efforts and serve as a flagship product for eco-tourism in Uganda.

assessment ensure that the project adheres to the necessary safeguards and promotes sustainable development in line with both national and international standards.

The scoping exercise identified potential environmental and social impacts of the proposed project and set the boundaries for the subsequent Environmental and Social Impact Study, which has culminated in developing this ESIS. The assessment has focused on proposing mitigating measures for likely effects, enhancing positive outcomes, and ensuring compliance with national and international environmental legal requirements

In compliance with the World Bank's Environmental and Social Standards (ESSs), the National Environment Act, Cap 181 and the World Bank Group's Environmental, Health, and Safety (EHS) Guidelines, NFA has contracted Strategic Sustainable Consult Ltd to conduct an Environmental and Social Impact Assessment (ESIA) for the proposed Canopy Walk project. The assessment has been undertaken to ensure that the project adheres to the necessary safeguards and promotes sustainable development in line with both national and international standards.

1.2. National Forestry Authority

The National Forestry Authority (NFA) was established under Section 52 of the National Forestry and Tree Planting Act Cap 160 and officially launched on April 26, 2003, in alignment with the Forestry Policy of 2001. NFA is tasked with the mandate to: “Manage Central Forest Reserves sustainably and provide high-quality forestry-related products and services to the government, local communities, and the private sector.” NFA envisions becoming a world-class global leader in sustainable forest management. Its mission is to sustainably manage and develop Uganda's Central



Forest Reserves while delivering quality forestry products and services to support the country's socio-economic development.

NFA oversees the management of 506 Central Forest Reserves (CFRs), covering a total area of 1,262,090 hectares. Its key objectives include enhancing the management of CFRs, expanding partnerships, supplying both forest and non-forest products and services, and ensuring organizational sustainability.

The NFA address is:

National Forestry Authority
Head Offices - Plot 10/20, Spring Road,
P.O. Box 70863, Kampala - Uganda
Telephone Contacts: +256-312-264035/6 or +256-312-230400

The NFA is the proponent of the proposed Canopy Walk at Kaniyo - Pabidi, located within the Budongo Central Forest Reserve (BCFR) for which the ESIA Report has been prepared.

1.3. Business

The National Forest Authority (NFA) seeks to establish a world-class forest canopy walkway and eco-tourism center at Kaniyo-Pabidi in the Budongo Central Forest Reserve (BCFR), Uganda. The project aims to transform this location into a premier eco-tourism destination, complementing the existing Budongo chimpanzee tracking experience and eco-lodge. This initiative builds on the success of over two decades of chimpanzee research and eco-tourism activities, further positioning Budongo CFR as a must-see destination for tourists visiting the nearby Murchison Falls National Park which is about 70 km from Kichumbanyobo gate. The entire distance from Kampala to Masindi is 212km and a distance from Masindi 30km. Thus, the general distance is 242km to the project site.

Kaniyo Pabidi was selected as the ideal site for this project due to its established ecotourism infrastructure, minimal environmental impact, and historical conservation efforts.

1.4. The Tree Based Canopy Walk

Kaniyo Pabidi is the entry point to Budongo Central Forest Reserve (BCFR) because of its strategic location. The proposed canopy walkway is therefore a necessary intervention for enhancing ecotourism services. The proposed TBCW aims to provide visitors with an immersive, low-impact experience while maximizing benefits for both the National Forestry Authority (NFA), biodiversity conservation and local communities. The planned access trail to the proposed canopy walk from the Eco-tourism Centre will utilize the existing, well-maintained nature trails, covering approximately 900 meters to the walkway entrance. NFA is preferring the use of already existing trails because literature shows that the same model implemented at Nyungwe National Park in Rwanda, where the Uwinka Visitor Centre and canopy walkway are connected by a similar buffer distance of over 600 meters, optimizing visitor flow and environmental protection.

Positioning the canopy walkway within an active, eco-tourism-friendly trail network using trees to hold the walkway allows for minimal ecological disruption, avoiding sensitive areas like endangered bird habitats and sections frequented by chimpanzees or other sensitive wildlife. This strategic approach ensures the integration of ecotourism infrastructure within a managed area, minimizing the potential for adverse impacts on local biodiversity while enhancing visitor experience and conservation awareness.



By elevating visitors from ground trails onto an aerial pathway, the tree-based system effectively manages visitor flow, preserving the natural environment while providing structured, controlled access to the forest’s unique canopy ecosystem. Tree-based canopy walkways offer an immersive and adventurous experience, reducing the need for extensive construction routes and eliminating ground-based structures or the introduction of foreign materials into the ecosystem. Designed for portability, these walkways allow all components to be transported along existing trails, requiring neither intrusive construction methods nor lengthy build times. This approach aligns with eco-friendly tourism goals, ensuring that the beauty and integrity of Kaniyo Pabidi’s landscape are preserved while enhancing visitor engagement and environmental stewardship.

1.5. Project Cost

The Table 1.1 provides cost estimates for the TBCW in Kaniyo - Pabidi below:

Table 1-1: Demonstrating proposed cost summary

Item	No. estimates	Percent estimation	Amount estimation in \$ USD
Tree Platforms	10		420,000
Bridges	11		461,872
Shipping			35,000
Installation			352,749
Engineering		10	88,187
Project Management		20	253,924
Total			1,611,733

1.6. The Background to Establishing the Nature Based canopy

The National Forestry Authority’s (NFA) tourism development strategy aims to diversify visitor activities within the Forest Reserve, tapping into new revenue streams and enriching the tourism experience. As outlined in the Strategic Plan 2020-2025, NFA’s initiatives are projected to generate a significant UGX 10 billion in direct contributions to Uganda’s tourism GDP. By the end of this period, Non-Tax Revenue (NTR) is expected to rise substantially from the current UGX 8.32 billion to an impressive UGX 29.95 billion, reflecting the positive economic impact of expanded ecotourism offerings in Uganda’s forest reserves. As part of this strategy, NFA wishes to explore the possibilities of a Canopy Walkway Tourism facility within Budongo Central Forest Reserve (CFR) in Kaniyo - Pabidi:

- Develop a world-class forest canopy walkway and eco-tourism centre at Kaniyo Pabidi (KP) in Budongo Central Forest Reserve (BCFR), transforming the area into a premier eco-tourism destination.
- Build upon the success of the Budongo Chimpanzee tracking and Eco-lodge to create additional eco-tourism experiences and opportunities, attracting visitors and positioning BCFR as a must-see destination, complementing nearby Murchison Falls National Park.
- Support chimpanzee habitat conservation and highlight decades of research and education that have benefited forest conservation in Uganda and Africa, using the Chimpanzee’s Nest Canopy Walkway as an anchor for the destination.
- Ensure the development has minimal environmental impact by using tree-based canopy



walkways and existing nature trails, avoiding disruptive construction and protecting sensitive wildlife habitats.

- Offer a unique and adventurous visitor experience by providing structured and controlled access to the environment, similar to successful projects like Rwanda's Nyungwe National Park.

Implement a phased, low-footprint eco-tourism development that balances tourism growth with environmental sustainability

1.7. Relationships to Other Projects

Revitalizing Uganda's tourism industry, canopy walks offer an elevated adventure through the tropical high conservation value rain forests of Bwindi, Kibale, Mabira, and beyond. These unique attractions provide visitors with the opportunity to explore forest canopies, observe diverse fauna and nature formations, and enjoy breathtaking views, all while promoting eco-friendly and sustainable tourism. Designed with safety and accessibility in mind, canopy walks cater to adventure seekers, eco-tourists, families, and educational groups. They diversify Uganda's tourism portfolio, complementing traditional attractions like wildlife safaris and gorilla trekking. Beyond enhancing visitor experiences, canopy walks generate revenue through entrance fees, guided tours, and local crafts while creating jobs and fostering community engagement. They also raise awareness of forest conservation, aligning with Uganda's Vision 2040 and its commitment to preserving natural heritage.

Marketing strategies for canopy walks include digital campaigns, partnerships with tour operators, and curated packages combining canopy walks with forest hikes and birdwatching. Launch events and eco-tourism fairs will further boost visibility, attracting adventure enthusiasts worldwide. By investing in such initiatives, Uganda strengthens its position as a premier eco-tourism destination, ensuring sustainable growth and long-term benefits for communities and conservation. A prime example is the Tree-Based Canopy Walk (TBCW) under development in Kaniyo Pabidi, Budongo Central Forest Reserve (CFR). Once completed, it will be a landmark attraction, standing as Uganda's second canopy walk after the Uganda Wildlife Authority (UWA) project proposed in Sebitoli, Kibale National Park. Situated over 200 km apart along the Albertine Rift, these iconic experiences anchor Uganda's ecological and adventure tourism within this vibrant conservation region.

The TBCW project, financed by the World Bank, is classified as Moderate Risk under the Bank's Environmental and Social Framework, that requires careful assessment and management of potential impacts. In contrast, earlier road infrastructure project in the area, though classified as high-risk during construction, have ultimately enhanced regional tourism connectivity. South of the main road in Kaniyo Pabidi, a Budongo eco-lodge is under construction approximately 3 km from the proposed TBCW location. This is an indication that the area is automatically becoming an eco-tourism hub. The ecolodge commissioned to Great Lakes by the National Forestry Authority (NFA), aims to develop additional tourism products while enhancing conservation efforts in the area.

Interestingly, the proposed location of the TBCW lies along the main route to the Murchison Falls Conservation Area, one of Uganda's most renowned tourism destinations. This strategic placement



makes the TBCW a valuable addition to Uganda's tourism offerings, enhancing diversity and complementing the existing attractions within Murchison Falls National Park.

1.8. Environmental Social Impact Assessment Requirements

Section 113 of the National Environment Act (NEA), Cap 181 requires the developer of a project set out in Schedule 5 of the Act to conduct an Environmental and Social Impact Assessment by way of scoping, prepare terms of reference for the environmental and social impact study, and undertake an environmental and social impact study. In addition, the World Bank's Environmental and Social Framework (ESF) specifically ESS 1 is being used since it applies to all projects supported by the Bank through Investment Project Financing. Projects supported by the Bank through Investment Project Financing are required to meet the ten Environmental and Social Standards. The Bank requires that all environmental and social risks and impacts of the project be addressed as part of the environmental and social assessment conducted in accordance with ESS1. ESS2–10 set out the obligations of the Borrower in identifying and addressing environmental and social risks and impacts that may require particular attention. These Standards establish objectives and requirements to avoid, minimize, reduce and mitigate risks and impacts, and where significant residual impacts remain, to compensate for or offset such impacts. The proposed project falls under the category of "hotel, tourism and recreational development" in Schedule 5 of the NEA, Cap 181. Schedule 5, Section 10 (e) lists the establishment of zip lines, canopy walks, cable cars, hot air balloons, paragliding, bungee jumping, or related infrastructure, as projects for which environmental and social impacts assessment is mandatory. The ESIA has been undertaken in line with the Ugandan laws and regulations and international best practices.

1.9. Environmental Social Impact Assessment Objectives

The specific objectives of the assignment were:

- i. To evaluate the project's potential environmental and social risks and impacts; examine project alternatives; identify ways of improving project selection, siting, planning, design, and implementation in order to apply the mitigation hierarchy for adverse environmental and social impacts and seek opportunities to enhance the positive impacts of the project.
- ii. To carry out comprehensive biophysical and social-economic assessments of the project area.
- iii. To carry out stakeholder engagement as an integral part of the assessment, in accordance with ESS 10.
- iv. To establish the baseline conditions in the project and their surrounding environments and assess how these conditions will be affected by the proposed project on one hand and how the conditions will affect the project on the other hand.
- v. To identify and assess the magnitude and duration of both positive and negative impacts resulting from the implementation and operation of the project.
- vi. To compile an environmental and social management Plan of the project to assist in the decision-making process and serve as a basis for future environmental monitoring of the project.

1.10. Scope of the ESIA

The ESIA consultants identified and assessed the potential environmental and social impacts related



to the proposed Canopy Walk operations. The scope of work for the consultants included the following:

- provide a suitable description of the proposed project, including purpose and justification, location (with maps at appropriate scales); general layout; size, capacity, waste streams; pre-construction activities; construction activities; scheduling; staffing and support facilities and services; stakeholder engagement; operation and maintenance activities; required off-site investments; life span; the material in-puts into the Project and their potential environmental effects; the technology and processes that shall be used; description of alternative technologies and processes, and the reasons for not selecting them; the products and by-products of the Project. collect, evaluate, and present baseline data on the relevant environmental characteristics of the study area, including the biological and physical state of the area.
- Assess the risks and impacts associated with primary suppliers.
- Review the current vegetation cover on the proposed areas and determine interventions for restoration and improvement.
- Assess the risk potential for introduction of exotic species not present in the project area, particularly when they replace endemic species or relicts and recommend measures for avoidance of the occurrence.
- Assess the effect of project related clearing of vegetation on co-dependent ecosystems and recommend measures to minimize the damage.
- Assess and make an inventory of flora or fauna considered to be threatened or at risk, or that requires specific management and monitoring to ensure minimal impact occurs during the installation and operation of the canopy walkway.
- Assess specific habitat or environmental features that require special attention.
- Assess the presence in the area of birds, primates and other wildlife with focus on those that require special attention.
- Assess the risks and impacts associated with the supply of biological products to the project to ensure that they comply with the legal requirements and standards to protect the biodiversity and the natural habitats.
- Assess deterioration in soil stability and quality as a result of the project construction and operation activities.
- Determine project activities that promote soil erosion and recommend mitigation measures.
- Assess damage to the land, ground water and surface water ways off-site as a result of projected related activities.
- Determine significant potential modifications or damage to fragile ecosystems as result of project activities
- Assess the soil physical and chemical properties
- Assess potentially significant project-related risks and impacts, such as impacts from



effluents and emissions, increased use or contamination of waterways, emissions of short- and long-lived climate pollutants, climate change mitigation, adaptation and resilience issues, and impacts on threatened or depleted migratory species and their habitats.

- Assess accessibility, availability, quality and affordability of community health services and sanitation.
- Collect and analyze community health baseline data that covered HIV/AIDs, water-borne diseases, non-communicable diseases, COVID-19 and maternal health
- Assess the effects of quality of water entering and leaving project area.
- Investigate any proliferation of pathogens and sanitary vectors due to project activities including mosquito prevalence.
- Investigate effects of modification of water use destined for human consumption
- Assess community health and safety risks and the vulnerability of specific groups such as the elderly, women, children and the disabled.
- Integrate aspects of quality, safety and climate resilience in the design and construction of infrastructure.
- Investigate in consultation with the relevant stakeholders the presence of historic, cultural, public or archaeological monuments that could be impacted as a result of the project construction and operation.
- Investigate impact of project activities on any cultural sites and affected people, communities, cultural, religious and other groups.
- Assess the cultural attachment of the community to the project area.
- Integrate cultural aspects into the project development and subsequent implementation.
- Appraise the existing socio - economic situation in the project area.
- Develop engagement mechanisms for integrating the community roles and benefits in the project implementation.
- Assess the present and future roles of gender in project implementation.
- Determine inclusivity and equitable participation in the project development
- Assess the forest use by the communities including access to forest products and services within the project area.
- Assess any existing or potential human wildlife conflicts with the communities including problem animal issues, vermin etc.

The ESIA was conducted based on the approved Terms of Reference issued by NEMA under Reference (NEMA/4.5) on 30th December 20224. The ESIA process in Uganda is well stipulated in the in the National Environment (Environmental and Social Assessment) Regulations, 2020:



1.11. Structure of the Environmental Social Impact Statement

The Environmental and Social Impact Statement (ESIS) has been prepared in strict compliance with Regulation 18(1) of the National Environment (Environmental and Social Assessment) Regulations, 2020, and adheres to the prescribed format outlined in Schedule 5 of the same Regulations.



CHAPTER 2

2. PROJECT DESCRIPTION

2.1. Project Name

The name of the project is “Tree Based Canopy Walk” (TBCW) at Kaniyo Pabidi, Budongo CFR. It is part of a broader “Investing in Forests and Protected Areas for Climate Smart Development (IFPA-CD) Project”. The project is led by the Ministry of Water and Environment (MWE) in collaboration with the Uganda Wildlife Authority and the National Forestry Authority. The Ministry of Tourism, Wildlife, and Antiquities contributes to tourism-related initiatives, while the Office of the Prime Minister oversees activities in areas impacted by refugees.

2.2. Project’s Categorisation in World Bank ESF

The World Bank categorizes all projects it finances, in a consideration that it can be into one of four risk classifications i.e. High Risk, Substantial Risk, Moderate Risk, or Low Risk. The risk classification is determined based on various factors, including the project's type, location, sensitivity, and scale; the nature and magnitude of potential environmental and social risks and impacts; and the Borrower’s capacity and commitment (including that of any implementing entity) to manage these risks in alignment with the Environmental and Social Standards (ESSs). Additional considerations may include legal and institutional frameworks, the complexity of mitigation measures and technology, governance structures, and contextual factors such as stability, conflict, or security concerns.

Based on the environmental and social baseline assessment particularly given the project’s location away from community settlements and an evaluation of its scale (a 464-meter-long elevated TBCW, the findings indicate that the project’s anticipated positive impacts outweigh the potential negative effects. Consequently, the project is classified as Moderate Risk in consideration of activities during the construction and operation respectively.

2.3. About Kaniyo Pabidi and its location

The proposed Tree Based Canopy Walk (TBCW) will be located in Kaniyo Pabidi Forest, a north-eastern extension of the Budongo Central Forest Reserve (CFR), which exemplifies significant biodiversity and ecological heritage within Uganda. Dominated by species like mahogany and ironwood, Budongo CFR, covering approximately 82,530 hectares The Budongo Forest lies on an escarpment northeast of Lake Albert, featuring gently undulating terrain with drainage provided by rivers like Sonso, Waisoke, Wake, and Bubwa, flowing into Lake Albert. The forest contains five principal vegetation types: colonizing, mixed, *Cynometra*, *Cynometra*-mixed, and swamp-forest, with approximately half of the area dominated by semi-deciduous *Cynometra-Celtis* forest and drier regions characterized by *Combretum* savanna. Despite a legacy of selective logging over more than a century, resulting in partial degradation, Budongo remains a critical timber production site with robust biodiversity value. The Forest Master Plan prioritizes sustainable timber production, conservation of biodiversity, collaborative management with surrounding communities, recreational development, and ecosystem research (Banana et al., 2012).

The canopy walkway will be accessed via an established 900-metre trail starting from the Eco-tourism Centre, utilizing the region’s existing nature trails. This replicates a successful layout



employed at Nyungwe National Park, Rwanda, where the canopy walkway is linked to the Uwinka Visitor Centre by a similar trail distance. By integrating the canopy walkway into an area already structured for eco-tourism, the project avoids disturbing sensitive habitats or wildlife that may be adversely affected by increased human activity, such as endangered bird nesting areas or chimpanzee habitats.

The selection of Kaniyo Pabidi as the gateway for the Budongo CFR and the proposed canopy walkway underscores a commitment to eco-tourism development within an established and designated eco-tourism zone. This approach aims to ensure that visitor experiences are both environmentally sustainable and enriching, while supporting the NFA conservation objectives. The Kaniyo-Pabidi area, located within the Budongo CFR, is co-managed by the NFA and the UWA. Situated approximately 212 km from Kampala and 29 km from Masindi Town with a sum of 241km accordingly, this area forms part of the larger Murchison Conservation Area.

A tree-based system has been chosen for the canopy walkway to ensure minimal environmental impact and reduce the construction and operational footprint. By elevating visitors from the ground to an aerial trail, the design minimizes disturbance to the forest floor and controls visitor movement. This approach provides a structured and immersive experience while maintaining the integrity of the environment.

Tree-based systems are specifically designed to:

- **Preserve Natural Habitats:** By avoiding the need for ground-based structures, the system eliminates significant habitat disruption.
- **Reduce Construction Impact:** Components can be transported to the site via existing trails, eliminating the need for intrusive access routes.
- **Enable Portability:** The modular nature of the system allows for flexibility in installation and minimal disruption to the forest.

This design not only ensures environmental preservation but also offers visitors an adventurous and natural experience. By leveraging existing trails and utilizing innovative tree-based systems, the canopy walkway balances eco-tourism development with conservation, ensuring a sustainable and positive outcome for both visitors and the forest ecosystem. This thoughtful approach exemplifies how eco-tourism infrastructure can be integrated harmoniously into natural landscapes, providing both environmental and economic benefits.

2.4. Location of Budongo Central Forest

The Budongo Forests Area Management Plan encompasses five Central Forest Reserves (CFRs): Budongo, Rwensama, Maseege, Nyabyeya, and Kasokwa. Together, these reserves cover a total area of 84,028 hectares within the Albertine Rift in the Bunyoro sub-region of mid-western Uganda. The five Central Forest Reserves (CFRs) within the Budongo Forests Management Plan Area are held and protected in trust for the people of Uganda, as outlined in Article 237(2)(b) of the 1995 Constitution of the Republic of Uganda. These reserves are managed as Central Forest Reserves under the Forest Reserve Declaration Order, Statutory Instrument (SI) 1998, No. 63. Their management and control are entrusted to the National Forestry Authority (NFA), as mandated by Section 54(1)(a) of the National Forestry and Tree Planting Act, 2003. Boundary plans (BPs) and forest land registration details for the Budongo CFRs have been duly provided.



Budongo Central Forest Reserve (CFR) is located in North-Western Uganda, along the northeastern shores of Lake Albert within the Albertine Rift Valley, spanning Masindi and Hoima districts near the southern boundary of Murchison Falls National Park. Covering approximately 825 square kilometers, it is renowned for its biodiversity, particularly its large chimpanzee population. The reserve's boundaries extend 281 km, marked by rivers, cut lines, and live markers for conservation management.

In the Figure 2.1 is an illustration of the geographic location of the Budongo Forests Management Plan Area (BFMPA), situated above the escarpment of the Albertine Rift Valley on the Ugandan Map. It spans the districts of Buliisa, Hoima, and Masindi. The BFAMP lies within the coordinates of approximately 1°35' to 1°55' North latitude and 31°18' to 31°42' East longitude.

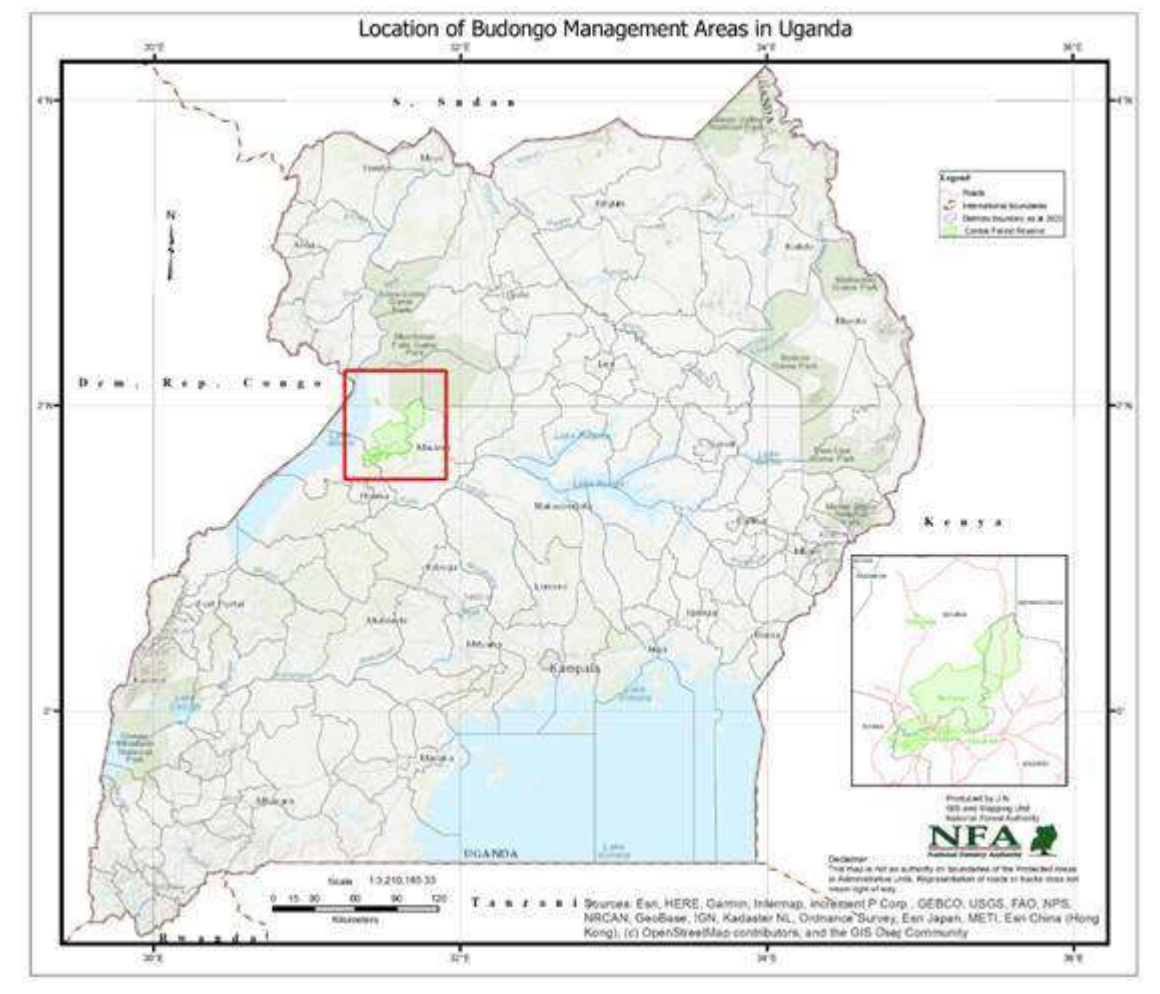


Figure 2-1: Location of Budongo Forests Area Management Plan

Source Draft FMP

The Kaniyo-Pabidi area, located within the Budongo CFR, is co-managed by the NFA and the UWA. Situated approximately 234 km from Kampala and 21 km from Masindi Town, this area forms part of the larger Murchison Conservation Area. Budongo CFR is a renowned eco-tourism destination, celebrated for its rich biodiversity and array of activities, including chimpanzee trekking, birdwatching, and guided forest walks. Visitors are supported by accommodations such as Budongo Eco Lodge, alongside other lodging options nearby, enhancing accessibility and comfort. The area's strategic location, coupled with its ecological significance and proximity to



surrounding attractions, establishes Kaniyo-Pabidi as a key hub for tourism and conservation in the region, offering unparalleled experiences for nature enthusiasts and contributing to the preservation of Uganda’s natural heritage.

2.5. Access to TBCW in Kaniyo Pabidi

Kaniyo Pabidi, nestled within the Budongo CFR, stands out as a premier eco-tourism destination, seamlessly blending accessibility with natural beauty. Its location along well-maintained routes ensure a hassle-free journey for visitors, enhancing the overall experience. The area’s proximity to Murchison Falls National Park further amplifies its appeal, enabling visitors to effortlessly combine forest exploration with wildlife safaris in one of Uganda’s most iconic conservation areas. This synergy between forest and savanna ecosystems creates a unique opportunity for eco-tourism enthusiasts to enjoy diverse landscapes and species in a single trip. Supported by well-established infrastructure and clear signage, Kaniyo Pabidi offers a welcoming and navigable environment for travellers. The figure below illustrates the accessibility and directional signage guiding visitors to this remarkable eco-tourism hub. The Figure 2.2 presents a compartmentalized map depicting the various working cycles and zones within Kaniyo Pabidi, which is primarily designated as a research and tourism area under the FMP.

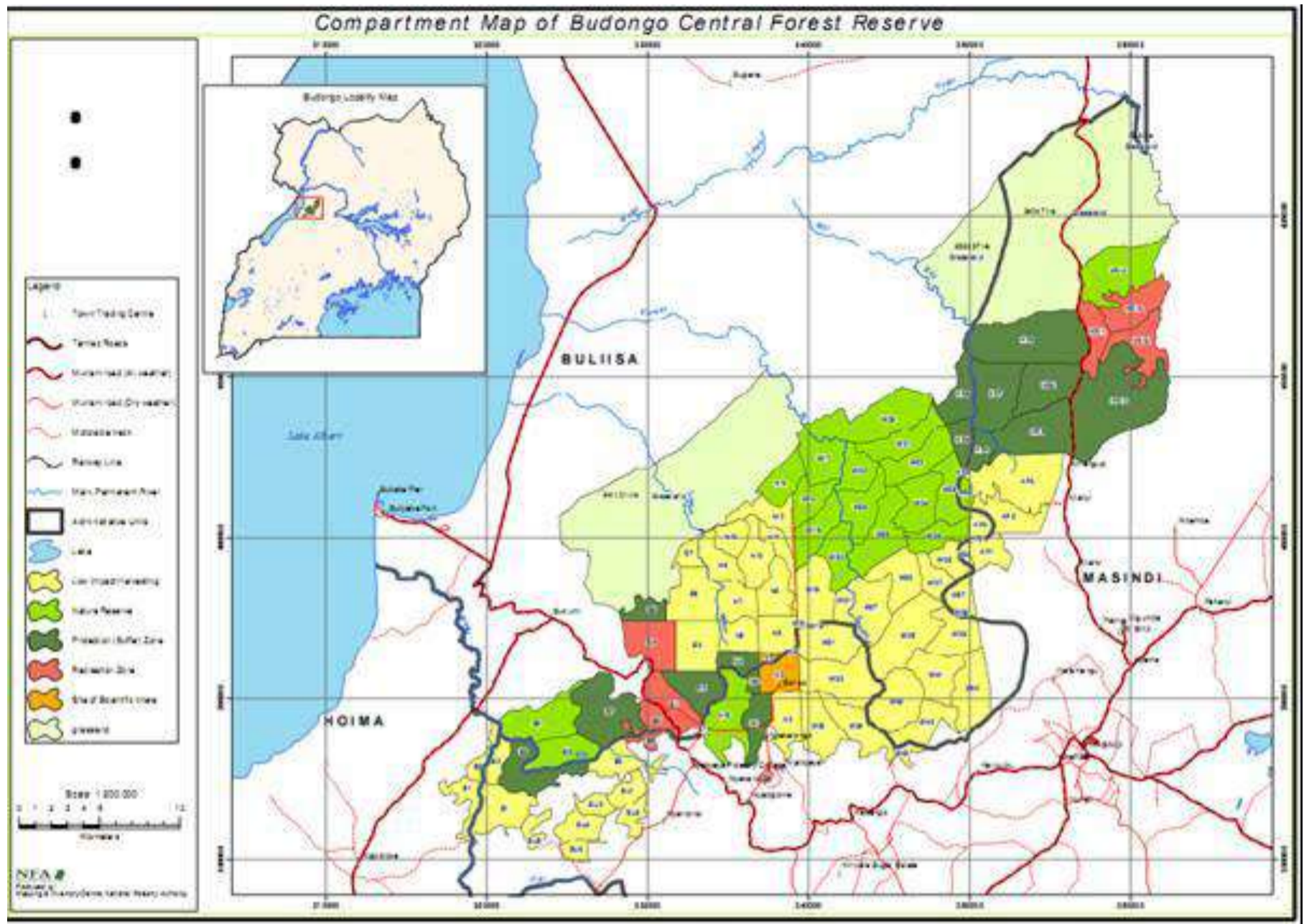


Figure 2-2: Budongo CFR Compartments where Kaniyo Pabidi is located

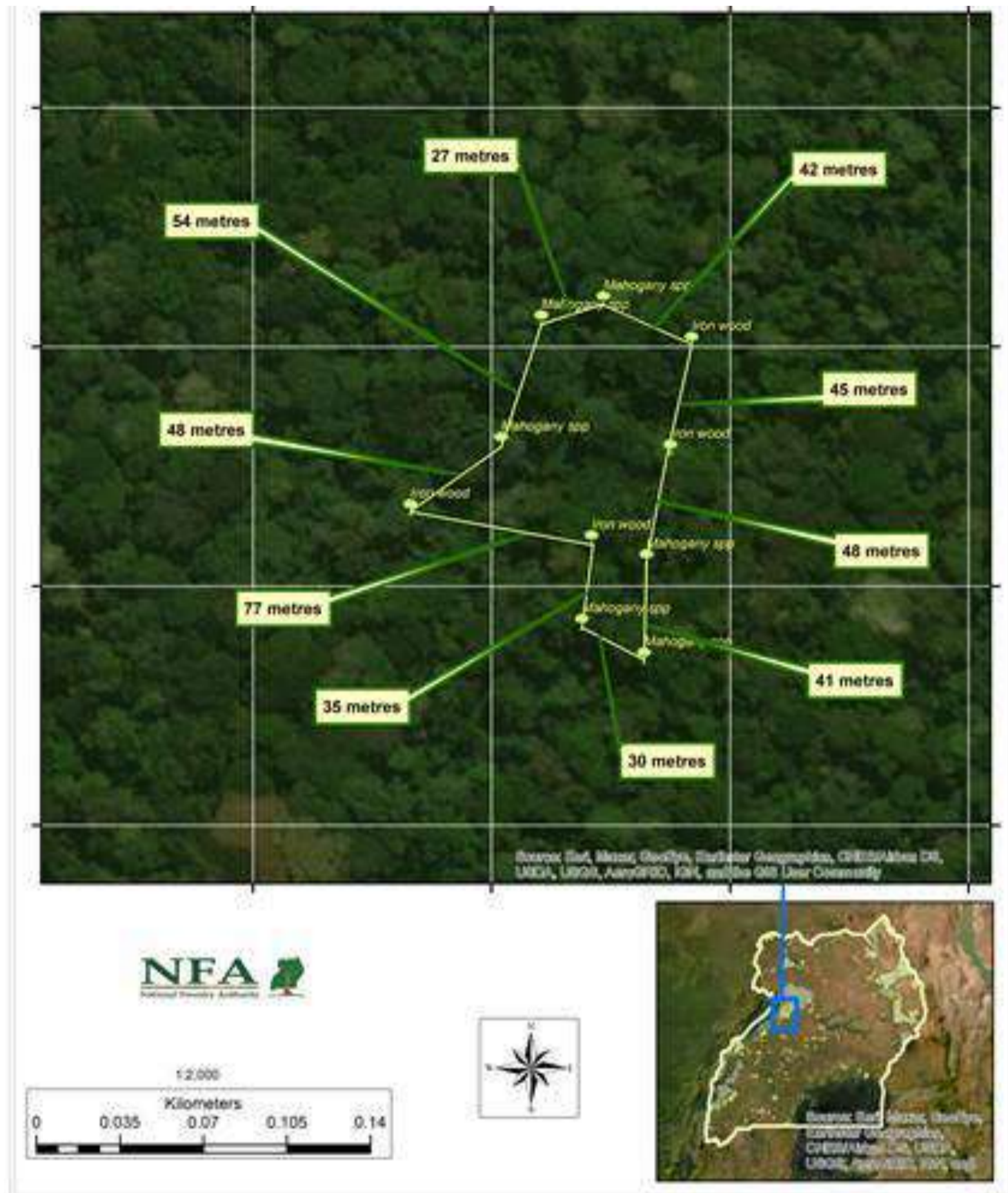


Figure 2-3: Map showing the Location of the proposed Kaniyo Pabidi Tree Based Canopy Walk



2.6. Site Selection and Visitor Experience

Kaniyo Pabidi, located within the renowned Budongo CFR, offers an exceptional eco-tourism experience, easily accessible via well-maintained routes that prioritize visitor convenience. Its strategic location, near the breathtaking Murchison Falls National Park, enhances its allure by providing visitors the unique opportunity to seamlessly combine immersive forest exploration with thrilling wildlife safaris in one trip. The area boasts robust infrastructure, including clear signage and travel-friendly pathways, ensuring a smooth and enjoyable journey for all. This makes Kaniyo Pabidi an ideal destination for eco-tourism enthusiasts, nature lovers, and conservation advocates seeking to explore Uganda’s rich biodiversity. The accompanying Figures 2.4 and 2.5 highlight the region’s accessibility and detailed signage, emphasizing the thoughtful planning and infrastructure in place to guide visitors through this remarkable eco-tourism hub.



Figure 2-4: Masindi Para Road through Budongo CFR



Figure 2-5: Access to the project area through the Conservation and Training Centre - Café Budongo

The selected site provides an unparalleled opportunity to highlight one of the world’s most biodiverse and awe-inspiring forests. This climax forest features mature Ironwood (*Cynometra spp.*) and Mahogany (*Khaya spp.*) trees, which not only support the canopy walkway structurally but also symbolize the ecological richness of the region. The forest offers visitors an immersive experience, combining wildlife observation with interpretive and educational themes that emphasize the importance of conserving this rare, intact ecosystem.



A defining feature of the canopy walkway experience is its holistic presentation of forest ecology. Visitors will gain a profound appreciation of the forest's role in maintaining biodiversity, showcasing the critical need to preserve such pristine habitats. Situated approximately 900 metres from the Eco-tourism Centre, the walkway's location ensures a tranquil experience away from highway noise pollution. Guests can explore the forest floor via access and egress trails before ascending to the mid and upper canopy levels for an unparalleled vantage point.

The host trees two of the most iconic species globally offer a sense of grandeur, inspiring awe and appreciation. These trees also provide an opportunity to connect visitors to ecological research, such as the fascinating observation that Uganda Ironwood is a preferred material for chimpanzee nest construction. This forest's rich history of research and management further enhances the visitor experience. Long-standing studies by the National Forestry Authority (NFA), ongoing research by NGOs, and insights gained from daily activities such as chimpanzee tracking, birdwatching, and nature walks contribute to a wealth of information that will inform and engage visitors. Through this canopy walkway, Kaniyo Pabidi becomes not just a site for eco-tourism but also a living classroom for understanding and preserving one of the world's most remarkable forest ecosystems.

*Of 1,844 nests sampled, chimpanzees selected Ugandan ironwood (*Cynometra alexandri*) for 73.6 percent of the nests, even though it represented only 9.6 percent of all trees in the sample area (<http://www.sci-news.com/biology/science-chimps-nests-ugandan-ironwood-01866.html>)*

The site was carefully chosen given that Kaniyo Pabidi's (KP) eco-tourism operations are entering their second decade of success, demonstrating a proven track record of attracting and engaging visitors. The proposed development of the canopy walkway presents an ideal opportunity to further enhance these operations. Upgrading or replacing the existing facilities as part of this project will not only strengthen the ongoing success of KP's eco-tourism initiatives but will also provide the essential infrastructure needed for the seamless operation of the canopy walkway and other related eco-tourism experiences.

Site inspections and discussions have revealed that significant investment is required to modernize the current facilities. The existing structures are aging and, in some cases, no longer meet the operational demands of the growing eco-tourism sector. This presents an urgent need for either substantial upgrades or full replacement to ensure the continued success and sustainability of the site. By addressing these infrastructure needs, the project will further elevate the quality of the visitor experience while supporting the long-term viability of Kaniyo Pabidi as a premier eco-tourism destination.

2.7. Walkway Design and Operation

2.7.1. Tree Based Canopy Walk System

Given the desire for the canopy walk way to be in an area of high biodiversity, a tree-based system is proposed as it has a proven track record as a modular, portable system, with very limited disruption or ongoing and low environmental impact during both installation and operation. Literature (Inside Nyungwe Forest National Park, 2025 and Margaret Lowman, 2020 etc) shows that the system has been successfully installed and operated in areas of high biodiversity with a desire for low impact and in active habitats for chimpanzees and other primates in forests in Rwanda, Brazil, Guyana, and Nigeria. The engineered all-aluminum lightweight bridges and tree

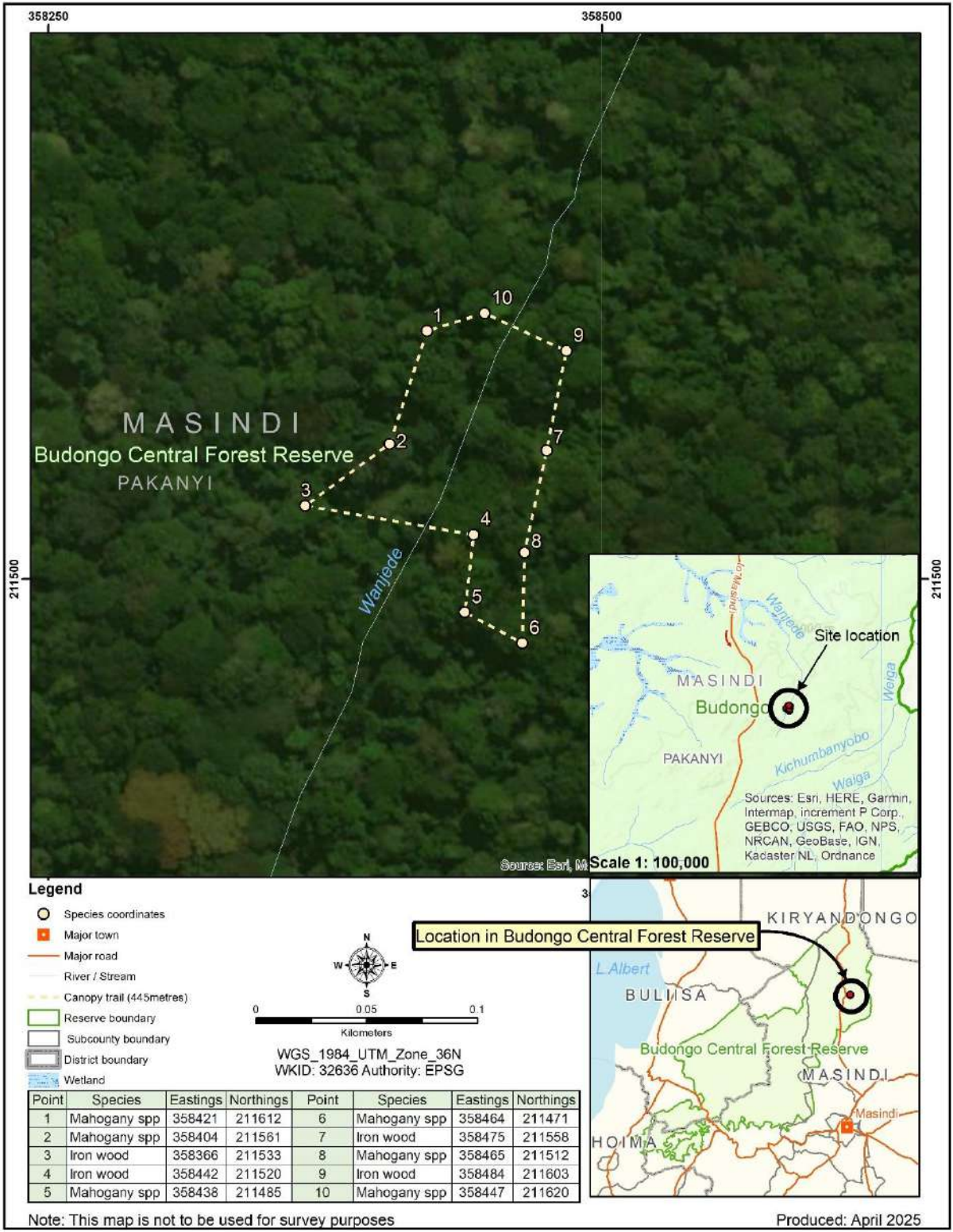


platforms will be installed and will require only minimal ground trail access (900m), with much of the installation taking place in the trees. The micro pile ground anchor system is installed with a portable drill and requires only a 5 cm hole for the micro pile anchor (Figure 2.6 below).



Figure 2-6: Micro pile anchor for canopy walkway

The proposed Tree Based Canopy Walkway will be 464 metres long with 10 tree-based canopy platforms and 11 Suspension Bridges. Figure 2.7 shows a simple layout of the canopy walk while Figure 2.8 shows a tree-based canopy walkway system in Iwokrama, Guyana



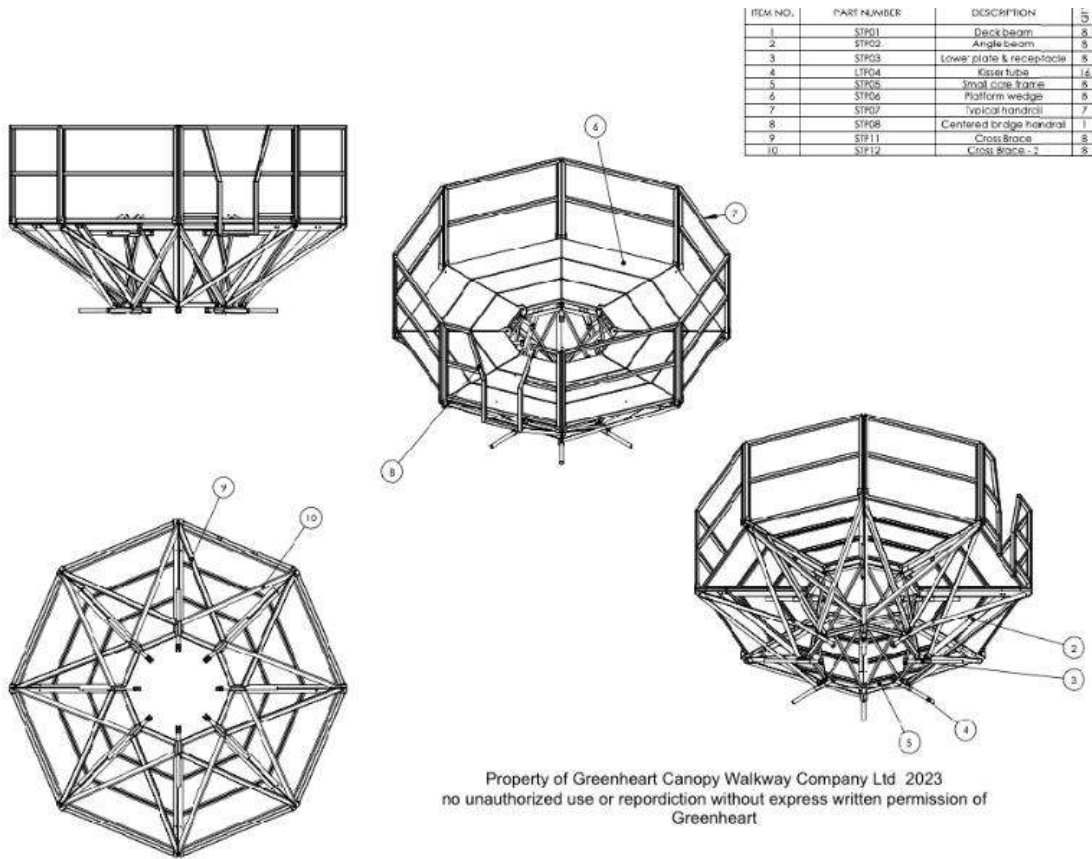


Figure 2-7: Proposed canopy walkway and platform drawings



Figure 2-8: Tree-based canopy walkway system Iwokrama, Guyana established in 2002

The proposed design is that of a modular canopy walkway system which provides for a low impact and a long lasting, safe, and enjoyable experience for both visitors and operators. The all-aluminum canopy walkway system, along with certified micro pile ground anchors has been designed and



refined by several worldwide stakeholders over two decades (Fidalgo, et al, 2022). A key component to the success of the system and longevity is the inclusion and training of a local team of canopy walkway technicians/guides. Prior to the commencement of the installation phase, members of the local community who will have been selected by the operator/owner (NFA) will commence training so that they can accompany, support, and learn by participating in the safe and efficient installation of the canopy walkway system. At a minimum, 4 to 6 local/community-based employees shall be involved in the entire installation of the canopy walkway system; and effectively trained and certified to carry out daily, weekly, and monthly inspections and ongoing preventative maintenance and monitoring of the system.

The entire system is modular, very portable and can easily be added to or removed and re-installed if for any reason there is a specific environmental concern or desire to transfer to an alternative site in the forest.

2.7.2. Emergent Canopy Towers

Emergent Canopy Towers will be added to the walkway system to provide for access in or above the rainforest canopy and provide a wider viewpoint. The towers offer significant space and multiple observation levels allowing for extended viewing periods for a large number of visitors. These towers can also act as entry and exit points with internal spiral staircases to provide immediate access to the mid and upper canopy. Designed to be carried into site the aluminum geodesic towers with spiral staircases and viewing decks can be added to a current system or built as a stand-a-lone attraction. The low impact base is built upon micro piles and each lift of the tower is designed in 2.5 metres increments. The towers are built from the ground up using hand winches and can allow for canopy walkways to extend above the treetops in certain forest sections.

2.7.3. Canopy Walkway Tree Platforms

Engineered all-aluminum tree platforms hanging from the Tree Hugger suspension system made from durable, light weight, divisible aluminum sections which can be easily backpacked into remote forest sites are being proposed. The tree platform space frame/core structure surrounds the support tree with deck wedge sections attached (Figure 2-9 and 2-10). The core of the tree platform has cushioned, telescoping struts (Tree Kissers'), like spokes of a wheel, that rest on the tree bark and supports the platform at two planes, safely handling unequal loading of people, yet can move with the host tree without damaging it and can be adjusted to accommodate tree growth. The platforms will be assembled at ground level and manually hoisted up the tree to the canopy level, (heights of up to 30m) and fastened to the Tree Hugger.

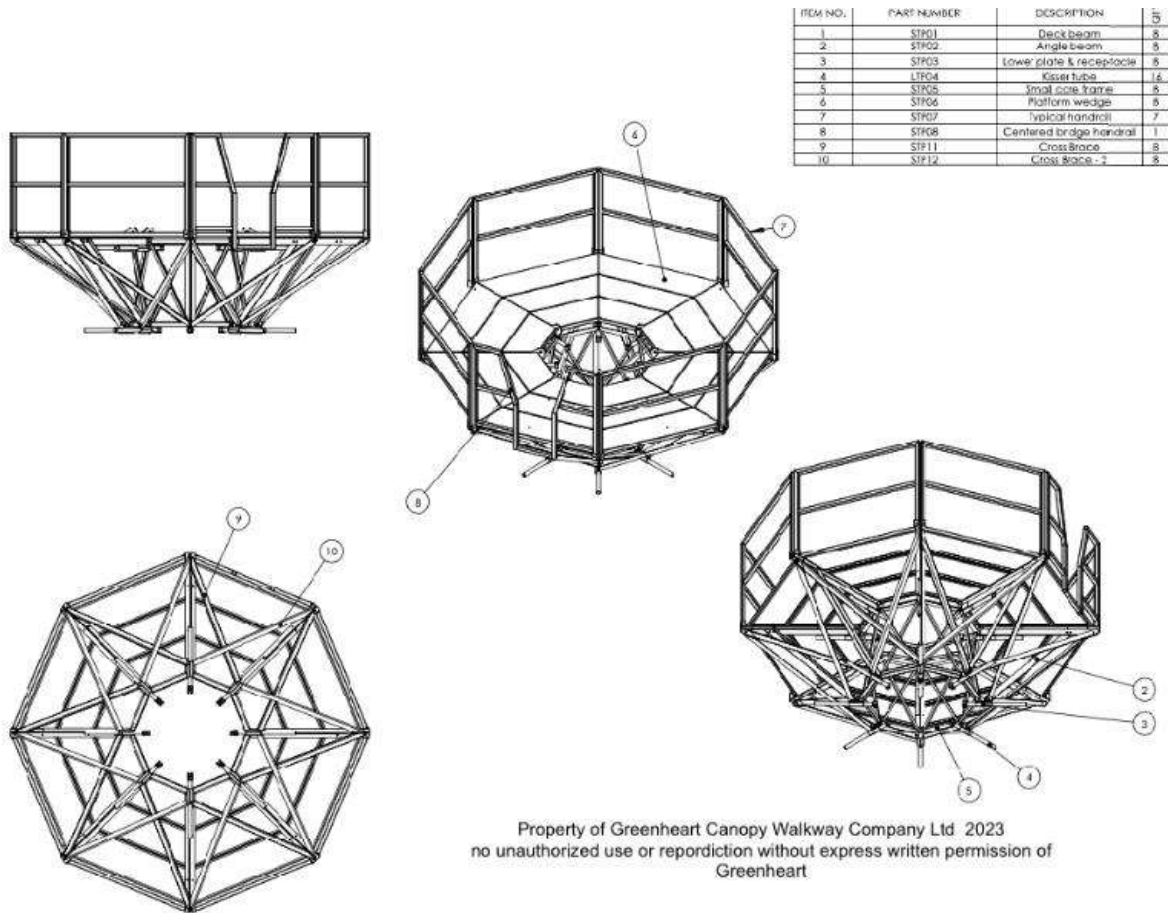


Figure 2-9: Tree Platform Engineered Design

Canopy walkway bridges will be made from custom extruded aluminum planks with perforated decking with built in safety grip to allow small debris, natural light, and precipitation to pass through. They will be suspended over the platform and will radiate out from various octagon sides to other trees with similar platforms. The canopy bridges can span up to 90m, such as the viewing bridge at Nyungwe National Park in Rwanda. Figure 2-10 illustrates the kind of platform and bridge proposed.



Figure 2-10: Tree Platform and Tree Hugger System

The decision to use a tree-based system for this canopy walk is to ensure minimal environmental impact and lowest build/operational footprint as visitors move off the ground trails and onto an



aerial trail. Thus, controlling the visitor footprint and providing structured and controlled access to the environment being showcased by the canopy walkway. Tree based canopy walkways provide a more adventurous and natural experience and eliminate the need for the creation of major construction access routes and avoid the introduction of ground-based structures and foreign materials. Tree based canopy walkway systems are designed to be portable to allow the components to be carried to site on existing ground trails and do not require an intrusive, lengthy, and disruptive construction methods or periods.

The access trail from the Eco-tourism Centre will follow the existing and other well-established nature trails in the area.

2.7.4. Non-penetrating Tree Hugger Suspension System

The Tree Hugger system proposed is a cable mesh suspension system for tree platforms and tree supported canopy walkway bridges. The cable will be woven in-place, allowing normal tree radial expansion during growth, and accommodates limbs and surface irregularities (bulges) without totally covering or breaching the bark surface. An important feature of the Tree Hugger is when the live load (i.e., people) are removed, the tension in the cable strands lowers accordingly, and takes all but the dead load off the tree surface. This ability to release tension will lead to minimum duress on the trees as the release avoids any long-term duress on the tree.

The cable to be used for the 'Tree Hugger' will be extremely flexible, fiber core, steel strand, which conforms to the irregular tree surface, releases tension properly and is not subject to UV or other environmental degradation, the bane of softer synthetic polymer strands. To further allow tree freedom and prevent hard anchoring, another unique feature of the Tree Hugger will be the pendulum, a cable running from the bottom of the Tree Hugger to the anchored suspension system. This feature will allow the treetop to sway freely in any direction within prescribed limits without causing excessive stress or damage to the tree or structure as well as not causing safety concerns for the tourists and guides.

The Tree Hugger strands are equalized through the connection at the top of the pendulum. This distributes the load evenly to the (tension field), with greatest tension in the lower area, gradually dissipating as the tree surface picks up the applied loading (very small radial loading at the top); the larger the load, the higher up the field is the effect, with the cables moving an incremental amount relative to each other in distributing the load.

With a focus on designing with nature it was preferable to work with trees and avoid the introduction of excessive or unnecessary structures into the host environment. The tree hugger system will allow the tree platforms and walkway itself to extend between living trees in an open or closed circuit to allow visitors experience the niche ecosystem of the rainforest canopy. The system remains in place and all of the original support trees remain in the system.

2.7.5. Labor Requirements

During the construction phase, 10 personnel will be required, including; engineers, custom aluminum fabricators, canopy walkway technicians and NFA staff. Whereas, during the operational phase, its planned that the following experts (trained technicians, canopy walk guides, ticket center and sales/booking personnel will be required, leading to a total of 10 personnel (Table 2-1).

Table 2-1: Workers to be employed at the Tree Based Canopy Walk



Position	Installation phase	Operation and maintenance phase
Operation phase workers		
GH installation team	4	
NFA installation and minimum NFA operational team including walkway	6	10
Total per a phase	10	10

2.7.6. Materials

The major materials proposed for use during the installation of the canopy walk are fiber cable made of steel and timber. As already stated above, the cable to be used for the ‘Tree Hugger ‘will be extremely flexible, fiber core, steel strand, which conforms to the irregular tree surface, releases tension properly and is not subject to UV or other environmental degradation, faced by softer synthetic polymer strands.

2.8. Cost Summary

Presented in Table 2-2 are project costs for the different components as well as the overall project cost.

Table 2-2: Canopy Walkway (cost estimate overview)

Tree Platforms (10)		\$ 420,000
Bridges (11)		\$ 461,872
Shipping		\$ 35,000
Installation		\$ 352,749
Engineering	10%	\$ 88,187
Project Management	20%	\$ 253,924
Total		\$ 1,611,733 USD

2.9. Waste management

Solid waste likely to be generated from the proposed project shall include the following waste streams:

- Site construction waste;
- Food waste;
- General waste (paper and cardboard);
- Plastic waste (bottles and packaging material).

All waste shall be segregated and temporarily stored in dry bins with and will be transported out of the BCFR and disposed of at designated waste handling sites where it shall be handled following environmentally sound practices, such as reduction, reuse, and recycling as approved by the relevant authorities, using a licensed handler.

2.10. Preparation and mobilization

2.10.1. Site clearance and construction

The preparatory phase will involve, finalizing the canopy walk design, obtaining approval from relevant authorities and mobilizing construction personnel and other resources (including funds,



equipment etc). Site specific studies that may not have been done before will be done in the preparatory phase as well as fabrication of system components.

This will involve clearing 5 cm holes for the micro pile anchors and installation of the anchors in the ground. No clearance will be done beyond the 5 cm holes. The rest of the construction/installations will be done up in the trees. The walk way in the trees will be installed as presented in section 1.5 above. All materials will be manually transported to the site, utilising existing trails instead of creating new access routes. Construction crews will collaborate with the team currently working at the Budongo Eco-Lodge. New crew members will be trained in best practices for minimising environmental impacts, including not teasing or feeding animals, proper waste disposal and responsible behaviour in a protected area.

Throughout construction, NFA management will work closely with environmental experts, local communities, and regulatory agencies to ensure compliance with relevant environmental regulations. Regular monitoring and supervision by various stakeholders will be conducted to promptly identify and address any potential environmental concerns. By implementing these robust project avoidance measures, NFA management aims to enhance the construction of the TBCW while providing an exceptional visitor experience and preserving the area's ecological integrity for future generations.

2.10.2. Operation and maintenance

Upon entering, visitors to the canopy walk way will be directed towards the Eco-tourism Centre, where they will purchase/present their ticket/booking reservation and meet their canopy walk/NFA guide (s). Each visitor will join a guided tour and will commence the 900-metre-long interpretive ground trail leading to the canopy walk/aerial trail entrance. Along with their guide, guests will enter the canopy walk and commence the approximately 464-metre-long canopy trail.

Over a series of eleven suspension bridges and ten viewing platform visitors will have the chance to learn about the unique environment, view wildlife and gain a better understanding of the importance and value of the forest. A major theme for the canopy walk is the importance of the forest for the native chimpanzee population and the fact that the chimps rely on a healthy forest for their continued survival. The unique fact that chimpanzees create a new nest in the trees every night along with other interesting and unique information gained from the chimpanzee tracking operations and chimpanzee research carried out in BCFR, will be shared with guests.

A team of 10 local staff will be selected to participate in and become permanent employees of the canopy walk operation. A core number of these staff who prove themselves as capable and proactive members of the installation team will become canopy walkway technicians responsible for the day-to-day inspection, maintenance, and reporting on the canopy walkway system. These staff shall also receive interpretive guide training, along with the other staff, and when not carrying out maintenance duties, will act as canopy walkway guides or fill other required positions on site.

Regular inspections and maintenance activities are critical, particularly due to the seasonal variations associated with the tropical rainforest climate, such as storms that may lead to tree falls. Daily checks are essential to uphold safety standards and preserve the structural integrity of the TBCW.



2.10.3. Site restoration after construction

After construction, areas which may have been disturbed by construction staff will be left to regenerate naturally. The materials to be used in the trees shall blend with the ecosystem.

2.10.4. Decommissioning

Following the completion of operations after the project cycle, the NFA or any other designated operator at the time may decide to close the TBCW based on its commercial viability and in alignment with Uganda's prevailing legal and regulatory framework. Any decision to close the operation should be guided by comprehensive evaluations, including the results of environmental and social compliance audits conducted annually. These audits will assess the environmental impact, social implications, and overall sustainability of the project, ensuring that closure is carried out responsibly and in adherence to applicable laws and best practices. A decommissioning plan will be developed and shared with NEMA for review and approval.

2.10.5. Site Restoration after decommissioning

In addition to the removal of metallic materials from the project-operated site and decommissioning of the canopy walk infrastructure, all other equipment will be dismantled and removed from the site. Any scrap metal generated will be collected and transported off-site for recycling or disposal in accordance with local waste management regulations and industry best practices.

General waste generated on-site during restoration will be routinely managed using a designated waste skip. This waste skip will be regularly emptied to maintain site cleanliness during operations and will be removed entirely from the site at the conclusion of operations as part of the decommissioning process. All activities will adhere to forest restoration and rehabilitation standards to ensure the used trees return to a condition consistent with pre-project environmental values.

2.11. Cost Benefit Analysis of the Project

The financial analysis, economic evaluation, and expanded cost-benefit analysis for the proposed project are based on the findings of the feasibility study, which include quantity surveys, cost estimates, and unit specifications for various construction materials. A summary of this analysis can be shared by the proponent.

Key factors such as visitor pricing, overall operational expenses, labor costs, and other relevant considerations have played a significant role in shaping the analysis presented in this report. These factors have been examined in the context of the project's location, which serves as a gateway to the Murchison Conservation Area, a renowned tourism destination.

It is important to highlight that this report offers an overview of the costs and benefits, incorporating indicative expenses associated with implementing enhancement and mitigation measures.

2.12. Proposed construction timelines

The Table 2.3 presents the proposed timeline for the anticipated construction activities leading up to the operational phase.

Table 2-3: Proposed Project Timeline



Phase	Activities	Anticipated period
Pre-Construction	<ul style="list-style-type: none">• Initial Site Assessment & Project Plan Presentation• ESIA (Ongoing)• Design Review & Finalization Incorporating ESIA and NFA Inputs – Ongoing	2021 – March 2025
Construction	<ul style="list-style-type: none">• Project Contracting & Mobilization• Formation of project team• Equipment procurement and mobilization• Final Engineering Design & Approvals• Submission of finalized plans• Commencement of fabrication• Fabrication & Quality Assurance• Logistics & Shipping• Site Preparation & Installation• Accommodation and trail upgrades• Site storage setup• Field composting toilet installation• First Aid station setup	March 2025 April 2025 April – June 2025 July 2025 August – November 2025 September 2025
Installation Teams & Training	<ul style="list-style-type: none">• Selection and training of local support teams by experienced canopy walkway technicians• Tree rigging and platform installation• Bridge installation• Anchor system setup	August – November 2025
Operational	Soft Opening & Operational Training	December 2025



CHAPTER 3

3. POLICY, LEGAL FRAMEWORK AND RELEVANT ADMINISTRATION

The Government of Uganda policies, legal, and the regulatory and institutional framework that will be triggered by the implementation of the Canopy Walk Project in Kaniyo Pabidi which must be complied with are prescribed in this chapter.

3.1. Policy Framework

3.1.1. *Vision Uganda 2040*

Uganda's Vision 2040 identifies tourism as a key driver of economic transformation, leveraging the country's rich natural and cultural heritage including wildlife, landscapes, and historical sites to position Uganda as a leading global tourism destination. The vision focuses on strategies such as improving infrastructure (transport, accommodation, and recreational facilities) to enhance accessibility and visitor experiences, promoting sustainable tourism to protect biodiversity and cultural heritage while involving local communities, and diversifying tourism products to include adventure, cultural, and eco-tourism. Additionally, it emphasizes strengthening international marketing to attract high-value tourists and building sector capacity through training and skills development. These efforts aim to boost tourism revenue, create jobs, and significantly contribute to Uganda's GDP, making tourism central to the nation's development agenda.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve aligns with Uganda's Vision 2040 by promoting sustainable eco-tourism, enhancing visitor experiences through infrastructure development, protecting biodiversity, and engaging local communities to boost tourism revenue and support national development.*

3.1.2. *National Development Plan III (2020/2021-2024/2025)*

The National Development Plan III (NDP III) prioritizes the tourism sector as a key driver of economic growth, focusing on enhancing infrastructure, promoting sustainable tourism, diversifying tourism products, and increasing international marketing to boost revenue and create jobs.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve supports the NDP III by promoting sustainable eco-tourism, enhancing infrastructure, diversifying tourism products, and contributing to increased tourism revenue and job creation.*

3.1.3. *The National Environment Management Policy, 1994*

The National Environment Management Policy for Uganda seeks to meet the following objectives:

- i. Enhance the health and quality of life of all people in Uganda and promote long-term, sustainable socio-economic development through sound environmental and natural resource management and use;
- ii. Integrate environmental concerns in all development policies, planning and activities at national, district and local levels, with full participation of the people;



- iii. Conserve, preserve and restore ecosystems and maintain ecological processes and life support systems, especially conservation of national biological diversity;
- iv. Optimize resource use and achieve a sustainable level of resource consumption;
- v. Raise public awareness to understand and appreciate linkages between environment and development; and
- vi. Ensure individual and community participation in environmental improvement activities.

The policy generally requires that projects or policies likely to have significant adverse environmental or social impacts undertake an ESIA before their implementation.

Relevance

With this policy requirement for implementation, this ESIA has been undertaken by the developer of the proposed project (NFA). The relevance is that complying to the policy achieves the conservation of biodiversity, particularly in HCFV of Kaniyo Pabidi. Since the canopy walk is located in a forest ecosystem, adherence to this policy ensures that the project does not disrupt biodiversity, particularly endemic and threatened species.

3.1.4. The Uganda Wildlife Policy, 2014

Within this policy it is recognized that out of Uganda's total surface area of 241,551sqkm (both land and water), 25,981.57sqkm (10%) is gazetted as wildlife conservation areas, 24% is gazetted as forest reserves and 13% is wetlands. Uganda has 10 National Parks, 12 Wildlife Reserves, 10 wildlife sanctuaries, 5 community wildlife areas, 506 central forest reserves and 191 local forest reserves. It is however estimated that over 50% of Uganda's wildlife resources remain outside designated protected areas, mostly on privately owned land. One of the objectives of this policy is to sustainably manage wildlife populations in and outside wildlife protected areas including those in forest reserves and wetlands.

Relevance:

The construction and operational project workers are expected work within this Protected Area while undertaking both construction activities for the canopy walk and recreational activities. Both the project workers and tourists/visitors will be prohibited from interacting or posing risk to wildlife within the forest.

3.1.5. The Uganda Forestry Policy, 2001

The Goal of the forestry policy is to ensure an integrated forest sector that achieves sustainable increase in the economic, social and environmental benefits from forestry and trees by all the people of Uganda especially the poor and the vulnerable. It aims at protecting the natural resources on behalf of the people of Uganda. The government recognizes that Uganda's forests and woodlands are central to the three pillars of sustainable development - the economy, society and the environment - and that the sector is not being given adequate priority. The country's forest resources provide energy, forest and tree products, employment, livelihoods support, government revenues, business opportunities, environmental functions and services, and they maintain ecological integrity, and therefore should be protected.

Relevance: *With this policy requirement in mind, this ESIA has been undertaken by NFA to identify environmental and social risks and impacts of the proposed Canopy Walk in Kaniyo-Pabidi and suggest mitigation measures to minimize the risks and impacts.*



3.1.6. National Environment Health Policy, 2005

Within this policy, it is noted that Environment health encompasses a wide range of subjects but in the Uganda, context is concerned with; water supply, sanitation and hygiene promotion, solid, liquid and hazardous and health care waste management, air pollution control, food safety and hygiene, the control of insect vectors and vermin, occupational health and safety, road safety and housing conditions. The Ministry of Health is the lead agency for the implementation of this policy through institutional arrangements at town and District levels.

Relevance:

The proposed project involves the construction and operation of a canopy walk and the operation of which is a facility for tourists and visitors, thus necessitating proper waste and pollutant management in compliance with the policy.

3.1.7. The National Water Policy, 1999

The National Water Policy seeks to manage and develop the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with full participation of the stakeholders.

Relevance: *The construction and operation of the canopy walk will require sustainable water use, with this ESIA supporting compliance with the national water policy.*

3.1.8. 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. It sets priority areas for action at the National, Sectoral, District and Community levels. The ultimate objective of this policy is to evolve a society that is both informed and conscious of gender and development issues and concerns because sustainable development calls for maximum and equal participation of both men and women in economic, political and social cultural development.

The Sector Ministries and Sector Working Groups are required to translate the policy into sector specific strategies and activities, build capacity of staff in gender analysis, planning and budgeting; monitor and evaluate sector Programmes for their impact on gender equality; commit adequate resources for implementation of gender related activities; disaggregate data and information by sex and gender where applicable; and to collaborate with MGLSD on matters of gender mainstreaming.

Relevance: *The operator will integrate gender equality into the construction and operation of the canopy walk and its components to minimize socio-economic impacts.*

3.1.9. 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. Immediate action should be taken by community members, police, teachers, parents and all stakeholders.

Relevance: *The developer/operator of the proposed canopy walk will use the project gender policy to eliminate gender-based violence and collaborate with the community and stakeholders to address gender issues.*

3.1.10. National Policy on Disability, 2006

Section 19 makes it the responsibility of all organs in the public or private institutions to provide suitable entrances and exits for Persons with Disabilities (PWDs) and universal standards or



designs for infrastructure. Additionally, Section 22 requires availability of accessible transport services to PWDs, who use mobility devices such as crutches and/ or callipers, or wheelchairs. Transport systems like aeroplanes, trains, taxis, buses and motorcycles should be accessible to PWDs.

Relevance: *The canopy walk design will prioritize inclusivity by addressing the needs of persons with disabilities.*

3.1.11. National Orphans and other Vulnerable Children's Policy, 2004

The goal of the Policy is full development and realization of rights of orphans and other vulnerable children. The policy provides support to vulnerable children and families such that their capacity to sustain themselves is strengthened; and provides residential care for orphans and other vulnerable children as a last resort.

The policy objectives are:

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

Relevance: *The developer of the proposed canopy walk will explore the implementation of the Collaborative Forest Management Regulations and Murchison Falls National Park General Management Plan (2015-2025) to support initiatives that benefit orphans and vulnerable children.*

3.1.12. The Uganda National Land Policy, 2013

The goal of this policy is to ensure efficient, equitable and optimal utilisation and management of Uganda's land resources for poverty reduction, wealth creation and overall socio-economic development. Policy statement number 14 states that: "the state shall exercise the power of public regulation of land use, in the interest of socio-economic welfare and development." In addition, policy statement (d) states that, "Government shall ensure that all land use practices conform to land use plans and the principles of sound environmental management, including biodiversity conservation, soil and water protection, conservation and sustainable land management".

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve, a gazetted tourism zone under the Murchison Falls National Park General Management Plan (2015-2025), will utilize land designated for wildlife conservation and tourism. To address potential issues such as sanitation and land degradation, measures to minimize environmental and social impacts have been proposed.*

3.1.13. The National Aids Policy (2004)

This provides overall policy framework for national HIV/AIDS response. The National Policy on HIV/AIDS recognizes special groups, which include migrant workers. The Policy recommends the need to identify strategies to address migrant workers in view of the challenges posed by mobility and vulnerability to HIV. This is in line with the Constitution of the Republic of Uganda, 1995



Article 39. This Article creates the right to a clean and healthy environment, implying that workplace safety and health (including prevention of HIV infection), is a basic right of every citizen. Under its General Objective XIV, the State is committed to fulfilling the fundamental rights of all Ugandans to, among others, social justice and economic development and shall, in particular, ensure that all developmental efforts are directed at ensuring the maximum social and cultural well-being of the people.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with these requirements by ensuring workplace safety and health for all workers, including migrant workers, while promoting social justice, economic development, and the well-being of all involved in the project.*

3.1.14. National Policy on HIV/AIDS in the Workplace, 2007

Formulated in 2007, the policy focuses on the workplace and acknowledges that it is the workplace where the working population spends most of its active lifetime. The key principles underlying its implementation are non-discrimination, confidentiality; HIV testing, greater involvement of people living with HIV/AIDS (GIPA); promotion of prevention; treatment, care and support as well as gender concerns in the world of work. It provides a framework for prevention of further spread of HIV and mitigation of its social economic impact within the world of work in Uganda. The policy further defines the roles of key stakeholders namely government, employers, workers and the private sector including the informal sector, people living with HIV/AIDS, civil society organization and development partners. Amongst the roles for employers is the formulation of a sound HIV/AIDS policy, around the principle of non-discrimination, equality, confidentiality, care and support and incorporation of HIV/AIDS training into new worker inductions.

Relevance:

The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with these requirements by by preparing the project's HIV/AIDS policy to ensure non-discrimination, confidentiality, and equal treatment, while incorporating HIV/AIDS training into new worker inductions and providing care and support for all employees, including those living with HIV/AIDS.

3.2. Legal Framework

3.2.1. The Constitution of the Republic of Uganda

The Constitution is the supreme law of Uganda and it provides for protection of the environment; Under Article 39, the Constitution guarantees the right of every Ugandan to a clean and healthy environment. The Constitution, therefore, requires that the project to be implemented without endangering human health and the environment.

It has provisions that oblige the state to promote and preserve those cultural values and practices which enhance the dignity and well-being of Ugandans (Principle XXIV), mandate the central Government to manage national monuments, antiquities and archives as parliament shall determine (189 (1) schedule 6(10)); and require Districts to cooperate to promote cultural and traditional lands (Fifth Schedule article 178).

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Constitution by ensuring the project is implemented in an*



environmentally sustainable manner, preserving cultural values and practices, and promoting the well-being of the community, while safeguarding both human health and the environment.

3.2.2. The National Environment Act, Cap 181

Section 113 of the National Environment Act (NEA), Cap 181 requires the developer of a project set out in Schedule 5 of the Act, to conduct an Environmental and Social Impact Assessment by way of scoping, prepare terms of reference for the environmental and social impact study, and undertake an environmental and social impact study.

The proposed project falls under the category of "hotel, tourism and recreational development" in Schedule 5 of the NEA, Cap 181. Schedule 5, Section 10 (e) lists the establishment of zip lines, canopy walks, cable cars, hot air balloons, paragliding, bungee jumping or related infrastructure, as projects for which environmental and social impacts assessment is mandatory.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with Section 113 of the National Environment Act (NEA), Cap 181, by conducting an Environmental and Social Impact Assessment (ESIA), preparing terms of reference, and undertaking the necessary environmental and social impact studies, as required for tourism and recreational developments under Schedule 5.*

3.2.3. The Uganda Wildlife Act, 2019

The Wildlife Act established the Uganda Wildlife Authority and has several sections on the management of wildlife conservation areas among other issues pertaining to wildlife in Uganda. Relevant contents of this Act include; Restrictions on ownership of every wild animal and wild plant existing in its wild habitat to Government, Requirement for environmental impact assessment for any project which may have a significant effect on any wildlife species or community. Uganda Wildlife Authority was established under this act to ensure the sustainable management of wildlife Conservation Areas.

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, in order to support sustainable utilization of wildlife for the benefit of the people of Uganda, the sustainable management of wildlife conservation areas, the conservation of selected examples of wildlife communities in Uganda, the protection of rare, endangered and endemic species of wild plants and animals, the implementation of relevant international treaties, conventions, agreements or other arrangement to which Uganda is a party; and Public participation in wildlife management. Section 23 of this Act makes ESIA a requirement for any developer desiring to undertake any project which may have a significant effect on any wildlife species or community to undertake an environmental impact assessment in accordance with the National Environment Act, Cap 181.

Relevance: *The proposed Canopy Walk project is located in Kaniyo-Pabidi Area within Budongo Central Forest Reserve within Murchison Falls National Park with diverse wildlife species. However, during stakeholder consultations there was no concerns raised related to human-wildlife conflicts in the latest past. In addition, the project shall take into consideration to prohibit any worker in possession of unauthorised wildlife meat or products. Considering that the proposed canopy walk is to be located within the central forest reserve and will involve minimum clearing*



of vegetation, and anchoring of the canopy walk infrastructure on the identified trees among other, this Act is quite relevant, and relevant provisions should be complied forthwith for project implementation.

3.2.4. Local Governments Act, Cap 243

This Act provides the legal foundation of the Government Policy on decentralization and devolution of functions, powers, and services to Local Governments. Under this Act, district and lower local councils are given the responsibility of managing their natural resources including environment at the Local Government level. Natural Resources Committee is responsible for environmental issues at the district.

***Relevance:** The Masindi District Local Government was involved in the ESIA, and in issues of environmental monitoring and compliance. They will continue to be involved in project development implementation and operation in line with this Act.*

3.2.5. National Climate Change Act, 2021

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

***Relevance:** The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Climate Change Act by integrating climate change response measures into its design and implementation, ensuring participation in climate change mechanisms, and contributing to emission reduction efforts, while aligning with national and international climate commitments under the UNFCCC, Kyoto Protocol, and Paris Agreement.*

3.2.6. The National Forestry Act Cap 160

Section 38 of this Act requires that a person intending to undertake a project or activity, which may impact a forest, should undertake environment and social impact assessment studies to evaluate the magnitude and extent of forest destruction and the mitigation measures for salvaging the forest.

***Relevance:** The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve within Murchison Falls National Park will comply with Section 38 of the Forest Act by conducting an Environmental and Social Impact Assessment (ESIA) to evaluate potential impacts on the forest and outline mitigation measures to preserve it.*

3.2.7. The Water Act Cap 152, 1995

According to Part II (Water Resources) of Water Act, the Minister and the Director are responsible for the implementation of this Act which provides for the use, protection and management of water resources and supply. Part I Section 4(1) of the Act spells out the objectives which include the coordination of all public and private activities which may influence the quality, quantity, distribution, use or management of water resources. Part I Section 6 (1) stipulates that notwithstanding any other law to the contrary; no person shall acquire or have a right to:

- (a) Use any water



- (b) Construct or operate any works; or
- (c) Cause or allow any waste to come into contact whether directly or indirectly with any water, other than under the provision of this Part of the Act.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Water Act by ensuring the proper management of water resources, preventing any unauthorized use or contamination, and coordinating all activities that may impact water quality or distribution during construction and operation.*

3.2.8. The Plant Protection and Health Act 2015

The Plant Protection Act consolidates and reforms the law relating to protection of plants against destructive diseases, pests and weeds; this is entailed at prevention of introduction and spread of harmful organisms that may adversely affect Uganda's agriculture, the national environment and livelihood of the people. This intends to ensure sustainable plant and environmental protection, to regulate the export and plant and plant products and introduction of new plants in accordance with international commitment. The Commissioner for Agriculture is charged with the due administration of the Act, and the responsible Minister has power to make rules for the prevention of spread of an introduced plant, among others.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Plant Protection Act by preventing the introduction and spread of harmful organisms, ensuring sustainable plant and environmental protection, and adhering to regulations governing the management of vegetation within the project area.*

3.2.9. The Access to Roads Act, 1965

The Access to Roads Act seeks to ensure that a private land owner who has no reasonable means of access to public highway may apply for leave to construct a road of access to a public high way. The law establishes a mechanism for applying for such a road. It also establishes a legal regime to ensure the safety of the neighboring environment.

The Act permits the owner of any land who is unable through negotiations to obtain leave from adjoining land owners to construct a road of access to the public highway, to apply to a magistrate for leave to construct a road of access over any land lying between his land and the public highway. The law also provides for means by which an order for the construction of an access road can be invoked. The Act further provides for maintenance of the access road in a good and efficient state of repair, and for payment of compensation by the applicant in respect of the use of land, the destruction of crops or trees and such other property.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Access to Roads Act by ensuring that any required access roads to the project site are constructed through lawful processes, including obtaining necessary permissions, compensating affected landowners, and maintaining the roads in good condition to protect the surrounding environment.*

3.2.10. The Historical and Monuments Act, 1967

This is an Act to provide for the preservation and protection of historical monuments and objects of archaeological, paleontological, ethnographical and traditional interests and for other matters



connected therewith. Section 1 of this Act describes these terms used above. Section 8 of this Act specifies actions that are prohibited. Section 11 stipulates that any discoveries of the objects made that are considered to be of importance according to this Act shall be reported to the conservator of antiquities or district commissioner or the curator of the museum within fourteen days. Any person who contravenes any of the conditions issued under this Act commits an offence and this attracts a fine as stipulated in Section 19 of this Act.

Relevance: *A Physical Cultural Resources assessment was undertaken and results are presented in section 4.2.11. However, during construction, the contractor may come across chance finds of cultural and archeological importance, thus making this Act relevant. The contractor will follow both the National, World bank and international chance finds procedures in case cultural and archeological objects are found.*

3.2.11. The Occupational Safety and Health Act, 2006

This is a two-way Act that obliges employers to protect their workers and charges the employees to take responsibility of their safety while at work. The Act is concerned not only of the work area but also its immediate environment. According to section 13 (1) a of the Occupational Safety and Health Act, it is the responsibility of an employer to take as far as reasonably practicable, all measures for the protection of his or her workers and the general public from the dangerous aspects of the employer's undertaking at his or her own cost. Section 19 (2) further spells that it shall be the duty of an employer to ensure that Personal Protective Equipment provided under sub section (1) is used whenever it is required.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Occupational Safety and Health Act by implementing measures to protect workers and the public from potential hazards, ensuring the provision and proper use of Personal Protective Equipment, and maintaining a safe work environment in accordance with the Act.*

3.2.12. The Workers Compensation Act, 2000

The Act provides for compensation of workers for injuries suffered and scheduled diseases incurred in the course of their employment. The Act further spells out degrees of compensation depending on the levels of incapacitation, calculation of respective earnings, medical examination and treatment of workers, agreement as to compensation by the worker, power of Court to submit question of law, determination of claims and decisions of the court concerning the treatment of medical reports as well as procedures relating to claims.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Workers Compensation Act by ensuring fair compensation for any injuries or diseases incurred by workers during employment, adhering to prescribed procedures for claims, medical examinations, and treatment, and complying with court decisions regarding compensation.*

3.2.13. The Public Health Act, 1964

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.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Public Health Act by facilitating any inquiries directed by the Minister, granting access to relevant documents, plans, and premises, and ensuring full cooperation with inspections to uphold public health standards.*

3.2.14. Employment Act No 6, 2006

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

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

This law revises and consolidates laws governing individual employment relations and matters related to it. Similar to the Constitution, as earlier mentioned, it makes it an unlawful to discriminate people in employment. It defines discrimination as any distinction, exclusion or making preference on the basis of race, color, sex, and HIV status or disability amongst other which has the effect of nullifying or impairing the treatment of a person in employment or occupation or prevents an employee from obtaining any benefit under a contract of service.

Sexual harassment is one of the factors that put workers at the risk of HIV/AIDS. The Employment Act also makes it an offence for an employee's employers or their representative to make a request for sexual intercourse, contact or any other form of sexual activity either directly or indirectly that contains implied express promise for preferential treatment in employment, threat of detrimental treatment, threat about present or future employment status of the employee. They also commit an offence when they use a language whether written or spoken of a sexual nature, use visual material of a sexual nature or show physical behavior of a sexual nature which directly or indirectly subjects the employee to behavior that is unwelcome or offensive to that employee and that either by its nature or through repetition has detrimental effect on that employees employment , job performance or job satisfaction and exposes or makes the employee vulnerable to situation that expose him or her to HIV/AIDS and other STIs. The Employment Act also states that HIV status does not constitute fair reasons for dismissal or for the imposition of a disciplinary penalty.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Employment Act, 2006 by ensuring a non-discriminatory workplace free of forced labor and sexual harassment, providing fair employment conditions including rest*



and leave, and implementing measures to protect workers' health, safety, and rights regardless of HIV status or other factors.

3.2.15. Children Act Cap 59

The Act was put in place to reform and consolidate the law relating to children; to provide for the care, protection and maintenance of children; to provide for local authority support for children; to establish a family and children court; to make provision for children charged with offences and for other connected purposes. The act defines a child as a person below the age of 18. It lists the right for children to be with their parents, circumstances under which they should not, foster care and adoption procedures as well as mandates of local authorities and roles of community.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Children's Act by ensuring that its design, construction, and operations prioritize the safety and well-being of children, provide opportunities for family-friendly recreation, and adhere to all laws protecting children's rights and welfare, including safeguards against child labor and exploitation.*

3.2.16. The Traffic and Road Safety Act, 1998

This act provides for administration, records, registration and licensing of motor vehicles, driving permits, and licenses for public service, private omnibus and goods vehicles, use of motor vehicles, control of traffic, enforcement, and national Roads Safety Council.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Traffic and Road Safety Act by ensuring that all motor vehicles used during construction and operation, including those transporting materials and visitors, are properly registered, licensed, and maintained in compliance with road safety standards, and by promoting safe traffic management practices within the reserve.*

3.2.17. Access to Information Act, 2005

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

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the Access to Information Act by ensuring transparency and accountability through the provision of timely, accurate, and accessible information to the public about the project's objectives, environmental and social impacts, and decision-making processes, thereby empowering public participation in its implementation.*

3.2.18. Labour (Dispute/Arbitration and Settlement) Act, 2000

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



Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will engage labour officers during the project implementation in sensitizing and resolving any resulting labour disputes.*

3.2.19. National Social Security Fund (Amendment) Act, 2022

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

Relevance: *The operator /contractor for the canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will ensure that those employees that are eligible are registered under NSSF and contribute to their savings.*

3.3. Regulatory Framework

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

Section 3 (Part I) of these Regulations apply to—

(a) a project or activity for which—

- (i) a project brief is required to be undertaken in accordance with section 112 and Schedule 4 of the NEA;
- (ii) an environmental and social impact study is required to be undertaken in accordance with section 113 of the Act and Schedule 5 of the Act;
- (iii) an environmental risk assessment is required under section 114 of the National Environment Act (NEA);

(b) a project or activity proposed to be located in or near an environmentally sensitive area in accordance with section 113 (2) and Schedule 10 of the Act.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with these requirements by conducting and preparing an Environmental and Social Impact Assessment (ESIA) in accordance with sections 112, 113, and 114 of the National Environment Act (NEA), addressing potential environmental risks, and ensuring that the project adheres to the guidelines for activities in or near environmentally sensitive areas as outlined in Schedule 10 of the Act.*

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

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

Table 3-1: Standards for general chemicals and microbiological effluent discharge (Schedule 2)



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

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



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

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

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

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



Relevance: Effluent discharged from the Canopy Walk facility should conform to these regulations. Since the project is funded by World Bank, the one that is more stringent, that is, Uganda regulations or IFC/WB General EHS Guidelines will dominate. The operator of the canopy Walk and the Contractor for this project will apply to DWD for permits for discharging effluents from the facility and construction activities, respectively, to the environment.

3.3.3. National Environment (Noise Standards and Control) Regulations, 2003

Subject to these regulations, no person shall, for an activity specified under regulation 6, emit noise in excess of the permissible noise levels provided under the first schedule of the Regulations, unless permitted by a license issued under these regulations. Part III Section 8 (1) requires machinery operators, to use the best practicable means to ensure that the emission of noise does not exceed the permissible levels presented under the first schedule of the regulations, some of which are presented under Tables 3-4, 3-5 and 3-6 below.

Table 3-4: Maximum permissible Noise levels for impact or impulsive noise

Column 1	Column 2
Sound Level dB (A) (L _{max})	Permitted number of impulses or impacts per day
140	100
130	1,000
120	10,000

Table 3-5: Maximum permissible noise levels for construction sites

Column 1 Facility (Leq) in dB (A)	Column 2	
	Maximum noise level permitted	
	Day	Night
Hospitals, schools, institutions of higher learning, homes for the disabled, etc.	60	50
Buildings other than those prescribed in (i)	75	65
*Time frame: Day 6. 00a.m -10.00 p.m; Night 10.00 p.m. - 6.00 a.m.		

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

Relevance: Noise will be emitted from different activities of the project including transportation of construction material and equipment, digging of pits, during assembling of the pillars, etc. All noise generating activities will adhere to the noise standards and control regulations, and the UWA Operational Guidelines for Developments in Wildlife Protected Areas (UWA, 2020).

3.3.4. The National Environment (Air Quality Standards) Regulations S.I. No. 22 of 2024

Considering construction equipment and machinery are powered by diesel/ gasoline engines, pollutants such as CO₂, NO_x, SO_x, VOC, and particulates are expected to be emitted. The National Environment Air Quality Standards provide the following regulatory limits for these emissions as shown in Table 3-6 below.

Table 3-6: Criteria for Ambient Air Quality Standards and Tolerance limits.

Pollutant	Time Weighted -Average	Standard for ambient Air
Carbon monoxide (CO)	24- hour	7 mg/m ³
	8- hour	10 mg/m ³



Pollutant	Time Weighted -Average	Standard for ambient Air
	1- hour	35 mg/m ³
Hydrogen Sulphide (H ₂ S)	1- hour	42 µg/m ³
Ozone (O ₃)	1- hour	235 µg/m ³
	8- hour	120 µg/m ³
PM _{2.5}	Annual Average	25 µg/m ³
	24- hour	35 µg/m ³
PM ₁₀	Annual Average	40 µg/m ³
	24- hour	60 µg/m ³
Sulphur dioxide (SO ₂)	1- hour	50 µg/m ³
	24- hour	20 µg/m ³
Nitrogen dioxide (NO ₂)	Annual Average	30 µg/m ³
	24- hour	50 µg/m ³
Total Volatile Organic Compounds (VOCs)	24- hour	600 µg/m ³

Legend:

- (a) µg- microgram.
- (b) m³ – cubic meter.
- (c) PM_{2.5} - particulate matter with an aerodynamic diameter of less than or equal to a nominal 2.5 micrometers, as determined by the appropriate validated method of analysis.
- (d) PM₁₀ - particulate matter with an aerodynamic diameter of less than or equal to a nominal 10 micrometers, as determined by the appropriate validated method of analysis.

Relevance: *The proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve will comply with the National Environment Air Quality Standards by ensuring that all construction equipment and machinery are regularly maintained and operated to minimize emissions, adhering to the regulatory limits for CO₂, NO_x, SO_x, VOCs, and particulates throughout the project implementation.*

3.3.5. The National Environment (Waste Management) Regulations, S.I. No.49, 2020

These Regulations apply to all waste classified, characterized and categorized under Schedule 2, Schedule 3 and Schedule 4 to these Regulations; the generation, collection, transportation, storage, treatment and disposal of waste; to transboundary movement of waste; and to all waste management facilities.

Responsibility for waste management.

A person who generates waste, a waste handler or product steward has a duty of care and shall take measures to ensure that—

- waste is managed appropriately and securely in accordance with the Act, these Regulations, any other applicable law, environmental standards and conditions of the license;
- waste is managed in a manner that does not cause harm to human health or the environment;
- any leakage or spillage of waste is quickly detected and managed; and spillages which may cause pollution are managed in accordance with regulation 95.

The regulations also describe issues such as sorting and disposal of domestic waste, cleaner production methods, application for licenses for transportation and storage of waste, packaging of waste and powers of environmental inspector among others.



Relevance: Construction and operation of the canopy walk and other facilities is expected to generate waste of different types and the handling of this waste shall be in accordance with these regulations.

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

The Regulations emphasize the right to clean and healthy smoke-free environment. The regulations are in line with Section 107 of the National Environment Act, Cap 181 which gives provisions of the requirements under these regulations. Furthermore, the regulations give a list of public places in which smoking is prohibited, and a list of public places in which smoking is restricted. The areas where smoking is prohibited include; Offices, office buildings and work places including individual offices, public areas, corridors, lounges, eating areas, reception areas, lifts, escalators, foyers, stairwells, toilets, laundries, amenity areas. “No smoking” sign-ages should strategically be placed at prohibited areas and areas designated as ‘smoking areas’ properly indicated.

Relevance: Smoking is prohibited in the park. Thus, project workers must ensure that the requirements of these regulations are complied with.

3.3.7. The National Environment Audit Regulations, 2020

These Regulations apply to an environmental audit for a project or activity for which environmental and social assessment has been undertaken and any other project or activity as may be prescribed by the Authority. An environmental audit shall be undertaken to ensure compliance by the developer with the Act (National Environment Act), regulations and standards made under the Act, conditions in permits and licenses and any other applicable law, environment management systems and the environmental management and monitoring plan of the developer.

Relevance: The construction, operation and maintenance of the canopy walk will require regular environmental audits as will be prescribed by NEMA in the ESIA approval certificate. NFA should comply with the audit regulations and the ESIA approval certificate conditions for the project.

3.3.8. The Water (Waste Discharge) Regulations, 1998

Regulation 4 (1) of these regulations prohibits any person to discharge effluent or waste on land or into the aquatic environment contrary to the standards established under regulation 3 unless he or she has a permit issued by the Director of Water Resources. According to Regulation 4 (2) (a), a person granted a permit under Regulation 4 (1) shall ensure that the effluent or waste discharged conforms to the maximum permissible limits established under regulation 3 (1).

Relevance: Since the proposed project will generate waste water during the construction and operation phases of the project, the developer for the project will have to abide by these regulations.

3.3.9. The Guidelines for Environmental Impact Assessment in Uganda, 1997

The National Environment Management Authority (NEMA) published EIA guidelines in 1997 where the ESIA process and procedures are outlined.

Relevance: The ESIA for the proposed project has been carried out in accordance with these guidelines.

3.3.10. The Environmental Audit Guidelines for Uganda, 1999

Section 2.1.3 of the Environmental Audit Guidelines reiterates the National Environment Act’s (Part II-Section 4 (3)) requirement for all on-going activities that have or are likely to have a significant impact on the environment to be subjected to an environmental audit. An environmental



audit is defined under section 2 of the NEA as a systematic; documented, periodic and objective evaluation of how well environmental organization, management, and equipment are performing in conserving the environment and its resources. Section 23(i) of the National Environment Act gives NEMA the responsibility for carrying out Environmental Audits. Under section 2.1.4 of the Environmental Audit Guidelines, it is stated that NEMA may carry out the audits by certifying auditors to carry out the audits.

Under section 2.1.8 of the audit guidelines it is stated that a developer is expected to submit the first Environmental audit report to the Executive Director, NEMA within a period of not less twelve months and not more than thirty-six months after the completion of the project or commencement of its operations, whichever is earlier, provided that an audit may be required sooner if the life of the project is shorter than the afore mentioned period. The guidelines under section 2.1.4 also reiterate section 23(3) of the National Environment Act that gives developers of projects for which an Environmental and Social Impact Statement has been made the responsibility to keep records and make annual reports to the NEMA describing how far the project conforms in operation with the statements in the ESIS.

Relevance: *The proposed project is likely to have some significant impacts of the environment. Therefore, the developer will be required to undertake environmental audits for the facility.*

3.3.11. The National Environment (Minimum Standards for Management of soil quality Regulations, 2001)

Section 12 of this Act requires compliance with prescribed measures and guidelines for soil conservation for the topography, drainage and farming systems, contravention of which constitutes an offence.

Relevance: *Whereas Uganda soil regulatory limits have been established (National Environment (Minimum Standards for Management of Soil Quality) Regulations, 2001), they do not state the regulatory limits for the specific soil parameters. Therefore, the United States Environmental Protection Agency (USEPA) regulatory limits for the specific soil parameters that were used being analysed are referred to for comparison purposes of the soil samples analysed (as indicated in Section 4, Table 4-4). Measures to prevent soil contamination will be put in place by the developer.*

3.3.12. Employment Sexual Harassment) Regulation, 2012

The regulations require an employer with more than twenty-five employees to adopt a written policy against sexual harassment which includes a notice to employees that sexual harassment is unlawful, a statement of consequences for employees who are found to have committed sexual harassment, and education and training programs on sexual harassment for all employees on a regular basis.

Relevance: *NFA and their Contractor will develop a policy on sexual harassment to be implemented during the construction and operation phases of the project. They will also make use of the project policy that is already in place.*

3.3.13. Standards for consultation

The public consultation process adhered to both Ugandan guidelines and the World Bank Operational Policies. While Uganda does not have specific regulations for public consultations, its



national Environmental and Social Impact Assessment (ESIA) guidelines emphasize the importance of ensuring full public involvement and participation throughout the ESIA process. This approach prioritizes engaging individuals and groups within local communities who may be directly affected by the proposed project, giving them a platform to share their views and concerns.

Additionally, the guidelines stress the importance of identifying and including members of the public who might be indirectly affected by the proposed activity, a task that requires careful consideration. It is essential to ensure that the consultation process captures a fair and balanced representation of views, preventing the voices of minority groups from being overshadowed by more influential participants. This approach fosters inclusivity and ensures that all perspectives are considered in decision-making.

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

- Informing them about the proposed project;
- Open public meetings on the projects;
- Inviting written comments on proposed project;
- Use of community representatives;
- Comment and review of the Environmental Impact Statements; and,
- 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 ESIA process are spelt out:

(a) Public consultation before ESIA is done

Upon receiving and reviewing the developer's ESIA report, the National Environment Management Authority (NEMA), in consultation with the Lead Agency, may determine the need for public consultation and feedback. If this is deemed necessary, NEMA is required to publish the developer's notification along with supporting documents or their summary in public media within four weeks of receiving the project brief or notice of intent to develop.

The public and other stakeholders are then given 21 days from the date of publication to submit their objections or comments to both NEMA and the Lead Agency. This process ensures transparency and provides an opportunity for stakeholder engagement.

(b) Public consultation during the ESIA

The team responsible for conducting the ESIA will engage the public to gather opinions and views on the project's social and environmental aspects. This public involvement will take place during the scoping phase and other relevant stages of the study.

(c) Public consultation after ESIA (ESIA Review)

The Environmental and Social Impact Statement (ESIS) / ESIA Report shall be a public document, accessible for inspection by any individual at a reasonable time.



Relevance: Based on the project's scale and potential impacts, the Authority, in consultation with the Lead Agency, will determine the regions where the ESIA report should be made available to the general public.

3.4. Institutional Framework

Key institutions identified responsible for ensuring compliance with legal requirements and their mandate are summarized in Table 3-7.

Table 3-7: List of National Stakeholders

INSITUATION	DEPARTMENT	MANDATE
Ministry of Water and Environment	National Environment Management Authority (NEMA)	Coordination, monitoring and supervision of environmental conservation activities directly or through District Environmental Officers at district level and Environmental Liaison units at ministries. Review and approval of Environmental Impact Statements (EIS) in consultation with any relevant lead agencies
	National Forest Authority	NFA is mandated to; "Manage Central Forest Reserves on a sustainable basis and to supply high quality forestry-related products and services to government, local communities and the private sector". The directorate majorly focuses on restoring of the integrity of the central forest reserves, develop and innovate new products and services, improve ecotourism management and increase forest coverage across the CFR's in the Country.
Ministry of Tourism, Wildlife and Antiquities		Policy formulation, planning and coordination of conservation and development of museums and cultural heritage. Monitoring project construction activities, especially excavations to ensure that chance finds or artifacts of cultural significance are not destroyed.
	Department of Museums and Monuments	Concerned mostly with heritage and culture. This department may be contacted in the event of any suspected archaeological or living culture finds during construction.
	Uganda Wildlife Authority	UWA is responsible for the management and conservation of wildlife in Uganda, both in and outside the wildlife protected areas. UWA is also obliged to ensure the protection of rare, endangered and endemic species of wild plants and animals, through provision of appropriate wildlife policies, management plans and promotion of wildlife management best practices, as well as development and boosting tourism.
	Uganda Tourist Board	The Board's mandate is to promote and market Uganda across the region and internationally, promote quality assurance in tourist facilities through training, grading and classification, promote tourism investment, support, and act as a liaison for the private sector in tourism development.



INSITUATION	DEPARTMENT	MANDATE
Ministry of Gender, Labour and Social Development	Department of Occupational Safety and Health	Inspection of workplace environment to safeguard occupational safety, rights of workers and gender equity.
Ministry of Local Government	Masindi District Local Government	<ul style="list-style-type: none"> • Infrastructure and social development in accordance with district development plan • Environmental and social monitoring • Project approvals • Review of ESIA reports • Participate in the identification and selection of relocation sites. • Facilitate the registration and transfer of interests in land; • Review the progress of the land acquisition and resettlement implementation and problems, if any, identified through monitoring.
Bunyoro Kingdom	Royal Aforestation Program	Bunyoro Kitara Kingdom, has mobilized the masses to conserve the environment by providing tree seedlings to people in the region and launching campaigns over radios about the importance of planting trees. However less have been achieved, thus the Kingdom have decided to participate itself in the activity of tree planting and a forestation to conserve the depleted environment.
Wildlife Conservation Society	Murchison Falls National Park	The Wildlife Conservation Society (WCS) is a non-governmental, science-based conservation organization that works in over 50 countries around the world. Founded in 1895 as the New York Zoological Society, its mission is to conserve wildlife and ecosystems by generating and applying innovative scientific and field-based solutions to critical problems.

3.5. Multilateral Agreements

Uganda has signed and/or ratified a range of international agreements relating to the environment, both regionally and globally. The National Environment Act, 2019, provides for the implementation of the International Conventions on Environment ratified by Uganda.

The conventions relevant to the proposed established canopy walk are discussed below.

3.5.1. *Convention for the Protection of the Ozone Layer and Its Montreal Protocol*

The Montreal protocol to the Vienna Convention for the Protection of the Ozone Layer is an international treaty designed to protect the ozone layer by phasing out the production of a number of substances believed to be responsible for ozone depletion. The treaty was opened for signature in January 1987 and was last revised in 1999 at Beijing. It has been ratified by 96 countries; Uganda inclusive.



The Ozone depleting substances are Chlorofluorocarbons (CFCs) and Hydro chlorofluorocarbons (HCFCs). The ozone shield is important because it protects plant and animal life on land from the sun's ultraviolet rays, which can cause skin cancer, cataracts, and damage to the immune system.

Thinning of the ozone layer also may alter the DNA of plants and animals. Ozone depleting substances also act as greenhouse gases, with several thousand times the per-molecule greenhouse potential of carbon dioxide.

Uganda has put a law in place to guide in the adherence to this Protocol; The National Environment (Management of Ozone Depleting Substances and Products) Regulations 2020.

Relevance: *Construction of the canopy walk will require a number of equipment which may use CFCs and HCFCs thus the developer of the project shall abide by the requirements of the Convention.*

3.5.2. United Nations Framework Convention on Climate Change (UNFCCC)

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The convention encouraged industrialized countries to stabilize greenhouse gases while the Kyoto protocol commits them to do so. Uganda signed the Kyoto Protocol in June 1992, ratified it September 1993 and its enforcement was March 1994. Uganda ratified the convention in March 2002 while entry into force was February 2005. Greenhouse gases are gases in an atmosphere that absorb and emit radiation within the thermal infrared range and greatly affect the temperature of the Earth. In Uganda, Climate Change Unit in the Ministry of Water and Environment is responsible for the implementation of the strategies to meet the Conventions requirements.

Relevance: *The emission of greenhouse gases including Carbon dioxide expected to be released from project vehicles and equipment during construction of the proposed canopy walk, and this should be limited in conformity with this convention.*

3.5.3. Convention for the Safeguarding of the Intangible Cultural Heritage, 2003

The 2003 Convention for the Safeguarding of the Intangible Cultural Heritage calls on States that have ratified it to safeguard living heritage on their own territories and in cooperation with others. Ratified by more than 80 countries, it seeks to celebrate and safeguard the intangible heritage distinctive for particular communities. At the same time, the convention does not intend to establish a hierarchy among heritage elements or identify some as more valuable or important than others. The Convention affirms that the intangible heritage of all communities, whether they are large or small, dominant or non-dominant, deserves our respect.

The Convention sets out the duties of State Parties in identifying potential sites and their role in protecting and preserving them. Each member country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage. The State Parties are encouraged to integrate the protection of the cultural and natural heritage into regional planning programs, set up staff and services at their sites, undertake scientific and technical conservation research and adopt measures which give this heritage a function in the day-to-day life of the community.



Relevance: *The emission of greenhouse gases including Carbon dioxide expected to be released from construction vehicles and equipment during construction of the proposed canopy walk should be limited in support of the convention. The developer is therefore obligated to safeguard any intangible cultural heritage that may be in the project area during the implementation of the project.*

3.5.4. The Convention on Biological Diversity 1992 (CBD)

The CBD was one of the major outcomes of the 1992 United Nations Conference on Environment and Development, termed the “Earth Summit” in Rio de Janeiro. The three main goals of the Conventions on Biological Diversity (CBD) are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from utilization of genetic resources. The CBD calls for a much more holistic approach to biodiversity, by recognizing its ecosystem, species and genetic levels.

Relevance: *This ESIA will identify potential impacts on the biodiversity on site and surroundings, and propose feasible mitigation measures to promote its conservation, in line with the CBD.*

3.5.5. The Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention, 1972)

The convention considers the following as "cultural heritage"; monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science. Each State Party to this Convention recognizes that the duty of ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage referred to in Articles 1 and 2 and situated on its territory, belongs primarily to that State. It will do all it can to this end, to the utmost of its own resources and, where appropriate, with any international assistance and co-operation, in particular, financial, artistic, scientific and technical, which it may be able to obtain.

Relevance: *The possibility that some physical cultural resources may be discovered during construction phase of the project makes this convention relevant. The project will be implemented in accordance with the convention requirements.*

3.5.6. The African Convention on the Conservation of Nature and Natural Resources, 1968

The Contracting States to African Convention on the Conservation of Nature and Natural Resources are required to undertake to adopt measures to ensure conservation, utilization and development of soil, water, flora and faunal resources in accordance with scientific principles and with due regard to the best interests of the people.

The Contracting States to this convention are also required to ensure that conservation and management of natural resources are treated as an integral part of national and/or regional development plans. In addition, during the formulation of all development plans, full consideration is required to be given to ecological, as well as to economic and social factors.

Relevance: *Because of the location of the project site within Budongo Central Forest Reserve with Murchison Falls National Park, conservation of biodiversity and ecosystems will have to be taken seriously during the project as a commitment to this convention.*



3.6. World Bank Environmental and Social Standards

According to ESF document (World Bank, 2017), the World Bank Environmental and Social Framework sets out the Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The Framework comprises; A Vision for Sustainable Development, The World Bank Environmental and Social Policy for Investment Project Financing and The Environmental and Social Standards, together with their Annexes, which set out the mandatory requirements that apply to the Borrower and projects.

The Environmental and Social Standards (ESSs) set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing. The Environmental and Social Standards (ESSs), are designed to assist borrowers to avoid, minimize, reduce or mitigate the adverse environmental and social risks and impacts from development projects. Some of the standards and guidelines that are relevant to the proposed project are highlighted below;

- ESS 1: Assessment and Management of Environmental and Social Risks and Impacts;
- ESS 2: Labour and working conditions;
- ESS 3: Resource Efficiency and Pollution Prevention and Management;
- ESS 4: Community Health and Safety
- ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- ESS 8: Cultural Heritage;
- ESS 10: Stakeholder Engagement and Information Disclosure.

3.6.1. ESS1: Assessment and Management of Environmental and Social Risks and Impacts

This standard sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing.

The ESSs are designed to help Borrowers manage the risks and impacts of a project, and improve their environmental and social performance, through a risk and outcomes-based approach.

As such;

- Borrowers will conduct environmental and social assessment of projects proposed for Bank financing to help ensure that projects are environmentally and socially sound and sustainable.
- The environmental and social assessment will be proportionate to the risks and impacts of the project.
- It will inform the design of the project and be used to identify mitigation measures and actions and to improve decision-making.

Borrowers will manage environmental and social risks and impacts of the project throughout the project life cycle in a systematic manner, proportionate to the nature and scale of the project and the potential risks and impacts.



Relevance: *The environmental and social assessment has been based on current information, including an accurate description and delineation of the project and any associated aspects, and environmental and social baseline data has an appropriate level of detail sufficient to inform characterization and identification of risks and impacts and mitigation measures.*

3.6.2. ESS 2: Labour and Working Conditions

This standard recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. The standard aims;

- To promote safety and health at work.
- To promote the fair treatment, non-discrimination and equal opportunity of project workers.
- To protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate.
- To prevent the use of all forms of forced labour and child labour.
- To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law.
- To provide project workers with accessible means to raise workplace concerns

Relevance: *Considering that over 06-10 workers will be employed on the project, the requirements of ESS2 shall be implemented throughout the project execution period.*

3.6.3. ESS 3: Resource Efficiency and Pollution Prevention and Management

The applicability of this ESS is established during the environmental and social assessment. ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention and GHG emission avoidance, and mitigation technologies and practices have become more accessible and achievable.

- The Borrower will consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention measures in accordance with the mitigation hierarchy.
- The measures will be proportionate to the risks and impacts associated with the project and consistent with GIIP, in the first instance the EHSGs.

Resource efficiency

- The Borrower will implement technically and financially feasible measures for improving efficient consumption of energy, water and raw materials, as well as other resources.
- Such measures will integrate the principles of cleaner production into product design and production processes to conserve raw materials, energy and water, as well as other resources.
- Where benchmarking data are available, the Borrower will make a comparison to establish the relative level of efficiency.



Relevance: While using water, power and material, NFA or their contractor will ensure efficient use of the resources so that wastage is minimised and pollution avoided.

3.6.4. ESS 4: Community Health and Safety

This standard requires borrowers to evaluate the risks and impacts of the project on the health and safety of the affected communities during the project life cycle, including those who, because of their particular circumstances, may be vulnerable. The Borrower will identify risks and impacts and propose mitigation measures in accordance with the mitigation hierarchy.

This ESS addresses potential risks and impacts on communities that may be affected by project activities. Occupational health and safety (OHS) requirements for project workers are set out in ESS2, and measures to avoid or minimize impacts on human health and the environment due to existing or potential pollution are set out in ESS3.

Relevance: Potential risks and impacts on communities that may be affected by project activities were identified and measures to avoid or minimize impacts on human health suggested in this ESIS (section 7.0).

3.6.5. ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

Based on the environmental and social assessment, the requirements of this ESS are applied to all projects either that potentially affect biodiversity or habitats, positively or negatively, directly or indirectly, or that depend upon biodiversity for their success. ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development.

- The environmental and social assessment as set out in ESS1 will consider direct, indirect and cumulative project-related impacts on habitats and the biodiversity they support.
- This assessment will consider threats to biodiversity, for example habitat loss, degradation and fragmentation, invasive alien species, overexploitation, hydrological changes, nutrient loading, pollution and incidental take, as well as projected climate change impacts.
- It will determine the significance of biodiversity or habitats based on their vulnerability and irreplaceability at a global, regional or national level and will also take into account the differing values attached to biodiversity and habitats by project-affected parties and other interested parties.
- The Borrower will avoid adverse impacts on biodiversity and habitats. When avoidance of adverse impacts is not possible, the Borrower will implement measures to minimize adverse impacts and restore biodiversity in accordance with the mitigation hierarchy provided in ESS1 and with the requirements of this ESS.
- Where significant risks and adverse impacts on biodiversity have been identified, the Borrower will develop and implement a Biodiversity Management Plan.

Relevance: In adherence to ESS6, the provision of the existing NFA - FMP for BCFR will be complied with, by NFA and MWE



3.6.6. ESS 8: Cultural Heritage

This ESS sets out general provisions on risks and impacts to cultural heritage from project activities. The term ‘cultural heritage’ encompasses tangible and intangible heritage, which may be recognized and valued at a local, regional, national or global level. The requirements of this ESS8 will apply to all projects that are likely to have risks or impacts on cultural heritage. This will include a project which:

- Involves excavations, demolition, movement of earth, flooding or other changes in the physical environment;
- Is located within a legally protected area or a legally defined buffer zone;
- Is located in, or in the vicinity of, a recognized cultural heritage site; or
- Is specifically designed to support the conservation, management and use of cultural heritage

The requirements of ESS8 apply to cultural heritage regardless of whether or not it has been legally protected or previously identified or disturbed.

Relevance: *The requirements of the ESS 8 will be adhered to during the project implementation.*

3.6.7. ESS 10: Stakeholder Engagement and Information Disclosure

States that effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.

- To establish a systematic approach to stakeholder engagement to identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties.
- To assess the level of stakeholder interest and support for the project and to enable stakeholders’ views to be considered in project design and environmental and social performance.
- To promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them.
- To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.
- To provide project-affected parties with accessible and inclusive means to raise issues and grievances and allow Borrowers to respond to and manage such grievances.

Relevance: *The requirements of ESS10 will guide the implementation of the project Stakeholder Engagement Plan to improve project sustainability. Community engagement and grievance redress should be part and parcel of activities during project implementation.*

3.7. The World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines), 2007

These are technical reference documents with general and industry-specific examples of good international industry practice. IDA and IFC use the EHS Guidelines as a technical source of information during project appraisal. The EHS Guidelines contain the performance levels and



measures that are normally acceptable to IDA and IFC, and that are generally considered to be achievable in new facilities at reasonable costs by existing technology. The General EHS Guideline contains information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors. The environmental, health and safety (EHS) guidelines that are of relevance to the proposed project include:

- (a) EHS Guidelines – Tourism and Hospitality Development
- (b) EHS Guidelines - Air and Noise Emissions and Ambient Air Quality and Noise Levels
- (c) EHS Guidelines – Occupational Health and Safety
- (d) EHS Guidelines – Community Health and Safety
- (e) EHS Guidelines - Waste Management
- (f) EHS Guidelines - Hazardous Materials Management
- (g) EHS Guidelines - Construction and decommissioning

This will be used together with the relevant industry sector guideline(s) to guide the development and implementation of Environmental, Health and Safety Management Plan for the project.

Relevance: *These EHS Guidelines will guide the development and implementation of an Environmental, Health and Safety Management Plan for the project.*

3.7.1. WBG EHS Guidelines: Tourism and Hospitality Development

The Environmental, Health, and Safety (EHS) Guidelines for Tourism and Hospitality Development provide internationally recognized standards for managing environmental and social risks associated with tourism projects. These guidelines emphasize sustainable tourism practices, ensuring that developments minimize their ecological footprint while promoting biodiversity conservation, efficient resource utilization, and community engagement. Key provisions address waste management, energy and water efficiency, pollution prevention, health and safety of workers and guests, and cultural heritage preservation.

Relevance: *The EHS Guidelines are highly relevant to the proposed canopy walk in Kaniyo-Pabidi Area within Budongo Central Forest Reserve, as they provide a framework to mitigate potential environmental and social risks associated with the project. The guidelines will ensure that the canopy walk minimizes its impact on the forest's biodiversity, manages waste and emissions effectively, and promotes energy efficiency during construction and operation. Additionally, they will enhance the safety of visitors and workers, encourage local community involvement, and safeguard the cultural and ecological value of the forest reserve, aligning the project with global sustainability standards.*

3.7.2. WBG EHS Guidelines - Air and Noise Emissions and Ambient Air Quality and Noise Levels

Projects with significant air emission sources and potential impacts on ambient air quality must take measures to prevent or minimize these effects by ensuring that emissions remain below the thresholds outlined in national air quality standards. In the absence of such standards, internationally recognized benchmarks such as the WHO Air Quality Guidelines should be applied. Uganda's national air quality standards are relevant for this project and must be adhered to during its implementation.

Air and noise pollution can result from a variety of activities throughout the construction, operation, and decommissioning phases of a project. These emissions can originate from specific locations (point sources), diffuse locations (fugitive sources), or moving sources (mobile sources) and may be linked to processes such as combustion, material storage, or industry-specific operations. To



protect human health, safety, and the environment, projects should aim to avoid, minimize, or control emissions. When avoidance is not feasible, emissions should be managed through strategies like improving energy efficiency, modifying processes, selecting fuels or materials that produce fewer pollutants, and implementing effective emission control technologies.

Table 3-8: World Health Organisation (WHO) ambient air quality guidelines

Pollutants	Averaging time for ambient air	Standard for ambient air ($\mu\text{g}/\text{m}^3$)
Sulphur dioxide (SO_2)	24-hour	125 (Interim target 1) 50 (Interim target 2)
	10 minutes	20 (guideline) 500 (guideline)
Nitrogen dioxide (NO_2)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM_{10}	1-year	70 (interim target 1) 50 (interim target 2) 30 (interim target 3)
	24-hour	20 (guideline) 150 (interim target 1) 100 (interim target 2) 75 (interim target 3) 50 (guideline)
Particulate Matter $\text{PM}_{2.5}$	1-year	35 (interim target 1) 25 (interim target 2) 15 (interim target 3)
	24-hour	10 (guideline) 75 (interim target 1) 50 (interim target 2) 37.5 (interim target 3) 25 (guideline)
Ozone	8-hour daily maximum	160 (interim target 1) 100 (guideline)

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

Table 3-9: Community Noise Level Guidelines

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

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

Relevance: From the field Assessments, the following parameters were considered: particulate matter, PM (measured as particles with an aerodynamic diameter $<10 \mu\text{m}$ (PM_{10}) and $<2.5 \mu\text{m}$ ($\text{PM}_{2.5}$)), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Volatile Organic Compounds (VOCs) and Carbon Monoxide (CO). $\text{PM}_{2.5}$ is an important indicator of risk to health from particulate pollution and might also be a better indicator than PM_{10} for anthropogenic suspended particles in many areas. $\text{PM}_{2.5}$ and PM_{10} baseline data will be useful in monitoring the dust nuisance around construction sites as well as vehicular emissions. The baseline for the gases (SO_2 , NO_2 , VOCs and CO) will also be useful in monitoring impact of construction activities as well as use of volatile



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

3.7.3. WBG EHS Guidelines – Occupational Health and Safety

Employers and supervisors are required to take all reasonable measures to safeguard the health and safety of workers. This includes following guidance and implementing strategies to manage key occupational health and safety risks. While the emphasis is on the operational phase of projects, much of this guidance is also relevant to construction and decommissioning activities. Additionally, the developer should engage contractor(s) with the necessary technical expertise to address occupational health and safety concerns, ensuring that hazard management practices are upheld through formal procurement agreements.

Relevance: *The WB Environmental, Health, and Safety (EHS) Guidelines (Tourism and Hospitality Development, 2007) provide the latest internationally accepted GIIP for relevant OHS issues. The recommendations contained within the Guidelines have been reviewed during the development of this ESIA and incorporated in to the prescribed management and mitigation measures as appropriate.*

3.7.4. WBG EHS Guidelines – Community Health and Safety

This complements the guidance provided in the environmental and occupational health and safety sections by specifically addressing project-related activities that occur outside traditional project boundaries but are still connected to project operations. These considerations, which may arise at any stage of the project life cycle and could have lasting impacts, include: i) water quality and availability; ii) structural safety of project infrastructure; iii) life and fire safety (L&FS); iv) traffic safety; v) transportation of hazardous materials; vi) disease prevention; and vii) emergency preparedness and response.

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

3.7.5. WBG EHS Guidelines - Waste Management

These guidelines address construction waste management across all project implementation phases. Significant waste volumes are anticipated at locations such as the project site, material stockpile yards, site workshops, equipment parking areas, batching plants, and temporary contractor workforce shelters. The guidelines emphasize the importance of waste management planning, requiring waste to be categorized based on composition, source, type, and generation rates. They promote the adoption of a waste management hierarchy, which prioritizes prevention, recycling or reuse, treatment, and disposal. Additionally, the guidelines mandate the separation of conventional waste from hazardous waste. Examples of hazardous construction waste include vehicle and machinery waste oil, paint waste, thinners, and concrete wash water (e.g., from cleaning concrete mixers).

Relevance: *Improper management of construction waste would pose environmental and public health impacts. Both the contractor and Operator of the Canopy Walk will have a contractual*



obligation to ensure proper construction waste management. To this end, provisions of these guidelines should be utilized as vital guiding documents.

3.7.6. WBG EHS Guidelines - Hazardous Materials Management

These guidelines are applicable to projects involving the use, storage, or handling of hazardous materials (Hazmats), which are substances posing risks to human health, property, or the environment due to their physical or chemical properties. Hazardous materials are categorized based on their associated risks, including explosives, compressed gases (toxic or flammable), flammable liquids, flammable solids, oxidizing agents, toxic substances, radioactive materials, and corrosive substances.

Relevance: *Facilities involved in the manufacturing, handling, use, or storage of hazardous materials should implement management programs aligned with the potential risks associated with these materials. The primary goals of such projects are to safeguard the workforce and prevent or control the release of hazardous chemicals and accidents. These goals should be achieved by incorporating prevention and control measures, management practices, and procedures into daily operations. The proposed project activities will involve handling hazardous materials like fuel, lubricants, paint, and compressed gas cylinders, particularly at locations such as the construction site, fuel storage areas, and mechanical workshops.*

3.7.7. WBG EHS Guidelines - Construction and Decommissioning

This provides detailed guidance on preventing and managing community health and safety impacts that may arise during the development of new projects, at the conclusion of a project's lifecycle, or from the expansion or modification of existing facilities. It also includes references to relevant sections of the General EHS Guidelines.

3.7.7.1. Environment

- (a) Noise and Vibration:** Construction and decommissioning activities may generate noise and vibrations from the use of equipment such as pile drivers, excavators, concrete mixers, cranes, and the movement of materials, equipment, and personnel. To minimize noise impacts in areas near communities, implementing effective noise reduction and control measures is recommended.
- Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance;
- Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines; and
- Avoiding or minimizing project transportation through community areas
- (b) Air Quality:** The project will involve activities such as excavations and handling construction materials like aggregates, sand, and cement, which may generate fugitive dust, impacting nearby areas. Additional emissions could arise from diesel-powered earth-moving equipment and the open burning of construction waste.
- (c) Solid Waste:** Non-hazardous solid waste from construction and decommissioning sites may include surplus materials from grading and excavation, scrap wood and metals, and minor concrete spills. Other non-hazardous waste could result from office, kitchen, and dormitory operations if included in the project. Hazardous waste may include contaminated soils from



previous land use, oily rags, used oil filters, used oil, and spill cleanup materials from oil or fuel leaks.

- (d) **Hazardous Materials:** Construction and decommissioning activities could lead to the release of petroleum-based substances like fuels, lubricants, or hydraulic fluids during their storage, transfer, or use in equipment. Such materials may also be present in building components or industrial equipment during decommissioning.
- (e) **Wastewater Discharges:** Construction and decommissioning activities may generate varying amounts of sanitary wastewater depending on the number of workers on-site. It is essential to provide sufficient portable or permanent sanitation facilities for all workers at construction sites.
- (f) **Soil Erosion:** Site preparation activities such as clearing can expose soil to rain and wind, causing erosion. This erosion can mobilize soil particles, leading to sedimentation in drainage systems, potentially affecting the quality of natural water systems and the ecosystems that depend on them.

3.7.7.2. Occupational Health and Safety

- (a) **Working at Heights:** Falls from elevated positions, including ladders, scaffolding, or partially constructed or demolished structures, are a leading cause of severe or fatal injuries at construction and decommissioning sites. To address fall risks, a fall protection plan should be implemented, incorporating measures tailored to the specific hazards involved.
- (b) **Dust:** To reduce dust levels, suppression techniques like applying water or non-toxic chemicals during vehicle movements should be employed. Additionally, personal protective equipment (PPE), such as dust masks, should be provided and used in areas with excessive dust levels.
- (c) **Struck by Objects:** Construction and demolition work can pose risks of injuries caused by falling materials or tools, as well as solid particles ejected from abrasive or power tools, potentially harming the head, eyes, or extremities.
- (d) **Over-Exertion:** Physical strain, repetitive motions, and improper manual handling can lead to ergonomic injuries and illnesses, such as over-exertion or repetitive stress injuries, which are prevalent in construction and decommissioning activities.
- (e) **Slips and Falls:** Accidents due to slips and falls at the same level frequently occur as a result of poor housekeeping. Hazards include excessive debris, loose construction materials, liquid spills, and unorganized electrical cords or ropes left on the ground.
- (f) **Confined Spaces and Excavations:** Construction and demolition sites may contain confined spaces, such as silos, vats, tanks, sewers, pipes, access shafts, utility vaults, and hoppers. Trenches and ditches can also be considered confined spaces when entry or exit is restricted.
- (g) **Moving Machinery:** Vehicle traffic and machinery operations on construction sites can create temporary hazards, including risks of physical injury, spills, dust, emissions, and noise. Heavy equipment operators often have limited visibility around their equipment, increasing the risk of accidents involving pedestrians. Additionally, center-articulated vehicles present a significant risk of impact or crushing during turns.

3.7.7.3. Community Health and Safety

The guidelines recommend implementation of risk management strategies to safeguard the broader community from physical, chemical, or other potential hazards arising during site construction and decommissioning activities:



- (a) **General site hazards:** Projects should establish risk management measures to protect communities from physical, chemical, or other hazards linked to construction and decommissioning sites. Such risks may stem from unintentional or deliberate trespassing, which could lead to exposure to hazardous materials, contaminated soils, vacant or under-construction buildings, as well as excavations and structures that present risks of falling or entrapment.
- (b) **Disease prevention:** Construction activities may lead to an increased risk of communicable and vector-borne diseases, posing a significant health concern for both project workers and local communities. Measures for preventing and controlling these diseases, applicable during the construction phase, are recommended in the guidelines.
- (c) **Traffic safety:** The movement of heavy vehicles transporting construction materials and equipment during project activities can substantially increase the likelihood of traffic-related accidents and injuries affecting both workers and local residents. To mitigate such risks, the guidelines recommend education, awareness campaigns, and the implementation of proper safety procedures.

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



3.8. Permit/certificates/approval requirements

Below (Table 3-10) are some of the permits required to be obtained by NFA before project implementation

Table 3-10: Permits required

Type of Permit, Licence or Approval	Issuing Authority	Legislation Regulations	or	Requirement	Relevance to the Project
Certificate of Registration of a Workplace	Department of Occupational Safety and Health Ministry of Gender, Labour and Social Development	Occupational Safety and Health Act, 2006		Section 40 (2): a person shall not less than one month before he or she begins to occupy any premises as a workplace, serve on the Commissioner, a notice with the particulars prescribed in Schedule 3.	The project will obtain a registration of workplace certificate for the construction site before start of works.
Certificate of approval of ESIA	National Environment Management Authority	National Environment (Environmental and Social Assessment) Regulations, 2020		24 (4) Where the Authority approves the project under sub regulation (1)(a), it shall issue a certificate of approval of environmental and social impact assessment in accordance with Part IV of these Regulations.	A NEMA certificate of approval is required.



CHAPTER 4

4. ASSESSMENT METHODS AND BASELINE RESULTS

4.1. Impact Assessment Methods

A range of analytical approaches was employed to assess impact significance, including expert judgment, lessons learned from comparable projects, and compliance with relevant environmental policies, legal frameworks, management plans, and environmental standards. Significance was determined based on the criteria outlined above. To facilitate this process, a structured impact evaluation matrix was preferred, as presented in Table 4.1 – 4.3. The assessment was designed to identify potential impacts during the ESIA by recognizing and mitigating significant effects. Various tools were employed for this purpose, with impact checklists being a preferred method due to the short, linear nature of the project.

Through the application of this tool, multiple planning considerations emerged during stakeholder consultations. Significant impacts were categorized according to distinct project phases, namely construction, operation, and decommissioning. The study sought to identify, predict, and evaluate the significance of potential project impacts. Impact identification commenced with a summary of the field-documented impacts, followed by predictions derived using an impact correlation matrix. The significance of impacts was evaluated through multiple methods, including professional judgment, expert deliberations within the project team, stakeholder concerns, and a defined set of criteria, which included:

- The magnitude and likelihood of the impact, along with its spatial and temporal extent
- The expected degree of environmental recovery
- The intrinsic value of the affected environment
- The level of public concern regarding the impact
- The potential political implications of the proposed development
- An impact was deemed significant if it:
 - Extended across a broad spatial or temporal scale
 - Exceeded the assimilative capacity of the affected area
 - Surpassed established environmental thresholds or regulatory standards
 - Contravened environmental policies, land-use plans, or sustainability frameworks
 - Significantly affected ecologically sensitive areas
- Adversely impacted heritage resources, land use patterns, local communities, or the cultural and traditional values of indigenous groups



For all significant impacts, appropriate mitigation measures and enhancement strategies were proposed. The report included details on mitigation and monitoring plans, assigning responsibilities to ensure the effective implementation of these measures.

In conducting the impact evaluation, identification and prediction of impact magnitude, extent, and duration were undertaken. The initial baseline condition was utilized as a reference point for projecting future scenarios with the project in place. Changes were assessed in relation to national and sectoral policies, legal frameworks, guidelines, and applicable standards. Stakeholder perspectives were also incorporated to refine the determination of impact significance. A further evaluation of impact significance was recognized as a crucial component of the assessment process, directly influencing project costs, the formulation of project conditions, and the selection of feasible alternatives. Determining impact significance facilitated the integration of environmental costs into the overall project budget. For impacts identified as significantly negative, mitigation measures were formulated, whereas enhancement strategies were developed for those classified as significantly positive.

Table 4-1: Criteria for rating impacts

No	Rating	Description of Rating
1	+3	Very low positive impact to the project or receptor
2	+2	Moderate positive impact to the project or receptor
4	+1	High positive impact (Impact has advantages to the project or receptor)
5	0	No impacts
6	-1	High negative impact (Impact is disadvantageous to the project or receptor)
7	-2	Moderate negative impacts to the project or receptor
8	-3	Very low negative impacts to the project or receptor

Table 4-2: Risk Assessment Matrix

Probability Scale (P)		Severity Scale (G)	
Score	Significance	Score	Significance
P1	Very Unlikely	G1 Minor	Accident or illness without lost time
P2	Unlikely	G2 Moderate	Accident or illness with lost time
P3	Likely	G3 Major	Accident or illness with partial permanent disability
P4	Almost Certain	G4 Severe	Fatal accident or illness

B. Risk & Impact Assessment Approach – Risk Assessment

Table 4-3: Risk Assessment Matrix

Severity Scale (G)	Probability Scale (P)			
	P1	P2	P3	P4
G4				



G3				
G2				
G1				

The assessment appears as follows:

	Significance of Colours
	High Risk (Priority 1)
	Moderate Risk (Priority 2)
	Low Risk (Priority 3)

4.1.1. Mitigation Hierarchy Assessment

The assessment process classified impacts based on their likelihood of occurrence, leading to the development of a structured mitigation hierarchy. The proposed approach proceeded as follows:

- **Step 1 – Avoidance Measures (AM):** These encompassed actions designed to prevent or eliminate the occurrence of risks or impacts. Avoidance was achieved by either relocating project activities or infrastructure outside sensitive areas or modifying the production process or technology to eliminate the risk at its source.
- **Step 2 – Minimisation Measures (MM):** Where avoidance was not feasible, minimisation strategies were implemented to reduce the severity or significance of potential impacts. These measures were applied only after all viable avoidance strategies had been exhausted.
- **Step 3 – Mitigation Measures (MM):** For impacts that remained unavoidable, mitigation measures were employed to moderate, reduce, or eliminate risks over time. These actions were implemented following the application of both avoidance (Step 1) and minimisation (Step 2) measures.
- **Step 4 – Restoration Measures (RM):** Where impacts resulted in environmental degradation, restoration measures were undertaken to rehabilitate or restore affected ecosystems either in situ or in nearby locations. These corrective actions were implemented after avoidance, minimisation, and mitigation measures had been applied.
- **Step 5 – Compensation Measures (CM):** In cases where residual impacts persisted despite all prior measures, compensation strategies were employed to fully restore lost assets, property, or livelihoods affected by physical displacement or socio-economic losses. Compensation also extended to offsetting environmental impacts beyond the project footprint, including financing and implementing Biodiversity Action Plans (BAPs), supporting biodiversity research, or enhancing conservation initiatives. Compensation was considered a last resort, applied only after all previous mitigation steps had been exhausted.



4.1.2. Cost Benefit Analysis

The assessment included a cost-benefit analysis of the project, conducted in alignment with environmental management requirements to evaluate its overall viability. By incorporating environmental liabilities into the project's financial analysis, the evaluation provided a simple basis for determining some values that may be dependable during the implementation. This analysis was informed by engagement with the GreenHeart Co. in Canada, ensuring that both economic and environmental considerations were systematically integrated into decision-making.

4.1.3. Determination of Impacts of the TBCW

It was stated that the project would involve the identification and prediction of all potential impacts both qualitatively and, where feasible, quantitatively on the biophysical, socio-economic, and cultural environments. The methodologies for impact prediction, analysis, and evaluation would be comprehensively documented. Specifically, the issues identified during the scoping phase would be addressed. The assessment and evaluation of these identified impacts would take into account proposed mitigation measures to determine the significance of any residual effects. Impacts would be characterized to indicate whether they are beneficial or adverse, direct or indirect, short-term or long-term, and reversible or irreversible. The significance of each impact would be assessed based on the following attributes:

- **Geographic Extent:** The spatial scale of the impact.
- **Duration:** The temporal scale over which the impact persists.
- **Frequency:** The rate of occurrence of the impact within a defined period.
- **Reversibility:** The potential for the environment to return to baseline conditions following the impact.
- **Magnitude:** A measurable description of the impact's intensity, considering baseline conditions and relevant Ugandan or international standards.

Following this analysis and the classification of potential impacts associated with the proposed project activities, appropriate mitigation measures would be recommended, aligned with the assessed significance of each impact.

4.1.4. Preparation of the ESMP

It is stated based on the analysis and classification of identified impacts, feasible and cost-effective mitigation measures would be proposed to address adverse effects. However, in some areas of analysis the amount or values were not provided due to delayed response from the designing team. An Environmental and Social Management Plan (ESMP) was developed to guide project construction and operations including the likelihood of decommissioning after the endline of the project within the designated area. This plan outlines management and monitoring and where applicable estimated budgets provided, implementation schedules, and responsibilities, and timelines for executing the proposed mitigation measures. Additionally, the ESMP incorporate emergency preparedness and response guidance to identify key environmental and social impacts and in some cases, risks associated with the TBCW, qualitatively assess each risk, and propose



measures to minimize the likelihood of occurrence. In case of an incident, the operator would define strategies to mitigate adverse effects.

The ESMP also provides guidance on closure and post-closure activities by establishing objectives and recommending appropriate measures, including contingency planning, to achieve them. Further emphasis would be placed on progressive rehabilitation, defining expected post-closure conditions, and outlining a framework for long-term post-closure monitoring. A comprehensive monitoring plan is also integrated into the ESMP to ensure the effective implementation of mitigation measures and the minimization of environmental and social impacts throughout the project's lifecycle including the construction, operation, and decommissioning phases. This plan specifies key monitoring parameters, their respective intervals and frequency, estimated costs, and clearly assigned responsibilities indicating who would be responsible for each task, when it would take place, and the methodologies to be applied. Additionally, provisions for post-closure monitoring would be incorporated within the broader monitoring framework.

It was further noted that ESIS was developed based on baseline data collected regarding the project scope, environmental and social baseline conditions, key stakeholder consultations, laboratory analyses, and other relevant sources. This was done in accordance with the Environmental and Social Impact Assessment Regulations of 2020. The ESIS include the identification, analysis, and classification of potential impacts, along with proposed mitigation measures and the Environmental and Social Management and Monitoring Plan for implementation. The report also features an Executive Summary, providing an overview of the ESIS by summarizing key findings while minimizing technical complexities.

4.2. Baseline Conditions

4.2.1. History of Budongo CFR

Budongo Central Forest Reserve has undergone notable ecological transformations over time, primarily due to timber harvesting and silvicultural practices. These activities significantly altered the forest's seral stages, leading to a reduction in its total area to 3,375 hectares just 4% of the original forested expanse. Despite this decline, the forest retains discernible characteristics of its initial ecological state. Budongo is classified into various forest types, including wooded grassland, colonizing woodland, mixed forest, *Cynometra*-dominated forest, and swamp forest. Among these, the mixed forest type now dominates, accounting for 85% of the forested area. This dominance is attributed to canopy openings created during salvage harvesting of aging mahogany trees, allowing increased light penetration to lower forest layers. This intervention not only stimulated the development of these layers but also delayed the progression of mixed forests into pure *Cynometra* stands.

Moreover, arboricide treatments further contributed to the reduction of pure *Cynometra* areas, converting them into mixed forest stages. Historical records indicate that Eggeling (1947) estimated *Cynometra alexandri* to occupy around 30% of the reserve, expanding at the expense of mixed forest areas. Over time, silvicultural practices, such as the removal of non-commercial species, have expanded mixed forest coverage, improving the forest's economic potential while diminishing mahogany populations.



4.2.1.1. Grassland Ecology

Forest inventory data from the Forest Department's 1992 regime revealed that grasslands occupied a significant proportion (46.3%) of Budongo Forest Reserve. These grasslands appeared as enclaves or near the reserve's outer edges, with Kitigo Block predominantly covered by grass species such as *Pennisetum purpureum* in Siba Block and *Hyparrhenia cymbaria*. The persistence of grasslands was primarily driven by annual fires set by hunters during dry seasons. Late-season fires, fuelled by dry, highly flammable grasses, destroyed herbaceous plants and young forest seedlings, hindering the colonization of woodland species.

As noted in similar tropical ecosystems by Louppe et al. (1995), effective grassland colonization by forest species requires uninterrupted fire protection for 40 to 60 years. A case in point is Biiso Block's grassy glade below Busingiro Rest House, which transitioned to colonizing forest species following fire suppression measures implemented after 1940. Eggeling (1947) observed that this area, previously wooded grassland exploited for firewood by East African Railways in 1944, began regenerating after fire suppression efforts. By the mid-1960s, the glade had transformed into a mature colonizing forest, featuring *Khaya anthotheca* and *Milicia excelsa* stems with diameters exceeding 10 cm.

4.2.1.2. Colonizing Forest

Colonizing forests primarily occur along forest margins and are characterized by various woodland tree species, including *Albizia zygia*, *Sapium ellipticum*, *Cordia africana*, *Maesopsis eminii*, and *Spathodea campanulata*. This forest type covers approximately 5% of Budongo's forested area and has remained relatively stable since 1945 (Philip, 1964). Over time, older colonizing forests have gradually been overtaken by mixed forest species such as *Cordia millenii*, *Diospyros abyssinica*, *Milicia excelsa*, *Olea welwitschii*, and *Funtumia africana*.

The development of colonizing forests depends on the suppression of annual fires, a process influenced by climatic conditions such as disrupted dry seasons or the early onset of wet seasons. While colonizing forests typically support limited biodiversity, they are economically valuable due to the presence of high-value timber species, including *Guarea* and *Olea*.

4.3. Physical Environment

4.3.1. Geology

Budongo Forest is predominantly underlain by ancient rocks of Precambrian origin, including *gneiss*, *schists*, and *granulites*. These rocks are among the oldest in the region, forming the foundational geology that supports the forest's unique ecosystems (Hepworth, 1961, and McConnell, 1972). These Precambrian formations are characterized by their high-grade metamorphism, a testament to the intense geological processes that shaped them over billions of years (McConnell, 1972, and Pallister, 1995). In contrast, the southern part of Siba is primarily underlain by rocks of the Bunyoro–Kyoga series, which include mudstones, *shales*, *phyllites*, *quartzites*, and *conglomerates*. These rocks, believed to be of pluvio-glacial origin, have undergone varying degrees of metamorphism, resulting in their current composition and structure (Harvey., & Parker, 2000). The quartzites and conglomerates exhibit significant resilience to erosion, forming ridges and elevated features within the landscape. The shales and phyllites, on the other hand,



contribute to more fertile soils, which support diverse vegetation. The Figure 4.1. below show some existing types of granite nature in the area.

The interplay between these geological formations influences the hydrology, soil characteristics, and biodiversity of Budongo Forest and the southern Siba region. The high mineral content in some of these rocks, combined with weathering processes, supports nutrient cycles vital for sustaining the forest's ecosystem.



Figure 4-1: Protruding granite rocks seen adjacent the TBCW area

4.3.2. Soils

The soils of Budongo Forest are predominantly ferrallitic, representing an advanced stage of tropical weathering. These soils are deep, with minimal differentiation into distinct horizons. They exhibit a fine granular structure, which forms larger, weakly coherent clods that are friable and porous (Hepworth, 1961; and Goudie, 2006). Weatherable minerals are virtually absent, and the clay minerals consist primarily of kaolinite, a lattice-type mineral. These soils are associated with significant amounts of iron oxides and occasionally hydrated aluminum oxides. The base saturation of the exchange complex typically remains below 40% (Jones, Breuning-Madsen., Brossard., et al. 2013).

Soils with heavier textures, such as sandy loams and sandy clay loams, exhibit higher fertility and share characteristics with ferrisols (*ibidi*). Murram is abundant and occurs as concretions or sheet ironstones. These ironstone sheets, which often cover elevated areas such as hilltops (e.g., Little Kasenene), are underlain by quartzite rocks. The soil composition varies from red loam, containing small amounts of ironstone concretions that support forest vegetation, to ridge-top pavements of solid, cellular iron sheets.

In the Kitigo grasslands, soils exhibit significant carbon accumulation, enhancing their organic content and fertility. In the western Waibira block, low rocky ridges feature shallow soil outcrops



of granulite. These ridges host a unique forest type dominated by *Strombosia scheffleri* (formerly *Styelmus mills*) in association with *Cynometra alexandri* in the upper canopy and *Celtis wightii* in the understory, reflecting a distinct ecological adaptation.

Soil sampling was conducted at two georeferenced locations within the project area. At each sampling point, surface soil samples were collected from a depth of approximately 1 foot (30 cm) using a clean shovel to minimize contamination. A minimum of 1 kilogram of soil was obtained from each location. The samples were securely packaged, labelled, and transported to a certified laboratory in Kampala for analysis. Laboratory testing focused on determining key soil physicochemical properties, including composition and other parameters, as presented in Table 4-4 below. The laboratory tests realised the results as showing correlation in the project site in the Table 4-4 below:

Whereas Uganda soil regulatory limits have been established (National Environment (Minimum Standards for Management of Soil Quality) Regulations, 2001), they do not state the regulatory limits for the specific soil parameters. Therefore, the United States Environmental Protection Agency (USEPA) regulatory limits for the specific soil parameters were used for comparison purposes of the soil samples analysed (as indicated in Table 4-4 below).

Results

The results of the soil laboratory sample analysis are presented in Table 4-4 (Refer to Appendix 2 for soil quality analysis certificates).

Table 4-4: Soil Sample Results from the proposed site for the Tree Based Canopy Walk

Parameter and SI Units	Site 1	Site 2	Limits/Authority (USEPA)
	Coordinates (WGS 84)36N, UTM 358426.00 mE, 211591.00 mN, Elevation 1005 metres above sea level	Coordinates (WGS 84)36N, UTM 358470.00 mE, 211566.00 mN, Elevation 1000 metres above sea level	
	Result		
PH	6.83	6.88	6.0-8.0
Cadmium	0.00	0.00	1.0 max
Calcium	20.0	20.0	Not indicated
Lead (mg/kg)	0.07	0.07	5.0 max
Manganese	0.13	0.16	1.0 max
Mercury	0.00	0.00	0.2 max
Nickel (mg/kg)	0.13	0.17	20.0 max
Silver (mg/kg)	0.00	0.00	5.0 Max
Zinc (mg/kg)	0.01	0.01	250.0 max
Nitrates	36.0	0.13	Not indicated
Sulphates	40.0	44.0	Not indicated

* Detection limit; Atmospheric Absorption Technique, Shimadzu, 6300

**Detection limit, GC/MS Technique

The soil analytical results indicate that the measured parameters are within the United States EPA regulatory limits in the table above and none of the parameters in the soil samples collected exceeded the limits. These results establish background levels for these parameters.



4.3.3. Climate

The Budongo Forest Reserve lies within Zone III of Uganda's climatic zones, a narrow region along the country's western boundary. This zone encompasses the elevated terrain of southwestern Uganda and the Rift Valley lakes, including Lakes Albert, George, and Edward. It features a chain of extensive forests such as Zoka, Budongo, Bugoma, Itwara, Kibale, Kalinzu, and Maramagambo. Like other equatorial regions, Zone III experiences a tropical climate characterized by high temperatures. However, the region's elevated terrain significantly moderates the heat. Temperatures on the high ground can drop as low as 15°C, while the lower-lying areas around the lakes may experience highs of up to 32°C (Uganda Meteorological Authority 2022; & NEMA, 2019).

Rainfall in Zone III varies with elevation and generally exceeds 1,250 mm annually, distributed over 100 to 150 days. Precipitation is more frequent on higher ground, while the lower regions receive relatively less. While rainfall typically occurs in the afternoons, it can happen at any time of the day. The climate is described as transitional between the dense Congo Basin forest and the drier savanna climates of Uganda (NEMA, 2019, Langdale-Brown, Osmaston., & Wilson., 1964).

The dry seasons occur from December to February and June to July, marking periods of lower rainfall throughout the region. Budongo Forest, situated in the northern part of Zone III, experiences its peak rainfall during October to December. This rainfall distribution supports the forest's biodiversity and influences its ecological patterns. The region's climate supports a mix of dense forests and savanna vegetation, contributing to the area's high biodiversity. The transitional nature of the zone facilitates the coexistence of species adapted to both wet forest conditions and drier savanna ecosystems. Furthermore, the seasonal rainfall patterns play a critical role in the hydrology of adjacent lakes and rivers, sustaining agriculture and wildlife in surrounding communities.

4.3.4. Temperature

The temperatures in Budongo Forest exhibit typical equatorial characteristics, with minimum daily temperatures ranging between 23°C and 29°C, while maximum temperatures fall between 29°C and 32°C. Cooler temperatures are most pronounced during the southern hemisphere's winter months (June–July), while the highest temperatures are recorded during the southern hemisphere's summer months (December–February). The daily temperature range, consistent with equatorial climates, varies between 11°C and 13°C, indicating a relatively stable thermal profile despite seasonal fluctuations. This moderate variation supports the region's biodiversity by maintaining conditions favorable for both flora and fauna throughout the year.

Relative humidity in Budongo Forest fluctuates seasonally, ranging from 45% to 50% during the dry seasons (December–February and June–July). During the rainy season, humidity levels increase significantly, averaging around 75%. On particularly wet days, relative humidity can reach as high as 90%, contributing to the lush and moist conditions characteristic of the forest ecosystem. These climatic conditions, characterized by warm temperatures and high humidity, play a pivotal role in shaping the unique ecological dynamics of Budongo Forest, including its soil processes, vegetation patterns, and wildlife behaviors.



4.3.5. Rainfall

Budongo Forest receives annual rainfall ranging between 1,397 mm and 1,524 mm, distributed across 100 to 150 rainy days per year. The precipitation in this region predominantly occurs in the form of thunderstorms, which are often accompanied by severe hailstorms, a frequent phenomenon in the area.

Consistent with typical tropical climates, rainfall in Budongo and its surrounding regions tends to occur primarily in the afternoon, driven by convective processes resulting from intense daytime heating. These rainfall patterns play a critical role in sustaining the forest's rich biodiversity and supporting its ecological functions. This variation is important for the TBCW operator to organise the tours of the canopy walk based on the daily updates.

4.3.6. Climate Change

Climate change, as defined under the United Nations Framework Convention on Climate Change (UNFCCC), refers to a change in climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere, in addition to natural climate variability observed over comparable time periods. It remains one of the most pressing global environmental challenges, with far-reaching implications for ecosystems, economies, and human well-being.

The primary driver of climate change is the increased concentration of greenhouse gases (GHGs), including carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), as well as synthetic gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃). These gases trap heat in the atmosphere, leading to the phenomenon of global warming and associated impacts such as changing precipitation patterns, rising sea levels, and extreme weather events (IPCC, 2021).

Uganda, situated along the Intertropical Convergence Zone (ITCZ), is highly vulnerable to climate variability and change. Projections indicate an increase in rainfall intensity and variability, particularly in regions such as the District District, where the proposed canopy walk project is planned (NAPA, 2007). While increased rainfall can benefit ecosystems like Budongo Forest, it may also lead to challenges such as flooding, soil erosion, and shifts in biodiversity patterns. Although the area where the TBCW is located in a fairly undulating and slightly flat that does not contain floods but allows it to flow into downstream. The Office of the Prime Minister (OPM) oversees the integration of climate adaptation measures, aligned with Sustainable Development Goal 13 (SDG 13), to strengthen Uganda's resilience to climate impacts.

The proposed TBCW in Budongo Forest presents a unique opportunity to contribute to climate change but in a netzero form that was mitigated in the design and carries on throughout operation phases. The TBCW was designed:

- By maintaining the forest's integrity, the project supports the sequestration of atmospheric carbon dioxide (CO₂). Tropical rainforests like Budongo are vital carbon sinks, and the project will reinforce their role by promoting conservation and sustainable tourism.
- Minimal disturbance to the forest ecosystem during construction will ensure that the forest continues to act as a natural carbon reservoir.



- The canopy walk will attract eco-tourists, fostering environmental awareness and generating funds for forest conservation. Sustainable design and construction practices, such as the use of locally sourced and eco-friendly materials, can reduce the project's carbon footprint.
- Use of renewable energy and waste management systems during the operation of the canopy walk will further contribute to climate-friendly tourism.
- By promoting biodiversity conservation, the project will enhance the forest's resilience to climate variability, ensuring its continued role in regulating local hydrology and temperature.
- Educational programs linked to the canopy walk can raise awareness of climate adaptation strategies among local communities and visitors.
- The project aligns with Uganda's National Adaptation Program of Action (NAPA), addressing vulnerabilities through community-based conservation initiatives. Employment opportunities and capacity-building programs associated with the canopy walk can reduce local dependence on forest resources, thereby minimizing deforestation risks.

Given the inherent uncertainties surrounding the predicted impacts of climate change, it is crucial to evaluate the potential vulnerabilities of the proposed canopy walk and identify adaptation strategies within the broader context of its establishment. Climatic changes, primarily driven by variations in temperature and precipitation, pose risks that could affect the project during both its construction and operational phases.

One notable but less probable concern is the occurrence of wildfires in the Budongo forest. While these forests are generally resilient, prolonged droughts exacerbated by climate change could increase the likelihood of extreme wildfires due to increased winds and causing stridulation of tree branches hence fire spikes. Such events might disrupt forest ecosystems, compel wildlife to migrate in search of pasture, and potentially affect local subsistence activities, such as hunting. However, these impacts are expected to materialize only in the long term, if at all.

Despite these potential risks, the TBCW is being developed as a Net Zero establishment, minimizing its contribution to climate change. The construction and operational phases are designed to avoid the use of flammable materials, thereby reducing vulnerability to fire hazards. This sustainable design approach ensures that the project aligns with global climate adaptation and mitigation efforts while safeguarding the ecological integrity of the Kaniyo Pabidi in Budongo CFR.

4.3.7. TBCW NetZero

The NFA plays a crucial role in implementing the strategic options outlined in the National REDD+ Strategy and Action Plan (2017), which directly contributes to achieving Net Zero emissions. By focusing on reducing deforestation and forest degradation, and enhancing forest carbon stocks through sustainable forest management, the NFA works to mitigate greenhouse gas emissions. Key actions, such as promoting reforestation, afforestation, and agroforestry, not only help sequester carbon but also contribute to the overall health and resilience of Uganda's forest ecosystems. Additionally, NFA's initiatives, which include providing technical support to local communities for sustainable land use practices, aim to shift traditional agricultural practices towards more climate-friendly and carbon-efficient alternatives. These efforts, in line with the REDD+



framework, ensure that forest-based solutions contribute significantly to carbon sequestration, thereby supporting the country's Net Zero target.

The implementation of the National REDD+ Strategy Chapter 3 about OPTIONS, NFA also encompasses the integration of climate change mitigation and adaptation measures into forest management practices. Through capacity-building and stakeholder engagement, NFA ensures that forest-dependent communities adopt practices that reduce emissions from land use change while improving their livelihoods. The NFA's monitoring, reporting, and verification (MRV) systems are central to tracking the progress of these initiatives and ensuring transparency in the carbon credits generated through forest conservation efforts. By promoting forest protection, restoration, and sustainable land use, the NFA significantly contributes to Uganda's broader climate goals, including achieving NetZero emissions. These integrated actions play an essential role in balancing the carbon cycle and reducing the overall greenhouse gas emissions of the country.

Achieving net-zero emissions in tourism activities, particularly in the construction and operation of a TBCW in Budongo's tropical rainforest, requires careful consideration of the project's unique environmental dynamics. The construction phase presents opportunities to integrate sustainable practices, especially in transporting and assembling materials. By sourcing construction materials locally and arranging them outside the project site at a 900m distance, the project minimizes transportation emissions. Using manual or low-impact methods to carry materials to the assembly site further reduces carbon emissions, helping align with net-zero objectives. Additionally, utilizing renewable or sustainably sourced materials, such as certified timber or recycled steel, can lower the project's overall carbon footprint.

During operation, the canopy walk can serve as a model for carbon-neutral tourism by adopting energy-efficient systems and renewable energy sources for lighting or maintenance. This includes solar-powered installations to eliminate reliance on fossil fuels. Moreover, visitor management should emphasize low-impact practices, such as restricting vehicular access to nearby areas, promoting walking or cycling, and limiting the visitor capacity to preserve the forest's ecological integrity. Educational programs that highlight the project's net-zero commitment can also encourage environmentally conscious behavior among tourists and foster broader awareness of sustainable tourism.

To offset unavoidable emissions, the project could invest in afforestation or reforestation initiatives outside the Budongo Forest region and be considered as a carbon offset accordingly. This ensures the conservation of the tropical rainforest, which acts as a significant carbon sink, and supports biodiversity. The canopy walk itself can integrate monitoring systems to evaluate its environmental impact over time, allowing for adaptive management strategies that ensure alignment with net-zero goals. By embedding sustainability at every stage, from construction to operation, the project can set a benchmark for eco-tourism while contributing to global climate goals.

4.3.8. Hydrology and Water Resources

4.3.8.1. Drainage

The CFR is predominantly situated at a moderate altitude, characterized by gently undulating terrain interspersed with isolated hills such as Kamusenene (1170m), Kaniyo Pabidi (1187m), and Lukohe (1160m). The forested nature of these hills plays a critical role in watershed management, particularly when considering their position within the broader context of the Albertine Rift and



the escarpment extending down to Butiaba on the shores of Lake Albert. This unique topography contributes significantly to the ecological integrity and hydrological functions of the region.

The hydrology of Budongo CFR is shaped by a network of seasonal and perennial streams that drain into the surrounding lowlands, ultimately feeding into major water bodies such as Lake Albert and the Nile River. Key rivers and streams in the area include the Sonso River, which supports diverse aquatic and terrestrial ecosystems, and other tributaries that sustain both wildlife and local communities downstream. The dense forest cover plays a crucial role in regulating water flow, enhancing groundwater recharge, and reducing surface runoff, thereby minimizing erosion and sedimentation in adjacent wetlands and watercourses. Additionally, the region’s high annual rainfall ranging from approximately 1200mm to 1800mm—ensures a relatively stable hydrological cycle, although climate change and land-use changes in surrounding areas pose potential risks to water availability and quality. Given the importance of Budongo CFR as a water catchment area see Figure 4.2, any infrastructure development, including the construction and operation of the canopy walk, must incorporate measures to protect these hydrological systems. Proper drainage design, minimal soil disturbance, and continuous monitoring of water sources will be critical in ensuring that the ecological functions of the forest remain intact.

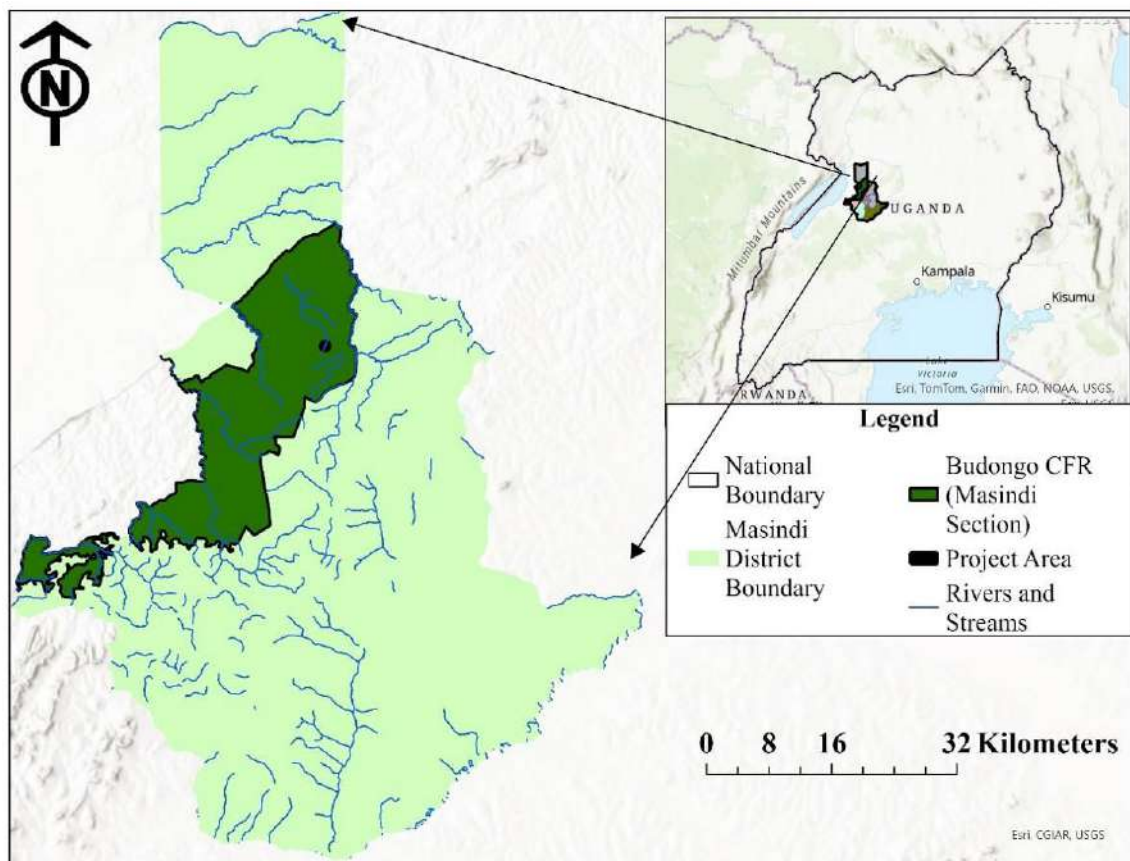


Figure 4-2: Rivers and Streams that transverse Budongo Central Forest Reserve

4.3.8.2. *Water Quality Analysis*

Two water quality samples were systematically collected during field investigations one from an upstream location and the other from a downstream location relative to the proposed project site. The sampling exercise followed standard water quality sampling protocols to ensure representative and uncontaminated samples. To capture seasonal variation in water quality, one sample was



collected during the fairly rainy season in December 2024, and the second sample was collected in January 2025, during the early part of the dry season. The collected samples were securely preserved, appropriately labelled, and transported under recommended conditions to the National Water and Sewerage Corporation (NWSC) Central Laboratory for comprehensive physicochemical and microbiological analysis. The results of the laboratory analysis are presented in the subsequent test results in Table 4-5 below. The water analysis certificates are attached to Appendix 3 of this ESIS.

Table 4-5: Water Sample Analysis Results from the two sampling points

Parameters	Units	Upstream Coordinates (WGS 84)36N, UTM 358447.00 mE, 211609.00 mN	Down Stream Coordinates (WGS 84)36N, UTM 358623.00 mE, 212786.00 mN	National Standards for Natural Portable water
Total Alkalinity :(as CaCO ₃)	mg/L	46.0	44.0	500
Bicarbonate	mg/L	113.0	110.0	500
Calcium: Ca ²⁺	mg/L	10.50	12.6	150
Chloride: Cl ⁻	mg/L	6.0	5.0	250
Colour	Ptco	180	177	50
Electricity Conductivity	uS/cm	136	119	2500
Faecal Coliforms	CFU /100ml	40	48	0
Fluoride: F ⁻	mg/L	0.19	0.15	1.5
Hardness: Total as CaCO ₃	mg/L	26	28	600
Iron: Total	mg/L	0.321	0.309	0.3
Magnesium: Mg ²⁺	mg/L	5.60	5.20	100
Manganese	mg/L	0.0	0.0	0.1
Nitrate -N	mg/L	6.0	10.0	45
pH (Physical - Chemical)	-	6.79	6.92	5.5 – 9.5
Sulphate: SO ₄ ²⁻	mg/L	6.0	9.0	400
Total Dissolved Solids (TDS)	mg/L	125	128	1500
Total suspended Solids	mg/L	8	12	0.0
Turbidity	NTU	15.80	16.80	25

Source: Laboratory Analysis Results 2024

The results of the water quality analysis indicate non-compliance with certain physico-chemical and microbiological parameters for untreated potable water. Specifically, several characteristics, including pH, electrical conductivity (EC), alkalinity, turbidity, and total dissolved solids (TDS), were found to be within acceptable regulatory limits. However, other parameters (TSS, Iron, Faecal Coliforms and colour-as indicated in Table 4-6 above) did not meet the required standards for safe drinking water, highlighting potential concerns regarding water quality and the need for treatment. The water contains TSS, iron and faecal coliforms above National Standard for Natural Portable Water and therefore cannot be used for human consumption unless when treated



4.3.8.3. Hydrological Relationship with the TBCW

In the area there is one existing seasonal stream that was recorded with water during the wet season but dry completely during the month of January. Water samples were collected within the project area during the relatively wet season of December 2024, when surface water was present in the stream. However, during the subsequent field visit in January 2025, the stream had completely dried up due to the prevailing dry season conditions, and therefore, no water samples could be collected at that time. In the inset in below the figure shows the variations of the seasons during scoping in December and January months respectively. The rest of the area does not show any signs of retaining water on the slope. The Figure 4.3 below shows the comparative appearance before any changes take place.



Figure 4-3: The appearance of the existing stream in 2 seasons of the year

Establishment activities of the canopy walk project in the Budongo CFR landscape are not expected to have significant negative impacts on the hydrology, as the land cover, soil structure, and nearby streams will remain largely undisturbed during both construction and operation. However, to ensure environmental sustainability and mitigate any potential indirect effects, strict environmental safeguards must be implemented. These include proper waste management strategies to prevent pollution, well-planned sanitation facilities to avoid contamination of water sources, and continuous monitoring of water quality to detect and address any unforeseen changes. Additionally, erosion control measures should be considered to prevent sedimentation in nearby streams, and



ensure minimal vegetation clearance to maintain ecosystem balance. Engaging local stakeholders and environmental experts in monitoring and adaptive management will further enhance the project's sustainability and ensure compliance with best environmental practices.

4.3.9. Aerosol Assessment

The construction and operation of the Kaniyo-Pabidi Canopy Walk in Budongo CFR may likely contribute to emissions both directly and indirectly. The direct cause may include the human movement increase in and around the site and how long they stay accordingly. Whereas some of the causes that are known include during the establishment activities may somewhat undergrowth conditions, they were assessed. Therefore, the impacts, of air quality and noise levels to establish benchmarks for future monitoring and to ensure compliance with environmental regulations were determined.

In alignment with the National Environment Management Authority (NEMA) Terms of Reference as approved, considered the baseline air quality and noise around the proposed project site.

4.3.9.1. Method of Assessment

The National Environment (Noise Standards and Control) Regulations, 2003 define noise as “any unwanted and annoying sound that is intrinsically objectionable to human beings or likely to have an adverse effect on human health or the environment.” Noise pollution, a form of energy that affects both humans and animals, can lead to partial or complete hearing damage in humans, depending not only on noise intensity but also on the duration of exposure. Noise levels above 85 decibels (dB) are considered alarming from a pollution perspective, necessitating protective measures to mitigate its effects. The Regulations, under Regulation 6(1), specify Maximum Permissible Noise Levels for the general environment to ensure compliance and safeguard health and well-being in the Table 3-4 and 3-5 in chapter 3 above **Note: No matter how short a time, a worker exposed to noise levels greater than 85dBA should wear hearing protectors with an attenuation of at least 6dbA and No workers should enter an area where noise levels exceed 140dBA.**

Noise Levels shall not exceed a LAeq of Factory/workshop 85dB (A); Office 50db(A); Factory/Workshop compound 75db (A).

Emissions, such as dust and exhaust fumes from machinery, can increase the concentration of suspended solid particles in the air, resulting in elevated levels of Suspended Particulate Matter (SPM) and Respirable Suspended Particulate Matter (RSPM). These changes can have detrimental effects on both human health and plant life. Key air pollutants that pose significant risks to the environment and living organisms include Sulphur Dioxide (SO₂), Nitrogen Oxides (NO_x), Greenhouse Gases such as Carbon Dioxide (CO₂) and Methane (CH₄), as well as fine particulate matter.

The health risks associated with particulate matter depend largely on particle size. Fine particles (PM_{2.5}) are particularly concerning as they can penetrate deep into the lungs and potentially enter the bloodstream, adversely affecting the lungs and heart. Coarse particles (PM_{10-2.5}), while less invasive, can still irritate the respiratory system, causing discomfort to the eyes, nose, and throat. These pollutants highlight the importance of monitoring air quality (using permissible limits in tables 3-6 and 3-7 in Chapter 3 above) and implementing mitigation strategies to protect human



health and the environment. Although noise levels at the time of sampling were relatively low and conducive to biodiversity, the introduction of the tree-based canopy walk project presents several potential implications. Increased noise may disturb wildlife, causing behavioral changes that could affect species distribution and the overall visitor experience. Chronic noise exposure can also stress trees, potentially leading to reduced growth, physiological alterations, or increased vulnerability to pests and diseases. Furthermore, noise pollution may disrupt the delicate balance of the forest ecosystem, impacting species composition, diversity, and abundance. Additionally, elevated noise levels could pose operational challenges, such as hindering effective communication between visitors, staff, and emergency services. Recognizing these potential impacts, mitigation measures have been proposed to ensure the project operates with minimal ecological disturbance.

4.3.10. Noise Emissions

The primary emissions expected during the construction of the Kaniyo-Pabidi Canopy Walk in Budongo Central Forest Reserve include particulate matter, hydrogen sulfide, nitrogen dioxide, methane, sulfur dioxide, volatile organic compounds (VOCs), and carbon monoxide. These emissions could lead to reduced air quality, health impacts such as lung conditions, and unpleasant odours exceeding human tolerance thresholds.

The assessment was conducted within the proposed site and control points at Café Budongo, identified as potential receptors due to their proximity to anticipated construction activities involving machinery. Specialized scientific equipment, including the Altair 4x, Multi-REA, and Tem-top Airing-1000 detectors, was employed to monitor air quality.

4.3.10.1. Noise Level Assessment

According to the National Environment (Noise Standards and Control) Regulations of 2003, noise is defined as any unwanted sound that is irritating, harmful to health, or damaging to the environment. Noise pollution, particularly at levels above 85 decibels (dB), poses significant risks to humans, animals, and ecosystems. It can lead to hearing loss, communication challenges, and disruptions to ecological functions. The degree of harm depends on both noise intensity and duration of exposure, making protective measures, such as ear protection, essential to mitigate its effects.

Noise assessments at the site were conducted using the equipment in Table 4.8 CEM DT-8852 Sound Level Meter with Data Logger, configured at a 114 dB (A) range. Instantaneous measurements, taken over five-minute intervals at sampling points, captured key metrics such as LAeq, LAFmax, and LAFmin. Given the forest's ecological importance to flora and fauna, unmanaged noise pollution could disrupt critical functions. These baseline measurements serve to inform mitigation strategies to ensure minimal environmental impact during the project.

Table 4-6: Equipment used during the Air quality and Noise pollution assesment



#	Type of Equipment	Activity	Photo
1	Altair 4x Multi gas detector	Real Time gas monitor for Carbon Monoxide, Volatile Organic Compounds, LEL (combustible gases), Oxygen and Hydrogen Sulphide. Sulphurdioxide, Nitrogen Dioxide	
2	Temtop Airing-1000 detector.	Temtop Airing-1000 Professional Laser Air Quality Monitor for Humidity, temperature and PM2.5/PM10 Detector Particle Counter Dust Meter Real Time Display High Accuracy.	
3	CEM DT-8852 Sound Level Meter with Data Logger.	This is a brand new CEM DT-8852 CE certified digital sound / noise level meter. It is very accurate (+/- 1.4 dB) and durable, an ideal companion for your field projects.	

In addition, Table 4.6 above, table 4.7 below shows the air quality parameters analysed, selection rationale and data source:

Table 4-7: Air Quality Parameters Analyzed, Selection Rationale and data Source

Parameter	Basis for Selection	Relation to Regulatory Drivers	Baseline Data for ESIA
Particulate Matter, Inhalable Particulate Matter, SO ₂ , N ₂ O	Indicators of potential project effects from diesel engines and fugitive dust emissions Parameters of concern with respect to human and environmental health.	Criteria Air Contaminants under National Ambient Air Quality Objectives	Project-specific data for emission rates National data for ambient air quality Quantitative data

4.3.11. Particulate Matter

Inhalable particulate matter (PM₁₀) and respirable particulate matter (PM_{2.5}) are composed of microscopic particles with diameters smaller than 10 µm and 2.5 µm, respectively. These particles



can penetrate deep into the respiratory tract, posing significant health risks when lodged in the lungs. Potential sources of particulate matter related to the project include pollen grains, decaying plant and humus materials, and emissions from internal combustion engines, such as diesel generators. Nearby receptors include a maize flour factory, office buildings, residential areas, and the general atmospheric environment.

The particulate matter assessment at the proposed Kaniyo-Pabidi Canopy Walk site within Budongo Central Forest Reserve was conducted using the Temtop Airing-1000 particulate matter detector. This advanced instrument measures total suspended particulate matter (TSPM) across key areas designated for construction. Equipped with a professional laser air quality monitor, the Temtop Airing-1000 provides real-time data on humidity, temperature, and concentrations of PM₁₀ and PM_{2.5}. The device delivers both gravimetric and real-time dust data and features foam inserts for size selection, enabling accurate measurement of PM₁₀, PM_{2.5}, and respirable fractions. These assessments establish critical baseline data to inform mitigation measures and compliance with environmental standards.

4.3.11.1. Sulphur Dioxide

The mass of sulphur dioxide emissions related to the project are expected to be very low. These emissions are largely confined to construction equipment and back up diesel generators when they are fired. They will be released through combustion processes of fuels that contain sulphur (gasoline, diesel oil, and waste oil). Propane contains negligible amounts of sulphur. The diesel oil and gasoline utilized on site will be low sulphur (<15 ppm). Waste oil will contain generally low amounts of sulphur.

4.3.11.2. Oxides of Nitrogen (NO, NO₂)

Nitrogen oxides are produced in most combustion processes and are almost entirely made up of Nitric Oxide (NO) and nitrogen dioxide (NO₂). Together, they are often referred to as NO_x.

4.3.11.3. Carbon Monoxide (CO)

Carbon monoxide is a colourless and odourless gas. It is a product of incomplete combustion of hydrocarbons such as fossil fuels and wood. Motor vehicles, industrial processes, and natural sources (fires) are some common sources. Typical concentrations in the atmosphere are 120µg/m³, while minimum levels known to produce cardiovascular symptoms in smokers is approximately 35.000µg/m³. CO will be released by all internal and external combustion equipment on site and at firewood fuelled cooking areas, but in relatively small quantities. The pictorial below shows the current environment in which measurements of the CO were conducted.



Figure 4-4: CO measurements undertaken in the TBCW area

4.3.11.4. Volatile Organic Carbon (VOC)

Volatile Organic Compounds (VOCs) are carbon-based compounds that readily vaporize into the atmosphere under normal environmental conditions. While some VOCs, such as methane, originate from natural sources, others are anthropogenic and can pose significant risks to both human health and the environment. These risks include direct harm from inhalation and indirect contributions to ground-level ozone and smog formation, which degrade air quality.

Key sources of VOCs include hydrocarbon fuels, paints, lacquers, and paint strippers. Other contributors include cleaning products, pesticides, building materials, furnishings, and office equipment like printers and copiers. Additionally, materials used in creative and technical processes, such as adhesives, permanent markers, and photographic solutions, also emit VOCs. Effective monitoring and management of VOC emissions are crucial to minimizing their environmental impact and protecting public health.

4.3.11.5. Greenhouse Gases (GHG)

Greenhouse gases (GHGs) are primarily emitted through combustion activities associated with both internal and external equipment on the project site, as well as land clearing practices, particularly through burning. The principal GHGs include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), with their cumulative impact typically expressed as carbon dioxide equivalent (CO₂e).

In the context of this project, methane (CH₄) emissions are negligible due to the absence of natural gas, which is predominantly composed of methane. Diesel and propane fuels, which are predominantly used in the Local Study Area (LSA), account for most of the fuel consumption. While nitrous oxide (N₂O) is emitted as a by-product of high-temperature combustion processes, its contribution is minimal. For the purpose of this assessment, greenhouse gas emissions are predominantly represented by CO₂ emissions, with no significant contributions from other GHGs (e.g., CO₂e ≈ CO₂).



4.3.11.6. Volatile Organic Carbon (VOC)

Volatile Organic Compounds (VOCs) are organic chemicals that readily evaporate into the atmosphere under ambient conditions. While some VOCs, such as methane, originate from natural sources, others are associated with human activities and may pose environmental and health risks. VOCs can contribute to air pollution both directly, through inhalation exposure, and indirectly, by promoting the formation of ground-level ozone and smog.

Common sources of VOC emissions include hydrocarbon fuels, paints, varnishes, paint strippers, cleaning agents, pesticides, building materials, furniture, and office equipment such as copiers and printers. Additionally, correction fluids, adhesives, permanent markers, graphic and craft materials, and photographic solutions are known to release VOCs into indoor and outdoor environments.

4.3.11.7. Greenhouse Gases (GHGs)

Greenhouse gases (GHGs) are released from both internal and external combustion processes on-site, as well as from land-clearing activities involving burning. The primary GHG emissions typically include carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄). The total GHG emissions are commonly expressed in terms of carbon dioxide equivalent (CO₂e), which standardizes the impact of different greenhouse gases based on their global warming potential.

For this project, methane (CH₄) emissions are negligible, as natural gas composed primarily of methane is not used as a fuel source. The predominant fuels in the Local Study Area (LSA) are diesel and propane. Nitrous oxide (N₂O) is generated as a by-product of high-temperature combustion, but its emissions are minimal. Consequently, for this assessment, GHG emissions are assumed to be fully represented by carbon dioxide emissions (i.e., CO₂e = CO₂).

4.3.11.8. Temtop Airing-1000 Detector – Air Quality Analysis

A real-time air quality assessment was conducted at the proposed Kaniyo-Pabidi Canopy Walk site in Budongo Central Forest Reserve using the Altair 4X multi-gas monitor. The assessment measured key atmospheric pollutants that pose potential risks to human health and the environment when present at high concentrations. These included carbon monoxide (CO), volatile organic compounds (VOCs), carbon dioxide (CO₂), lower explosive limit (LEL) gases (combustible gases), oxygen (O₂), and Hydrogen Sulfide (H₂S).

4.3.12. Discussion of findings

4.3.12.1. Particulate Matter (PM)

Particulate matter sampling was conducted to establish baseline air quality conditions at the proposed project site. The results of particulate matter concentration levels for specific areas are presented in Table 4-8 below. The observed concentrations were influenced by various natural sources, including airborne pollen, decaying vegetation, and humus decomposition.



Table 4-8: Readings for Particulate matter (particles/m³) measured

	PM _{2.5} / 35 Average Recording	PM ₁₀ 60µg/m ³ Average Recording	AQI	Temperature °F	Humidity	Impact rating	Current Weather conditions	Potential Sources/Activity
National Environment (Air Quality standard Regulation) S.I. No 22 2024 for Ambient air Quality standards and Tolerant Limits.								
Air Quality and Noise Assessment for proposed Kaniyo-Pabidi canopy walk in BCFR								
Point 1: Chimp nest track area 36N 0357928,UTM 0211539,E1013	53.5	39.5	130	75	79	Low	Sunny day	Suspended Particles in the atmosphere
Point 2: 36N 03658416,UTM 021610,E996	55.1	88.3	123	76	80	Moderate	Sunny day	Suspended Particles in the atmosphere.
Point 3: Seasonal stream 36N 0355444,UTM 021603,E963m	47.1	87.1	126	85	72	Moderate	Sunny day	Suspended Particles in the atmosphere.
Point 4: Bush pig tracking area 36N 0358571,UTM 0211611,E990	42.8	68.8	128	79	74	Moderate	Sunny day	Suspended Particles in the atmosphere.
Point 5: 36N 0358399, UTM 021398,984	43.7	49.1	125	80	65	Low	Sunny day	Suspended Particles in the atmosphere
Point 6: 36N 035899,UTM 0211394,E984	40.0	62.5	106	83	65	Moderate	Sunny day	Suspended particles in the atmosphere
Point 7: Café Budongo 36N 035543,UTM0212063,E1000	44.8	59.1	114	81	62	Moderate	Sunny day	Suspended particles in the atmosphere
<i>National Environment (Air Quality standard Regulation) S.I. No 22 2024 for Ambient air and indoor Quality standards and Tolerant Limits. Source: Field data source: Air quality (particulate matter) Assessment- January-2025).</i>								



Observations / Findings

From Table 4.8 above, baseline air quality assessments were conducted at the proposed Kaniyo-Pabidi Canopy Walk site in Budongo Central Forest Reserve as part of the Environmental and Social Impact Assessment (ESIA). Spot sampling was carried out to establish and document particulate matter (PM) concentrations. The recorded concentrations of PM_{2.5} ranged from 40.0 to 55.1 µg/m³, while PM₁₀ levels varied between 39.1 and 88.3 µg/m³ at the time of sampling. The observed particulate matter levels ranged from low to moderate, influenced by natural sources such as airborne pollen, decomposing plant fibers, and humus materials within the forest ecosystem.

4.3.13. Gas Emissions Assessment

Gas emission sampling was conducted at the proposed project site to assess existing atmospheric gas concentrations. The Altair 4X Mobile Gas Analyzer, a direct-reading instrument, was used for these measurements. This device is designed to detect and quantify combustion by-products from fossil-fueled sources in domestic and commercial environments.

Measurements were taken across the project site by strategically positioning the probe in designated areas to capture and analyze ambient pollutant gas levels. The recorded gas in Table 4.9 concentrations were directly displayed on the analyzer's screen, providing real-time data on atmospheric emissions. This assessment established baseline gas emission levels at the proposed Kaniyo-Pabidi Canopy Walk site in Budongo Central Forest Reserve.



Table 4-9: Readings for Gas Emissions Monitoring.

Name of Section / GPS Coordinates	Oxygen (O ₂) %	Carbon Monoxide CO (PPM)	Nitrogen Dioxide NO ₂ (µg/m ³)	Hydrogen Sulphide (µg/m ³)	LEL Methane CH ₄	TVOCs (mgNm-)	Impact rating	Potential Sources
National Environment. (Air Quality Standards 2024). 1hr Exposure	19.5-23.5	35	50	44	5	600	Low/medium/High BDL (Below Detection levels)	
Air Quality and Noise Assessment for proposed Kaniyo-Pabidi canopy walk in Budongo Central Forest Reserve								
Point 1: Chimp nest track area 36N 0357928,UTM 0211539,E1013	20.8	0.0	0.0	0.0	0.0	0.6	BDL/Low	Exhaust fumes from Motor traffic in the area
Point 2: 36N 03658416,UTM 021610,E996	20.8	0.0	0.0	0.0	0.0	0.6	BDL/Low	Exhaust fumes from Motor traffic in the area
Point 3: Seasonal stream 36N 0355444,UTM 021603,E963m	20.8	0.0	0.0	0.0	0.0	0.6	BDL/Low	Exhaust fumes from Bitumen extract machine
Point 4: Bush pig tracking area 36N 0358571,UTM 0211611,E990	20.8	0.0	0.0	0.0	0.0	0.6	BDL/Low	Exhaust fumes from Bitumen extract machine
Point 5: 36N 0358399, UTM 021398,984	20.8	0.0	0.0	0.0	0.0	0.6	BDL/Low	Exhaust fumes from Motor traffic in the area
Point 6: 36N 0358372,UTM 0211472,E1003	20.8	0.0	0.0	0.0	0.0	0.6	BDL/Low	Exhaust fumes from Motor traffic in the area
Point 7: Café Budongo 36N 035543,UTM0212063,E1000	20.8	0.0	0.0	0.0	0.0	0.6	BDL/Low	Exhaust fumes from Motor traffic in the area

Source: Field data source: January 2025.



Gas Emission Findings

Gas emission measurements were conducted at various sampling points within the project site to assess baseline atmospheric conditions. The results are summarized as follows:

- **Ambient oxygen (O₂) concentration:** 20.8% at all sampled points.
- **Carbon monoxide (CO) concentration:** 0.0 µg/m³.
- **Nitrogen dioxide (NO₂) concentration:** 0.0 µg/m³.
- **Hydrogen sulfide (H₂S) concentration:** 0.0 µg/m³.
- **Lower explosive limit (LEL) methane (CH₄) concentration:** 0.0 µg/m³.
- **Volatile organic compounds (VOCs) concentration:** 0.6 mg/Nm³ across all sampled points.

Due to the forest's natural ambient air conditions, most gases were found to be below detectable levels (BDL) at the time of sampling, while others remained within expected ambient concentrations.

4.3.14. Noise Assessment

A baseline noise assessment was conducted at the proposed Kaniyo-Pabidi Canopy Walk site in Budongo CFR to document existing ambient noise levels. Sampling was carried out in outdoor areas to establish reference conditions before project implementation.

The findings, presented in the table below, highlight noise levels recorded at specific locations, considering both natural and anthropogenic sources contributing to ambient noise. The accompanying Table 4.10 illustrates variations in noise levels observed during data collection as part of the environmental audit exercise.



Table 4-10: Details of the background Noise measurements in form of LAeq, LAF max, LAF Min, within the vicinity of the project components

Location description and Coordinates	Duration (minutes)	Noise limit (dB(A) LEQ)	Recorded noise level			Impact rating	Existing noise sources	
			LAeq	LAF Max	LAF Min		Natural	Anthropogenic
Air Quality and Noise Assessment for proposed Kaniyo-Pabidi canopy walk in Budongo Central Forest Reserve								
Point 1: Chimp nest track area 36N 0357928, UTM 0211539,E1013	45	45	36.1	39.1	35.7	Moderate	People	Machinery operations and vehicle movement
Point 2: 36N 03658416, UTM 021610,E996	45	45	39.1	48.8	39.9	Moderate	People	Machinery operations and vehicle movement
Point 3: seasonal stream 36N 0355444, UTM 021603,E963m	45	45	40.4	58.5	41.6	Moderate	People	Machinery operations and vehicle movement
Point 4: Bush pig tracking area 36N 0358571, UTM 0211611, E990	45	45	38.4	58.3	38.2	Moderate	People	Machinery operations and vehicle movement
Point 5: 36N 0358399, UTM 021398,984	45	45	38.7	36.2	37.8	Moderate	People	Machinery operations and vehicle movement
Point 6: 36N 0358372, UTM 0211472, E1003	45	45	35.9	53.5	31.8	Moderate	People	Machinery operations and vehicle movement
Point 7: Café Budongo 36N 035543, UTM 0212063, E1000	45	45	41.4	58.4	36.7	Moderate	People	Machinery operations and vehicle movement

Noise Limits are as prescribed for the Maximum Permissible Noise Levels for General Environment. Regulation 6(1) of the National Environment (Noise Standards and Control) Regulations, 2003 Field data Source: January 2025.

Noise Pollution Findings:

Noise pollution assessments were conducted at various sampling points within the proposed Kaniyo-Pabidi Canopy Walk site in Budongo Central Forest Reserve.

- The average equivalent continuous noise level (LAeq) recorded at the site ranged between 35.9 dBA and 41.5 dBA.

Observation: All measured noise levels were within the Permissible Exposure Limit (PEL) of 45 dBA, indicating that the site has ambient noise levels hence the developer has to ensure that activities during project implementation remain compliant with baseline and set environmental noise levels/standards.

4.3.15. Physical Agents

4.3.15.1. Heat Exposure Risk Assessment

Occupational heat exposure poses significant health risks, including diseases, injuries, decreased productivity, and, in extreme cases, fatalities. Heat stress is increasingly recognized as a critical issue, particularly in regions near the equator where climate change is expected to elevate temperatures, exacerbating the risk for workers [Lucas et al., 2014].

Industrial workers, especially those engaged in physically demanding tasks in hot environments, are at heightened risk of heat stress. This can lead to serious conditions such as heat stroke, heat exhaustion, heat syncope, heat cramps, and heat rashes. In extreme situations, it can even result in death. Additionally, heat exposure can cause symptoms such as sweaty palms, fogged safety glasses, and dizziness. It can impair cognitive functions related to reasoning, creating additional hazards in the workplace.

To assess heat stress risks, the Wet Bulb-Globe Temperature (WBGT) Index was used to evaluate key environmental factors, specifically temperature and relative humidity. Measurements were taken for the air (dry) bulb temperature (DB), natural wet bulb temperature (WB), and dew/globe thermometer temperature (GT). According to ISO 7243: Hot Environments Estimation of Heat Stress on Working Man, Based on the WBGT-Index (ISO 1989), the WBGT exposure limits for acclimatized workers are as follows:

- **33°C** for resting
- **30°C** for light activity
- **28°C** for moderate activity
- **25°C** for heavy activity
- **23°C** for very heavy activity

4.3.16. Archaeological Assessment

The selection of a forest with an established trail system for tourism offers an opportunity to situate the canopy walkway in an ecologically suitable location, minimizing potential environmental disturbances. This strategic placement avoids sensitive habitats such as nesting areas of endangered or



threatened avian species and regions frequently inhabited by chimpanzees or other wildlife with low tolerance for increased human activity. From a Physical Cultural Resources (PCR) perspective, the selected area has no documented archaeological sites or artifacts. The adoption of a tree-based canopy walkway system in Kaniyo Pabidi is intended to minimize environmental impact and reduce both construction and operational footprints. By elevating visitors from ground-based trails onto an aerial pathway, the design effectively controls visitor access and dispersal while preserving the integrity of the forest ecosystem. Tree-based canopy walkways offer an immersive, nature-integrated experience without the need for extensive access routes, large-scale ground disturbance, or the introduction of non-native materials that could potentially affect cultural heritage.

The modular design of tree-based canopy walkway systems ensures portability, allowing components to be transported along pre-existing trails without the need for intrusive construction methods. Consequently, this approach mitigates environmental and social disruptions within the park. The minimal ground disturbance associated with the project is limited to the excavation of small holes for support poles and the potential use of rocks for structural stabilization. While these minor activities may have localized impacts on cultural heritage—both within and beyond the project area comprehensive assessments were conducted to evaluate any potential effects.

To ascertain the presence of cultural heritage within the project site, a Physical Cultural Resources (PCR) Assessment was undertaken to assess the scale and nature of potential impacts. This assessment, focusing on culturally and archaeologically sensitive areas, employed methods such as archaeological surveys and community consultations to establish baseline conditions. The study aimed to:

- i) Identify and evaluate archaeological and cultural sites within and around the project's impact zone.
- ii) Assess potential impacts of the project on identified archaeological and cultural sites.
- iii) Recommend mitigation measures in compliance with environmental and social safeguard requirements.

4.3.16.1. Archaeological Background of the Project Area

The proposed project is situated within the Bunyoro-Kitara Kingdom, a historically significant region located along the eastern shores of Lake Albert in western Uganda. The inhabitants of Bunyoro, collectively known as the Banyoro (singular: Munyoro), belong to the Bantu ethnic group and primarily speak Runyoro-Rutoro, a Bantu language. The kingdom is governed by a hereditary cultural leader, the Omukama. While some Banyoro have migrated beyond their traditional homeland, Bunyoro-Kitara Kingdom remains geographically defined by the districts of Hoima, Kikuube, Masindi, and Kibaale. The region lies within the Western Uganda plateau and forms part of the western branch of the East African Rift System.

Historically, Bunyoro-Kitara, sometimes referred to as the "Great Bunyoro," is regarded as one of the earliest structured political entities in the interlacustrine region of East Africa. Oral traditions suggest that the kingdom once extended across vast areas north of the equator, covering present-day Toro, Buganda, and Busoga, with possible extensions into Ankole. The region has been continuously



inhabited since the Stone Age, with its earliest sociopolitical organization attributed to the Abatembuzi dynasty, whose name translates to "pioneers." The Abatembuzi were predominantly pastoralists, establishing one of the earliest forms of statehood in the region. Between the 14th and 16th centuries, the Chwezi dynasty (Bachwezi) succeeded the Abatembuzi, refining and consolidating the governance structures that shaped Kitara as it is historically recognized today.

The Bachwezi are often associated with supernatural abilities and are revered in oral traditions for their dominance over other communities. Despite their brief rule, they played a crucial role in organizing Bunyoro's early state structures before mysteriously vanishing. Their rule was succeeded by the Babito dynasty in the mid-16th century, a lineage that continues to the present day. The current Omukama, Prince Solomon Gafabusa Iguru, was enthroned in 1994 as the 27th ruler of the Babito dynasty. Over the centuries, Bunyoro has integrated diverse communities, maintaining its status as a significant cultural and historical center.

4.3.16.2. Environmental and Archaeological Insights

Budongo Forest, centrally located within the Bunyoro Kingdom, has undergone significant ecological modifications due to both natural and anthropogenic influences (Paterson, 2014). While historical climatic conditions would have supported the natural expansion of the forest, human activities and wildlife interactions have constrained its growth. For centuries, controlled burning practices were used to clear dry vegetation, promote fresh pasture for livestock, and manage savanna expansion. These periodic fires, coupled with the activities of large herbivores such as elephants, played a critical role in maintaining the ecological balance between forested and savanna landscapes (Paterson, 2014).

The arrival of European colonial administrators in the 20th century introduced a shift in forest management. European conservation policies suppressed natural fire regimes, controlled large herbivore populations, and prioritized commercial timber production. These interventions led to decreased biodiversity, altered forest composition, and the gradual encroachment of Budongo Forest into adjacent savanna ecosystems (Paterson, 2014). Consultations with local community members and forest guides indicate no historical evidence of permanent human settlements within Budongo Forest. While communities historically utilized the forest for resource extraction, such as harvesting forest products, there is no documented record of long-term habitation.

From an archaeological perspective, Bunyoro has been the subject of several research studies, particularly in areas such as Munsa (Kibaale District) and the Kibiro salt works (Connah et al., 1990). Palaeontological investigations have predominantly focused on the Albertine Graben escarpment, covering sites such as Kaiso, Nkondo, Jupadwonga, Gengere, Dellu, and Pakwach (Musalizi et al., 2015). The closest archaeological research to the project site was conducted in the Chobi sector of Murchison Falls National Park, which provided evidence of past human occupation before communities were relocated due to the park's gazettement (Soper, 1971).

Given the limited scope of archaeological studies within the immediate project area, it is essential to implement a Chance Finds Procedure (CFP) during project execution to ensure the protection and documentation of any undiscovered cultural heritage resources.



4.3.16.3. Methods used

4.3.16.3.1. Desktop Survey

A comprehensive literature review was conducted to establish a thorough understanding of the project area and its environmental and cultural context. The review encompassed relevant studies on archaeology, palaeontology, and the socio-cultural dynamics of the broader region, with a particular emphasis on the cultural heritage of the Bunyoro people and surrounding communities, who are expected to experience direct project impacts. Available literature indicates that while Bunyoro and Masindi District are rich in cultural heritage, no formally documented archaeological or cultural heritage sites exist within the specific project area. The study team was therefore tasked with evaluating the site's potential for cultural and archaeological significance.

4.3.16.3.2. Consultation Meetings

Stakeholder consultations were undertaken to gather insights on the project's potential impact on cultural and environmental resources. Key stakeholders included Masindi District Local Government, the NFA, and forest guides, who have extensive familiarity with the area due to their daily interactions with the forest ecosystem. The collective perspective from these consultations suggests that human activity in the forest has historically been limited, with no known evidence of past human settlement within the proposed project site.

4.3.16.3.3. Community Engagement

To integrate local knowledge into the study, community members were engaged as field assistants and guides during the archaeological survey. Their involvement was instrumental in identifying potential physical cultural resources within and around the project area, leveraging their intimate understanding of the landscape and its historical usage.

4.3.16.3.4. Archaeological Survey

In archaeological methodology, surveys aim to systematically or unsystematically identify and record the spatial distribution of cultural sites (Fagan & DeCorse, 2005). Systematic surveys typically involve grid-based or transect-based explorations (Renfrew & Bahn, 2008), while unsystematic surveys rely on opportunistic field observations across various landscape features (Feder, 1997; Renfrew & Bahn, 1996). For the proposed Canopy Walk at Kaniyo Pabidi Budongo project site, an unsystematic survey approach was deemed most suitable due to the dense vegetation, uneven terrain, and limited visibility. Field personnel conducted spot-check assessments and guided surveys, incorporating insights from local informants. Data collection methods included direct observations, photographic documentation, GPS recording, and mapping of all cultural and environmental features with potential significance.

The survey commenced at the northwestern corner of the site, where a rock outcrop was recorded at 36N 357943 211730 (elevation: 9671m). Geological analysis indicated that the rock formations were of natural origin, with no evidence of anthropogenic modification. The survey proceeded towards the northeastern sector at 36N 358325 211908 (elevation: 1006m), where no cultural materials were detected. A dry seasonal water point was mapped at 36N 358372 211908 (elevation: 100m), but no archaeological evidence was found in its vicinity. Subsequent survey efforts extended across the site,



covering coordinates 36N 358387 211860 (elevation: 1003m) towards the southern boundary at 36N 358384 211739 (elevation: 1011m), and further westward through 36N 358336 UTM 211851 (elevation: 1004m) and 36N 358364 211786 (elevation: 1008m). The south eastern segment, marked at 36N 358383 211681 (elevation: 1006m), was also systematically surveyed but yielded no evidence of past human occupation.

A significant ecological feature a large mahogany tree was documented at 36N 358308 211683 (elevation: 999m), followed by an assessment of a dry riverbed at 36N 358281 211691 (elevation: 998m). Additional surveys were conducted from the southwestern corner (36N 358203 211694, elevation: 1008m) to the western boundary (36N 358200 211805, elevation: 1007m), extending eastward to 36N 0358289 UTM 0211904 (elevation: 1002m). The final survey phase along the eastern margin, spanning 36N 358377 211955 (elevation: 994m) and terminating at 36N 358429 212041 (elevation: 996m), similarly yielded no evidence of archaeological materials or past human settlement. The Figure 4.4 – 4.5 below shows the field archaeologist around the proposed TBCW area.



Figure 4-5: Archaeological Survey in Progress

4.3.16.3.5. Test Pit Excavations

Excavation is a systematic process of uncovering subsurface materials through the removal of soil and sedimentary deposits, facilitating the study of past human activity (Renfrew & Bahn, 1996). According to Fagan and DeCorse (2005), excavation methods vary depending on site conditions and can be adapted as fieldwork progresses. The process involves a careful balance between extracting maximum information and minimizing site disturbance. Excavation remains a fundamental technique in archaeological fieldwork because it provides the most reliable data on two key aspects: (1) the nature and extent of human activity at a given time, and (2) the stratigraphic sequence of past events. This distinction between horizontal spatial distribution (“slices of time”) and vertical stratification (sequential layers through time) forms the foundation of archaeological excavation methods (Renfrew & Bahn, 1996).



For this project, a 1×1-meter test pit was excavated at the southern end of the project site to assess the depth and presence of archaeological deposits. The excavation was conducted at 36N 358402 211752 (elevation: 1001m) and proceeded in stratified layers. The survey began at Level 1 (0–10 cm) and continued to Level 3 (20–30 cm), where a sterile (undisturbed natural) layer was encountered. No archaeological artifacts or evidence of past human occupation were identified within the test pit. This absence of cultural material suggests that the project area has a low potential for buried archaeological deposits. However, continued monitoring during excavation activities is recommended to ensure that any previously undetected subsurface features are documented appropriately.



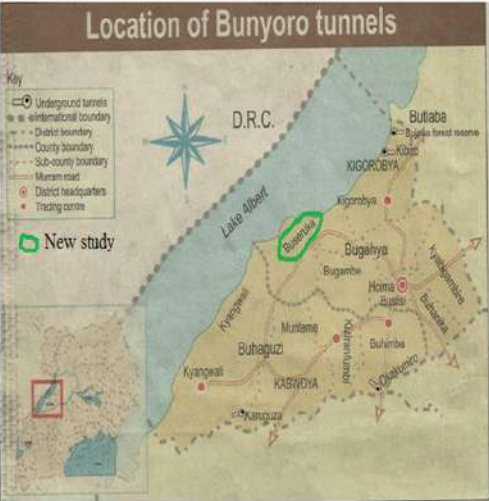

Figure 4-6: Test Pit Excavation in Progress

4.3.16.4. Archaeological Survey



The archaeological survey within the Canopy Walk project area, guided by literature review and consultations yielded No archaeological and cultural heritage sites in the direct influence of the project area. However, through literature review, nine (9) important cultural sites in Bunyoro Kitara Kingdom were identified. These sites will not be affected directly by the proposed project; however, it is expected that tourists to or from the proposed project can visit the sites. The detail of the sites area is in Table 4.11 below.





Table 4-11: Key Cultural Heritage Sites in the wider Project Area

CULTURAL HERITAGE SITES		
001	Site Name	Kabalega Underground Tunnel (KUT)
	GPS Coordinates	36N 0305966 UTM 0185094
	Baseline Condition and Significance	Kabalega's alleged underground war tunnels in Kitegwa village, and Nyakasinene village in Kabaale Sub County is one of the most important historical/prehistorical land marks in the subregion. From the preliminary literature reviewed, it was noted that the presence of such tunnels were recorded in Bujawa forest reserve, Kibiro, Okakumiro and Karuguza. This was reported in New Vision's "Discovery Magazine of Wednesday June, 2010". Similar sites have also been reported in Diima Sub County, close to Karuma Falls (Ayago ESIA 2012-2013). The tunnel is also known as Iseke cave in Nyangi now called Nsongagagi. It is a small rock shelter amongst the tumble of boulders that fringes the lake about 7 km south west of Kibiro. This rock shelter shows sign of current occupation by fishermen. It should be noted that other rock shelters exist in the area (Graham, 1996, pp.184). This site can be an important source of cultural tourism for tourists to or from the Canopy Walk at Kaniyo Pabidi Budongo.
		 <p>Plate 1: Location of KUT</p>
002	Site Name	Omukama Duhaga Tomb (ODT)
	GPS Coordinates	36N 0321171 UTM 0149957, Elevation 1138m,
	Baseline Condition and Significance	It is located in Kinogozi village about 10km along Hoima-Kampala road. King Duhaga was the son of Kabalega; it was believed that when Kabalega was overthrown by the British colonialists and exiled, his son took over the thrown from him. But when he was coming back, the daughter of Duhaga did not want Kabalega to come and overthrow Duhaga, so she was given poison to give to Kabalega who took it but before he died, Kabalega cursed her granddaughter that she would be passing wastes from the mouth instead of the anus. It is believed that this happened until she died. The Tomb site is treasured as one of Bunyoro's royal burial sites (Plate 2). The site can be an important source of cultural tourism for tourists to or from the Canopy Walk at Kaniyo Pabidi Budongo.
		 <p>Plate 2: Inner Look of ODT at Kinogozi</p>


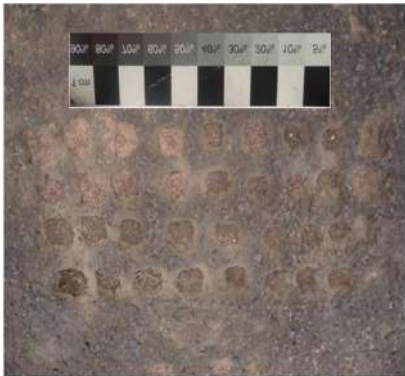



003	Site Name	Fort Katasiha (FK)	 <p><i>Plate 3: A Cave at FK</i></p>
	GPS Coordinates	36N 0315212 UTM 0166707, elevation: 1106m	
	Baseline Condition and Significance	Fort Katasiha and caves, an old fort and hiding/planning ditch Katasiha fort and caves are found in Hoima district, along the Hoima-Biiso-Butiaba road inside Miika Eco resort. It is about 3km from Hoima town. The fort and cave were constructed by Omukama Kabalega, the King of Bunyoro in 1894 as a hiding place and defence point against the British colonial rule. The caves are of historical importance to the Bunyoro people. River Bigajuuka which was before the fort was used extensively as a defence line before getting to the King's army. The fort and caves were used to fight the British after he abandoned his palace at Mparo. In all probability, it is related to the old Kabalega ditches found in most parts of the former Bunyoro- Kitara region (Plate 3). This can be an important source of cultural tourism site for tourists to or from the Canopy Walk at Kaniyo Pabidi Budongo.	
004	Site Name	Omukama Kabalega's Monument (OKM)	 <p><i>Plate 4: OKM at Mparo</i></p>
	GPS Coordinates	36N 0320071 UTM 0157824	
	Baseline Condition and Significance	Another important site is the Omukama Kabalega's monument at Mparo. The site is characterized by burials (tombs) some in built houses while others are in open space. There is a monument built to memorize the place and time when Omukama Chwa Kabalega received Dr. Emin Pasha on the 22 nd of September 1877 (Plate 4). This can be an important source of cultural tourism site for tourists to or from the Canopy Walk at Kaniyo Pabidi Budongo.	
005	Site Name	Mparo Historical Burial Sites (MHBS)	
	GPS Coordinates	36N 320066 UTM 157831, elevation 1169m	
	Baseline Condition and Significance	A number of informal and formal graves were noted with the major significant being the Mparo Tombs, a burial ground of Bunyoro Kingdom. Initially the Kingdom was at Kinogozi along Kampala road 7miles away from Hoima town where Kamurasi, the King Father of Kabalega was buried. But because of its good strategic location, Kabalega through his	



		<p>parish chief called Mparo selected to stay at Mparo and named the place Mparo basing on the name of the parish chief who used to head this place. Up to date it is used as the burial place for the Kings' clan.</p> <p>Apart from King Kabalega, the place also houses King Sir Titto Winyi, the heir to Kabalega as well as his mother. In 2010, the mother of the current King, Queen Komworu was also buried here. Many other people have been buried here including the prince and princess of Kabalega such as Rukidi Mpuuga who was a son of King Sir Titto Winyi and a brother to the current King Iguru (Plate 5). This site can be an important source of cultural tourism for tourists to or from the Canopy Walk at Kaniyo Pabidi Budongo.</p>	 <p><i>Plate 5: Graves at MHBS</i></p>
006	Site Name	Omukama Kabalega Board Game Site (OKBGS)	 <p><i>Plate 6: OKBG</i></p>
	GPS Coordinates	36N 0323747, 0160228	
	Baseline Condition and Significance	<p>The board game (Mweso) site is yet another fascinating cultural and historical site located about 1km away from the Hoima-Masindi road. The site is characterized by three game boards and some stone piles in a line. Oral history has it that, the site was used by Omukama Kabalega of Bunyoro and his forces as a place for planning and laying strategies for fighting invaders of the Kingdom. It was during their leisure times that they used to play the Mweso game. However, the site has adopted a cultural usage as it has been turned into a shrine where people go for different kinds of spiritual interventions (Plate 6). This site can be an important source of cultural tourism for tourists to or from the Canopy Walk at Kaniyo Pabidi Budongo.</p>	



007	Site Name	Omukama Duhaga Palace (ODP)	 <p><i>Plate 7: ODP at Kinogozi</i></p>
	GPS Coordinates	36N 0321212, UTM 0149926, elevation 1139m	
	Baseline Condition and Significance	This house was the palace of King Duhaga. It is still a complete structure but is now going in ruins. The palace is located in Kinogozi, Buhimba Sub County Kikuube district. The site remains an important memorial site in the history of Bunyoro Kingdom (Plate 7). This site can be an important source of cultural tourism for tourists to or from the Canopy Walk at Kaniyo Pabidi Budongo.	
008	Site Name	Kachungiro Board Game Site (KBGS)	 <p><i>Plate 8: KBGS</i></p>
	GPS Coordinates	36N 0321738 UTM 0148084, elevation 1096m	
	Baseline Condition and Significance	It is located within the Kachungiro Kabalega training ground in Kinogozi, Buhimba Sub County. The 4x8 game was recorded engraved on the rock basement. It is believed that Kabalega and his soldiers used to play the game during relaxation time. Similar board games engraved on the rock platforms have been reported in other parts of western Uganda and Northern Uganda (Ayago ESIA 2012-2013). There is however limited literature information on who exactly invented the game but it is still highly played up to present by communities across Uganda (Plate 8). This site can be an important source of cultural tourism for tourists to or from the Canopy Walk at Kaniyo Pabidi Budongo.	
009	Site Name	Kabalega Wells (KW)	 <p><i>Plate 9: View of KW</i></p>
	GPS Coordinates	36N 0322153 UTM 0147811, elevation 1088m	
	Baseline Condition and Significance	It is located within the vicinity of Kacungiro training ground in Kinogozi, Buhimba Sub County. It has male and female wells. The male well was specifically used by Kabalega while the female one was used by women and also for treating wounded soldiers. The wells are still treasured up to present and many people still use the water for healings. This accounts for proper maintenance of the site (Plate 9). This site can be an important source of cultural tourism for tourists to or from the Canopy Walk at Kaniyo Pabidi Budongo	



4.4. Biological Environment

4.4.1. General assessment method

The methods used during the assessment included a comprehensive review of the available literature on vegetation, flora, and their conservation status. This review aimed to identify key ecological attributes of the species and habitats within the reserve, such as their richness, uniqueness, rarity, threat levels, and other aspects of conservation concern. It was emphasized that understanding these factors in advance was critical for evaluating the ecological significance of the area and identifying priority species and habitats that might require targeted conservation efforts. Additionally, the assessment of potential natural vegetation was based on the seminal work by Langdale-Brown et al. (1964), which provided a foundational classification of vegetation types in the region, supplemented by comprehensive information from 1993 and 1994. The potential occurrence of species of conservation concern was further informed by Davenport & Howard's (1996) biodiversity report, which served as a basis for determining the presence and status of vulnerable, endangered, or rare species within the project area. This approach ensured that conservation priorities were accurately reflected in the assessment findings and the proposed mitigation measures.

Suitable sample sites for a detailed impact assessment were selected using purposive sampling and during actual surveys three methods, purposive, random, and systematic sampling depending on habitat characteristics, ecological sensitivity, habitat variability, and site accessibility as well as the taxon in question. All sampled sites were geo-referenced, and their characterization was based on floristic and landscape ecological features.

4.4.2. Flora Assessment

Plants form the structural foundation of terrestrial ecosystems, including forests, where they serve as primary food sources for a wide range of organisms inhabiting terrestrial, semi-aquatic, and occasionally aquatic environments. Beyond their role in sustaining biodiversity, plants provide essential breeding and nesting sites, as well as cover and resting areas for various fauna. Consequently, plant communities exert a significant influence on the distribution and diversity of faunal species across the landscape.

Terrestrial habitats are classified as either natural/intact or modified based on vegetation composition, structure, and associated edaphic factors. Moreover, plant species exhibit remarkable diversity and high habitat specificity, making them a key indicator taxonomic group in ecological assessments. In forested landscapes, plant composition and structure are critical in determining whether a forest is primary, secondary, regenerating, degraded, dense, or open. Forests are stratified into distinct layers the forest floor, understory, and canopy each characterized by a unique assemblage of flora and fauna, shaped by variations in light availability, moisture, and nutrient resources.

According to the Food and Agriculture Organization (FAO), a forest is defined as land spanning more than 0.5 hectares with trees exceeding 5 meters in height and a canopy cover greater than 10%, or with trees capable of meeting these thresholds in situ. Given this definition, vegetation assessments conducted as part of baseline studies for the Canopy Walk establishment were critical. These assessments facilitated the identification of key vegetation assemblages, individual species



potentially impacted by the project, and species of conservation concern, including invasive taxa requiring management. Additionally, the studies helped establish the vegetation type and its ecological status—whether natural or modified, and whether classified as critical habitat—ensuring informed decision-making in project design and implementation.

4.4.2.1. *Ecosystem Characterization*

The vegetative assemblages of the project area were classified using the Langdale-Brown et al. (1964) system (L-B system), which is based on plant community composition rather than biomass. This approach is particularly suited for identifying sensitive habitats and assessing potential ecological impacts. The L-B system distinguishes 26 vegetation categories, offering greater resolution compared to the 13 categories used in the National Biomass System (USAID, 2014). This enhanced classification allows for a more detailed assessment of development impacts on local ecosystems.

4.4.2.2. *Sample Site Selection*

Sampling locations were determined based on a feasibility study conducted during the canopy walk design phase, with key areas selected for detailed ecological assessment. To ensure a comprehensive understanding of potential project impacts, sampling extended beyond the direct footprint to include sites within a 100-meter radius of the project area. Baseline vegetation surveys were conducted in January 2025 to document species composition and ecological characteristics. Priority was given to locations where the proposed canopy walk structures are expected to significantly influence forest cover, vegetation, and flora. GPS coordinates were recorded at each sampling point for reference.

4.4.2.3. *Sampling Methodology*

A systematic field survey was undertaken to collect site-specific data on vegetation structure and floristic diversity. The survey team traversed the project area, documenting all observed plant species with particular focus on vegetation types, species of conservation significance, and invasive species. Photographs were taken to capture the site's ecological characteristics. Species conservation status was assessed using the IUCN Red List of Threatened Species (IUCN, 2023) and national conservation assessments (MTWA, 2018). Additionally, Uganda's reserved tree species list and the Global Register of Introduced and Invasive Species (Ogwang et al., 2020) were consulted to evaluate species invasiveness. The identification of critical habitats followed definitions outlined by the International Finance Corporation (IFC, 2012) and the National Environment Act (2019).

4.4.2.4. *Quantitative Assessment*

Vegetation data were collected using a stratified quadrat approach. Plots measuring 15m in radius were systematically placed at 40m intervals within the project footprint and at 100m intervals beyond it. Within each 15m quadrat, woody species of tree habit were assessed. Smaller trees and shrubs were documented in nested 10m radius plots, while saplings, herbs, and graminoids were recorded in 2m radius quadrats positioned at the center of the 15m plots. This approach ensured comprehensive representation of vegetative assemblages across the site. Fieldwork within each plot



included species identification, structural analysis, and documentation of floristic diversity. Data were also collected on disturbance history and the presence of exotic species.

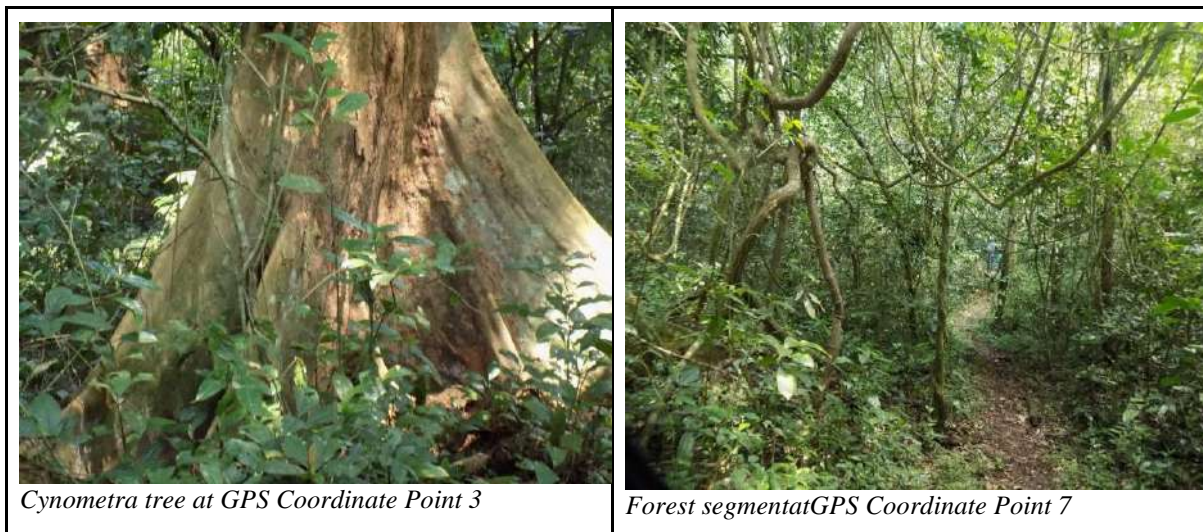
4.4.3. Floral Results

4.4.3.1. Vegetation of Kaniyo-Pabidi Area within Budongo Central Forest Reserve

Kaniyo-Pabidi Area within Budongo Central Forest Reserve is a regenerating forest transitioning from historical timber production to conservation-based ecotourism and nature reserve management. The site proposed for the canopy walk is undergoing succession towards a primary forest, characterized by a well-defined emergent and canopy layer, along with understory and forest floor vegetation. The canopy walk corridor is situated within a *Khaya-Cynometra alexandrii-Alstonia boonei* forest, with a moist streamside forest belt running through the central section of the route. Vegetation composition varies across segments of the proposed canopy walk:

- *Segments 3–6* traverse a *Cynometra-Khaya-Alstonia* forest on gentle slopes descending towards the stream.
- *Segments 2 and 7* fall within the streamside forest, dominated by *Khaya anthotheca*, *Alstonia boonei*, *Celtis africana*, *Acalypha ornata*, *Argomuelleria macrophylla*, *Cola gigantea*, *Marantochloa*, and *Chrysophyllum albidum*.

A full species inventory is provided in Annex. The visual representation of vegetation assemblages within the project footprint is presented in the accompanying Figure 4.6 below:





Forest segment within GPS Coordinate Point of the canopy walk



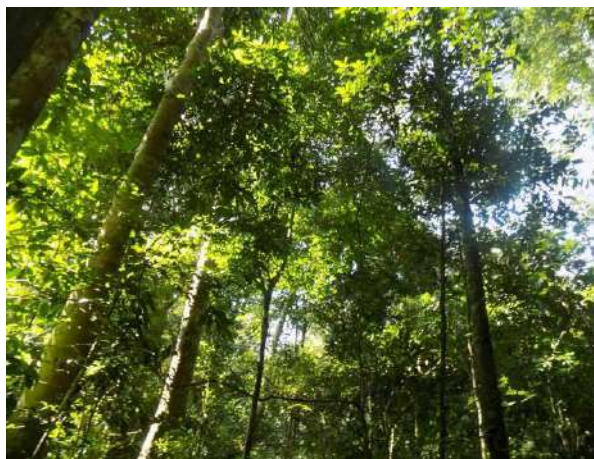
Forest segment at GPS Coordinate Point 6



Forest segment between GPS Coordinate Point 2 and 3 of the canopy walk



Forest segment within GPS Coordinate Point 4 of the canopy



Forest segment within GPS Coordinate Point 6 of the canopy walk



Forest segment near GPS Coordinate Point 6 of the canopy walk

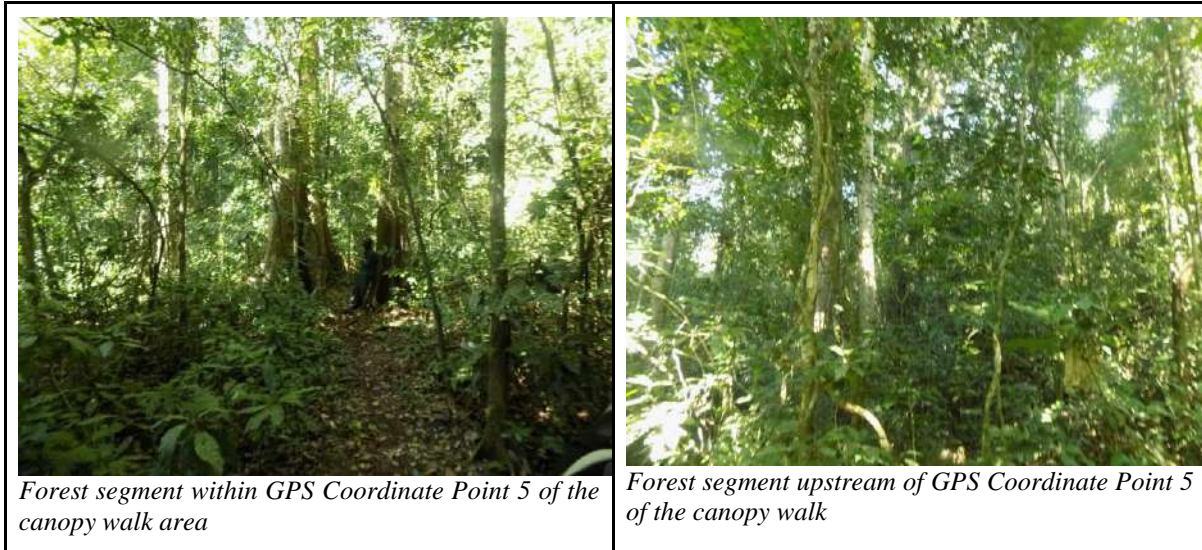


Figure 4-6: Visual outlook of vegetation cover around the proposed Canopy site

4.4.3.2. Plant species richness

The study identified a total of 156 species, distributed across 57 families and 134 genera. The most frequently occurring families included, *acanthaceae* with 16, *rubiaceae* 12, *euphorbiaceae* had 9, *asteraceae* 8, *commelinaceae* 8. *Poaceae* and *apocynaceae* 7, *malvaceae* 6, while *fabaceae*, *Cannabaceae*, *Moraceae*, and *Sapotaceae* each had 5, and the rest had less than 4 species recorded. This data is summarized in Figure 4.7 below.

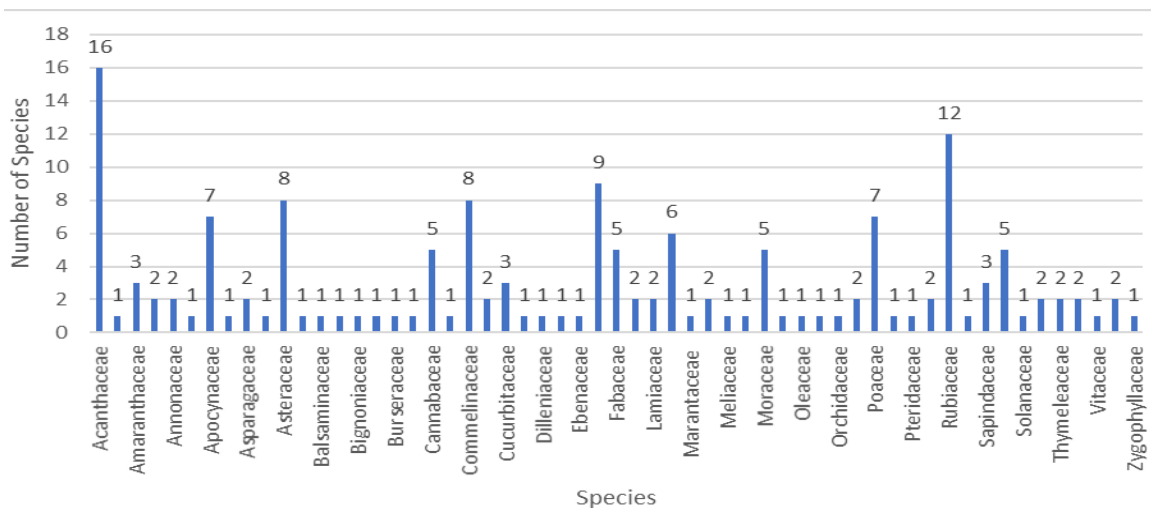


Figure 4-7: species composition by family

In terms of growth forms, shrubby plants had the highest spatial cover of 48 (30.77%) followed by herbs 44 (28.21%), trees 39 (25.00%), climbers 17 (10.89%) and grass 7 (4.49%). See Figure 4.8 below.

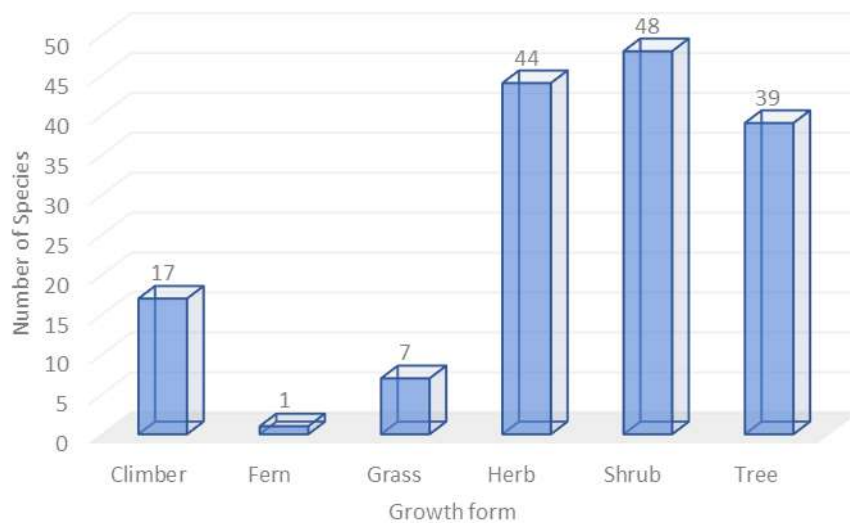


Figure 4-8: Species composition by growth form

The project footprint had fewer tree species because it mainly dominated by a few individual trees in emergent layers and canopy layer (about 30 individual trees and these have diameter at breast height (Dbh) of 70cm and above, the biggest tree has a Dbh of about 343.64cm and it's a *Cynometra alexandrii* tree. There were about 24 trees with Bbh above 92cm and these are the trees expected to support the canopy walk. Some of these have defects and they may require extra examination to establish their health and duration they will support the canopy structure. The other outstanding trees include *Khaya anthotheca* with a bdh of about 180cm, *Celtis mildbraedii* with three trees of 212.55cm, 122.5cm and 117.73 cm Dbh respectively; *Celtis zenkeri* with individuals of about 141.59 cm Dbh, *Alstonia booneri* with individuals of 143.18 cm Dbh, and *Balanites wilsoniana* with Dbh of about 98.64cm. More herbaceous plants were recorded near the stream and this is same with climbers.

The canopy cover is closed in the project direct footprint up to 85% closeness. In some sections like within the stream area, the canopy is at 65-70% closeness. Outside the project direct footprint, the canopy cover fluctuates depending on the level of forest establishment some section being at 90% and others being lower than 70%.

4.4.3.3. Species of conservation concern

The International Union for the Conservation of Nature (IUCN) developed a criterion for assessing and evaluating the conservation status of species, identifying, and documenting the species that are threatened, data deficiency and the least concern. In this system, species are evaluated against a series of objective criteria (available at www.iucn.org) and based on those criteria a species is placed in one of eight categories provided in Figure 4.9 below. Those species that fall within the Threatened and Near Threatened categories are Red listed and require rigorous conservation measures. The Ministry of Tourism Wildlife and Antiquities (MTWA) also published a list of nationally threatened species in 2018 (MTWA, 2018) following the same criterion developed by IUCN.

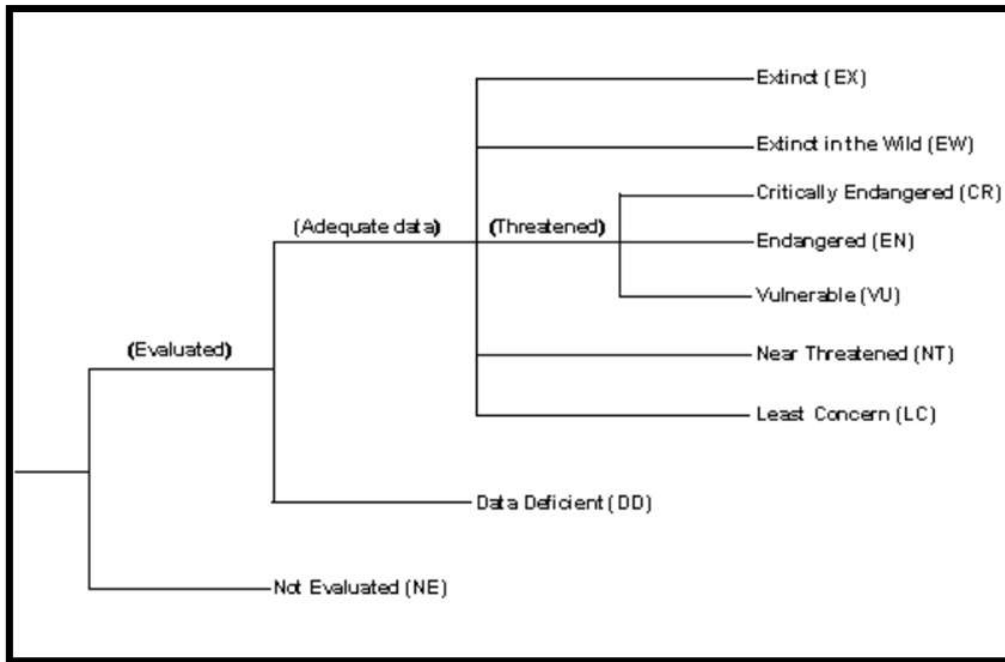


Figure 4-9: IUCN criterion for defining/determining threatened species categories

During the study, three (5) species of conservation concern, accounting for 3.21% of the recorded species, were identified. These included *Khaya anthotheca*, *Rinorea beniensis*, *Rinorea tshingandaensis* and *Leptonychia semlikensis* Engl. categorized as Vulnerable (VU) and 1 individual species of *Leptonychia mildbraedii* categorized as Near Threatened (NT). These species are considered threatened at global level, highlighting the need to prioritize their protection along with the conservation of their habitats.

Table 4-12: Species of conservation concern recorded from the project site

Family	Species	Life form	IUCN status	MTWA 2018
Sapotaceae	<i>Chrysophyllum albidum</i>	Tree	NA	VU
Sapotaceae	<i>Chrysophyllum perpulchrum</i>	Tree	NA	VU
Meliaceae	<i>Khaya anthotheca</i> (Welw.) C.DC.	Tree	VU	EN
Malvaceae	<i>Leptonychia mildbraedii</i> Engl.	Shrub	NT	NE
Malvaceae	<i>Leptonychia semlikensis</i> Engl.	Shrub	VU	NE
Violaceae	<i>Rinorea beniensis</i> Engl.	Tree	VU	NE
Violaceae	<i>Rinorea tshingandaensis</i> Taton	Tree	VU	NE

On the other hand, at the national level, there were three species recognised as threatened since no reviews have been conducted since 2018 by MTWA 2018 or WCS 2016. These species include *Chrysophyllum albidum* which is Vulnerable and *Chrysophyllum perpulchrum*, which is also Vulnerable at national level and *Khaya anthotheca* which is Endangered at national level. However, all the species identified will not be severely affected since they exist within forest reserve and the activity is not intended to destroy their ecology.

The project footprint is considered critical due to its protection status and presence of threatened and rare plant and animal species. However, the proposed activity is among those cited to promote sustainable resource use whilst bringing revenue necessary to manage the protected area.



Secondary the proposed activity is not destructive in nature, all mature trees will be saved, and a minimal fraction will be affected by trimming and all construction materials will be welded and/or mixed from another locality, only already approved, welded materials will be brought to site for final assembling or installations. During operations no understorey species will be affected since the canopy will be established in the canopy layer.

4.4.3.4. *Plant species Reserved under National Forestry and Tree Planting regulation 2016*

There were several plant species within the Kaniyo - Pabidi forest reserve at large and a few such species from the project footprint and its immediate environs that is flagged as reserved or protected as per National forestry and tree planting regulation 2016. Table 4-13 provides a list of plant species as listed under schedule 8 of the national forestry and tree planting regulation 2016 as reserved/protected species recorded from the surveyed area. One requires a permit from NFA as provided in schedule 9 to the forestry and tree planting regulation 2016 before cutting one. However, since the project is within a forest reserve and no gross clearances will be done apart from a few trees that will support project establishment, there is not much worry about protection of such species during project implementation. Secondary, the licensing body doubles as the developer.

Table 4-13: List of plant species protected under national forestry and tree planting regulations 2016

Family	Species	Life form	IUCN status	MTWA2018
Fabaceae	<i>Albizia grandibracteata</i>	Tree	NE	NE
Sapotaceae	<i>Chrysophyllum albidum</i>	Tree	NE	VU
Sapotaceae	<i>Chrysophyllum perpulchrum</i>	Tree	NE	VU
Vitaceae	<i>Cissus quadrangularis L.</i>	Climber	NE	NE
Moraceae	<i>Ficus asperifolia</i>	Shrub	NE	NE
Moraceae	<i>Ficus saussureana DC.</i>	Tree	LC	NE
Moraceae	<i>Ficus vallischaude</i>	Tree	NE	NE
Meliaceae	<i>Khaya anthotheca (Welw.) C.DC.</i>	Tree	VU	EN
Apocynaceae	<i>Mondia whitei (Hook.f.) Skeels</i>	Climber	NE	NE
Violaceae	<i>Rinorea beniensis Engl.</i>	Tree	VU	NE
Violaceae	<i>Rinorea tshingandaensis Taton</i>	Tree	VU	NE
Rhamnaceae	<i>Maesopsis eminii</i>	Tree	LC	LC

4.4.3.5. *Invasive species*

According to Kumar Rai P and Singh JS (2020), ecological trepidations caused by biotic invasion have been identified as a growing threat to global sustainability. Invasive alien plant species (IAPS) are one of the major drivers of biodiversity loss and thereby altering the ecosystem services and socio-economic conditions through different mechanisms. Therefore, mapping them out and properly managing their spread is key and this should be looked at through ecological indicator perspectives of IAPS, biosecurity, and risk assessment protocols with critical management of the pathways. Positive as well as negative implications of the IAPS on environment, health, ecosystem services and socio-economy (livelihood) must be highlighted to allow for designing a judicious policy framework or management plan which when implemented could mitigate the human health implications of IAPS.



An interrelation framework, among anthropogenic factors/global environmental changes (biotic invasions, habitat destruction/fragmentation, land-use/climate change, environmental pollution), impacting socio-economy/livelihood and human health as described by Kumar Rai P and Singh (2020).

Shackleton et al., 2019, asserted that native plants can act as sink for air pollutants and contribute significantly to carbon sequestration, thus loss of native plant diversity through invasive plant pathogens may indirectly affect human health through perturbations in the environmental quality (Jones and McDermott, 2018).

Success of the IAPS is not decided by merely a single environmental factor and ecological attribute. Here, it is worth mentioning that the plant invasion, anthropogenic disturbances, climate change, biodiversity and human health may have complex and intricate relationships (Rai and Kim, 2019). Thus, invasion ecology is now increasingly being considered as a trans-disciplinary subject, intimately linked with the global change biology, land-use change, health science, restoration, and conservation biology (Heshmati et al., 2019).

The spread of the IAPS at global scale, particularly in disturbed areas such as landfills/dumps, which may form invasive plant epicentres, can profoundly affect human health through their pollen and toxins as Plaza et al., 2018 narrated. It has been noted that global terrestrial as well as aquatic environments are being invaded by numerous IAPS. Therefore, rescue mechanisms, that make the replacement of indigenous climax communities originating through natural succession by IAPS-dominated communities (Slingsby et al., 2017), is of great importance in this case.

Global biotic invasions are also among the prime agenda of Convention on Biological Diversity (CBD) for the control of IAPS impacts on the ecosystems and public health, which is further emphasized through Biosafety and Cartagena Protocol (Pysěk and Richardson, 2010). Earth Summit in Rio de Janeiro, 1992 has further recognised IAPS in the forestry/ agroforestry systems as one of the key causes of the harm to global environment, biodiversity, and human health.

Therefore, it is important to consider Invasive species impact at all stages of the project development, appropriate measures designed and implemented to truncate its spread in the ecosystem. The guiding principles include:

- Early detection and implementation of an integrated control program,
- Effective control, monitoring, and surveillance, and
- Involvement of the local community in the management of invasive and alien species.

Even though some invasive plant species look localized, it's prudent to manage it to avoid its spread in natural fields, especially protected areas. Therefore, supporting early detection and surveillance (allowing for effective control) is key to management of invasive species. A literature review was carried out to identify those IAS most likely to have the potential to affect the Project Area. Impact species considered are those with potential to cause significant adverse impacts to the Landscape or Project area of influence (AoI) and for which introduction/spread pathways exist and/or the species is already present within the Project footprint.



4.4.4. Wildlife

4.4.4.1. Method of Wildlife Assessment

Kaniyo-Pabidi, forming the north-eastern extension of the Budongo Forest Reserve, lies at the southernmost boundary of Murchison Falls National Park, where it transitions into the park's wooded savanna landscape. This section of the Budongo Forest remains in a relatively undisturbed and ecologically intact state, supporting its development as an ecotourism hub. This approach emphasizes non-consumptive interactions with the forest ecosystem, thereby minimizing anthropogenic impacts and preserving its ecological integrity.

The proposed site for the Tree Based Canopy Walk is situated within a section of the forest characterized by established trails designed to support diverse ecotourism activities, adjacent to the Budongo Café at Pabidi (Refer to Figure 4.7 and Figure 4.8 below).

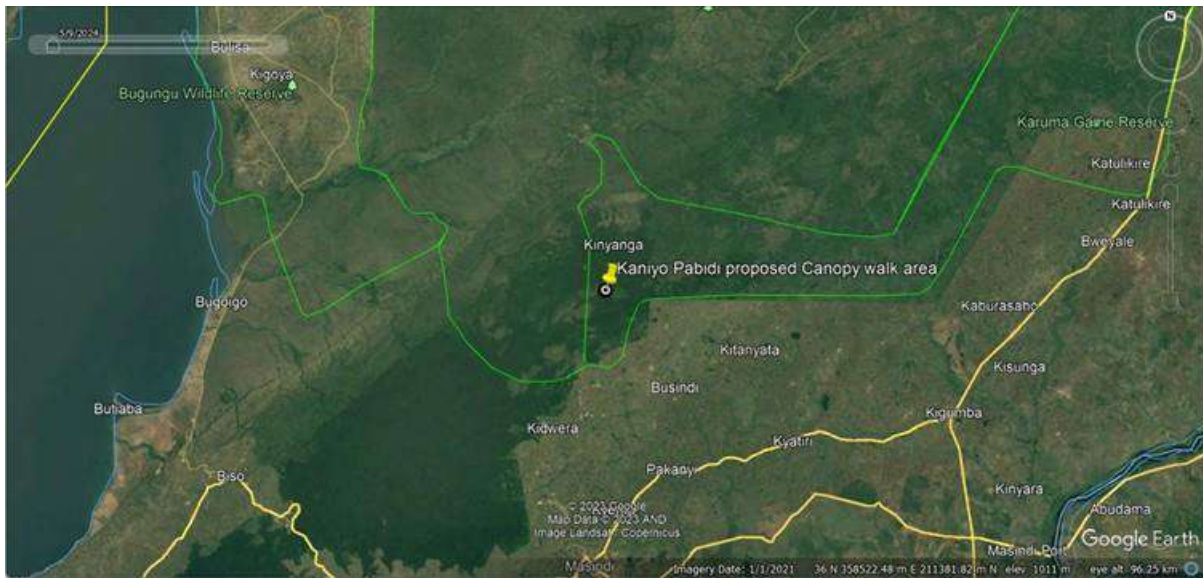


Figure 4-7: Budongo Forest showing the location of the proposed TBCW

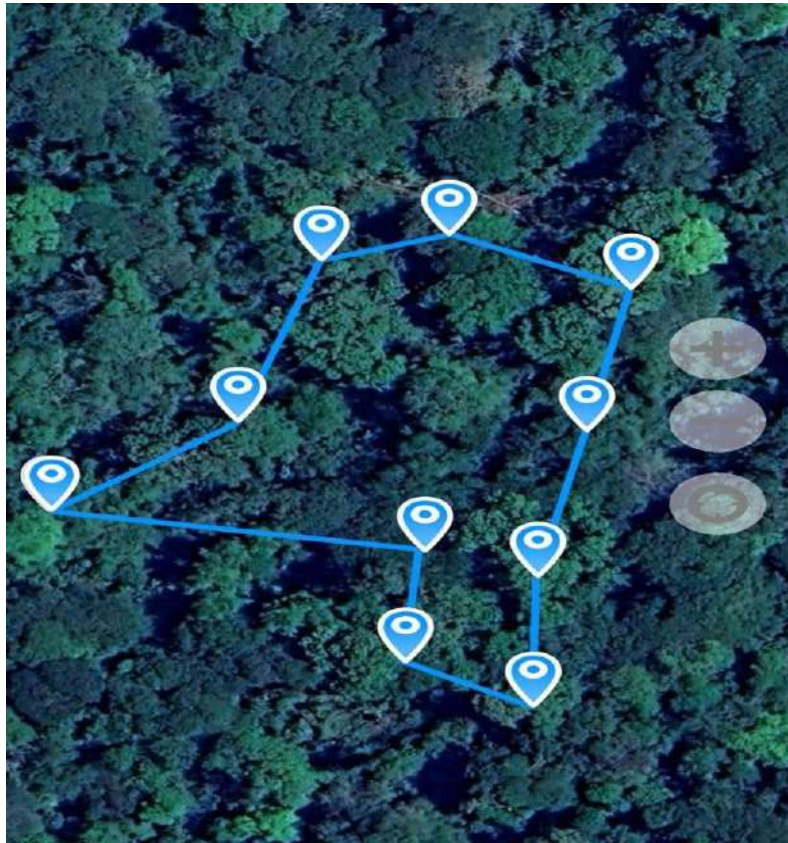


Figure 4-8: Closeup aerial view of the area proposed for the TBCW

The immediate area of influence associated with the proposed canopy walk, as well as its surrounding forest, was assessed for evidence of mammal presence and habitat use. Based on the project description provided, it is anticipated that the surrounding forest will experience minimal ecological disturbance. The area directly impacted by the project includes drainage channels that were dry during the fieldwork period. However, during the wet season, when these channels carry water, the habitat could transform significantly, potentially supporting a greater and more diverse assemblage of mammal species.

Fieldwork was conducted between 19th and 24th January 2025, coinciding with a dry spell. The Kaniyo-Pabidi section, the proposed site for the canopy walk, is a relatively undisturbed forest characterized by a high density of large, mature trees. The understory is notably open, offering limited cover for ground-dwelling mammal species (Refer to Figure 4.9 below).





Figure 4-9: Views into Kaniyo Pabidi demonstrating the very sparsely vegetated understorey

4.4.4.2. Survey approach

To maximize the likelihood of documenting the full range of mammal species within the surveyed area, a variety of survey techniques were employed.



4.4.4.3. Literature and Data Review

A preliminary literature review was conducted, supplemented by consultation of accessible private datasets, to compile an initial checklist of mammal species known to inhabit the Kaniyo-Pabidi area.

4.4.4.4. Field Methods

4.4.4.4.1. Camera Traps

Seven camera traps were deployed, secured to trees at heights between 30 cm and 60 cm above the ground, and left in place for five days. Upon recovery, the photos were analyzed to identify any mammal species captured during this period.

4.4.4.4.2. Sherman Traps for Small Mammals

A total of 50 Sherman traps were set for five consecutive days, resulting in a cumulative trapping effort of 250 trap-nights. The traps, designed to target small mammals such as rodents and shrews, were baited daily and checked every other day for captured individuals.

4.4.4.4.3. SM4 Acoustic Detector for Bats

An SM4 acoustic detector was deployed to record micro-bat vocalizations. The device was affixed to trees approximately 3 meters above the ground in relatively open forest spaces to align with the foraging behavior of micro-bats, which typically navigate and hunt in such areas.

4.4.4.4.4. Walked Transects

Systematic walked transects were conducted to observe mammals directly and record indirect evidence such as fecal material, digging marks, and vocalizations.

This multi-faceted approach ensured a comprehensive assessment of mammal diversity and activity within the sampled Kaniyo-Pabidi section of the proposed TBCW area.

4.4.4.5. Wildlife Results

The survey period was relatively brief; nonetheless, several mammal species were recorded through direct observations, evidence of presence (e.g., fecal material), or camera trap recordings.

4.4.4.5.1. Historically Documented Mammals in Kaniyo-Pabidi

Table 4.14 presents a list of 32 mammal species historically reported in the Kaniyo-Pabidi area, many of which are highly likely to inhabit the forest surrounding the proposed project site. These species represent four mammalian orders: *Insectivora*, *Chiroptera*, *Rodentia*, and *Primates*.

It is plausible that some of the species listed were originally recorded in the savanna-woodland section of Kaniyo-Pabidi. However, there is strong evidence to suggest that a significant proportion of these mammals also occur within the forested areas of Kaniyo-Pabidi, including the vicinity of the proposed project.

Table 4-14: Historically known mammals for the Kaniyo-Pabidi forest

Order	Species	Conservation status
Insectivora	Hildegarde's Musk Shrew <i>Crocidura hildegardeae</i>	
	Greater Grey-brown Musk Shrew <i>Crocidura luna</i>	



Order	Species	Conservation status
	Northern Giant Musk Shrew <i>Crocidura olivieri</i>	
	Lado Musk Shrew <i>Crocidura planiceps</i>	
Mega-chiroptera	Little Epauletted Fruit Bat <i>Epomophorus labiatus</i>	
	Dwarf Epauletted Fruit Bat <i>Micropteropus pusilus</i>	
	Bocage's Fruit Bat <i>Rousettus angolensis</i> *	
Micro-chiroptera	Lappet-eared Free-tailed Bat <i>Chaerephon major</i>	
	Duke of Abruzzi's Free-tailed Bat <i>Chaerophon aloysiisabaudiae</i>	
	Damara Woolly Bat <i>Glauconycteris argentata</i>	
	Noack's Leaf-nosed Bat <i>Hipposideris ruber</i>	
	Sundevall's Leaf-nosed Bat <i>Hipposideros cafer</i> *	
	Welwitch's Bat <i>Myotis welwitschii</i>	
	Hairy Slit-faced Bat <i>Nycteris hispida</i> *	
	Large-eared Slit-faced Bat <i>Nycteris macrotis</i> *	
	Schlieffen's Twilight Bat <i>Nycticeinops schlieffenii</i>	
	Halcyon Horseshoe Bat <i>Rhinolophus alcyone</i> *	
Rodentia	Northern Bush Rat <i>Aethomys hindei</i>	
	Common Thicket Rat <i>Grammomys dolichurus</i> *	
	Common Striped Grass Mouse <i>Lemniscomys striatus</i>	
	Northern Savanna Rat <i>Mastomys hildebrandti</i>	
	Pygmy Mouse <i>Mus minutoide</i> *s	
	Jackson's Soft-furred Rat <i>Praomys jacksoni</i> *	
Primates	Chimpanzee <i>Pan troglodytes</i> *	
	Black and White Colobus Monkey <i>Colobus guereza</i> *	
	Red – Tailed Monkey <i>Cercopithecus ascaniu</i> *s	
	Blue Monkey <i>Cercopithecus mitis</i> *	
	Vervet Monkey <i>Chlorocebus pygerythrus</i>	
	Olive Baboons <i>Papio anubis</i>	
	Potto <i>Perodicticus potto</i> *	
	Galago*	
	L'Hoist's Monkey <i>Cercopithecus lhoesti</i> *	

All species marked with an asterisk (*) in Table 4.15 above are associated with forested habitats and are likely to occur within the forest. The remaining species, while primarily adapted to savanna ecosystems, may range into the forest periphery and could potentially extend their presence into drier forested areas. Reports of bush babies (*Galago* spp.) reference only the generic group, suggesting that multiple species within this genus may inhabit the Kaniyo-Pabidi area. Additionally, larger mammals such as elephants and buffalos have been reported in Kaniyo-Pabidi and are likely to utilize the forest. However, a more comprehensive survey would be essential to capture the full spectrum of mammal diversity within the forested section of Kaniyo-Pabidi.

4.4.4.5.2. Results from observations and trapping for small mammals

A single individual of *Crocidura olivieri* was recorded during the trapping campaign. The dry forest floor, coupled with sparse ground-level vegetation, likely restricts the distribution and activity of small mammals in the area. During the walked surveys, three species of squirrel were observed within the project area: Boehm's squirrel (*Paraxerus boehmi*), Alexander's dwarf (bush) squirrel



(*Paraxerus alexandri*), and the African giant squirrel (*Protoxerus stangeri*). These species are primarily arboreal and exhibit diurnal activity patterns.

4.4.4.5.3. Bats observations and detections

The Two species of fruit bats (*Epomophorus labiatus* and *Epomops franqueti*) were recorded in the forest area near the proposed canopy walk.

From the acoustic detection, a total of 1379 signals were recorded in two nights of acoustic monitoring. These contained signals from eight species of bats (*Scotophilus dingani*, *Nycteris hispida*, *Nycteris argae*, *Neoromicia capensis*, *Rhinolophus alcyone*, *Nycticeinops schlieffenii*, *Coleura afra* and *Mimetilus moloneyi*). The calls of *Scotophilus dingani* and *Neoromicia capensis* were the most numerous which could only suggest a higher importance of the project area to these species for foraging rather than an absolute abundance.

4.4.4.5.4. The large mammals

From walked surveys for mammals or signs of presence (faecal, digging and/or vocalisation) and camera trapping, recorded the occurrence of 12 mammal species (Table 4.15). The mammals recorded belong to four orders with the majority being artiodactyls.

Table 4-15: The larger mammals recorded in and around the proposed canopy walkway project

Order	Species	Conservation concern (IUCN/Uganda)
Primates	Chimpanzee <i>Pan troglodytes</i>	EN/EN
	Red-tailed Monkey <i>Cercopithecus ascanius</i>	LC/LC
	Olive Baboon <i>Papio anubis</i>	LC/LC
	L'Hoest's monkey <i>Cercopithecus lhoesti</i>	
Artiodactyla	Giant Forest Hog <i>Hylochoerus meinertzhageni</i>	LC/EN
	Bush Pig <i>Potamochoerus porcus</i>	LC/LC
	Bush Duiker <i>Sylvicapra grimmia</i>	LC/LC
	Forest Duiker <i>Cephalophus rufilatus</i>	LC/DD
	Blue Duiker <i>Cephalophus monticola</i>	LC/LC
	Bushbuck <i>Tragelaphus scriptus</i>	LC/LC
Carnivora	Leopard <i>Panthera pardus</i>	NT/VU
Rodentia	Crested Porcupine <i>Hystrix cristata</i>	LC/LC

Chimpanzees were consistently observed within the general project area throughout the survey period, suggesting an abundance of fruit resources in and around the site. Fecal material from the giant forest hog (*Hylochoerus meinertzhageni*) and bush pig (*Potamochoerus larvatus*) was frequently encountered along the trails, alongside evidence of areas extensively dug up by these species. Additionally, five groups of red-tailed monkeys (*Cercopithecus ascanius*), three groups of olive baboons (*Papio anubis*), and a single group of L'Hoest's monkey (*Allochrocebus lhoesti*) were recorded within the vicinity of the proposed project area.

The survey findings do not provide evidence to suggest the presence of large populations for any of the recorded species. Figure 4.10 below illustrates examples of the mammals and indirect evidence documented in and around the project area.



Chimpanzees in the project area (left panel while moving on forest trail and right panel in the woods on left bottom corner)

Blue Duiker foraging on forest floor in the proposed project area

Bushbuck in the vicinity of the proposed project area



Forest Duiker (left) and its dung (left) in the proposed project area



Night Camera captures of Leopard (left) and Crested Porcupine (right)



Figure 4-10: Mammals and/or mammal signs recorded in and around the proposed canopy walk project



4.4.4.5.5. Summary of Survey Results

Between 20th and 24th January 2025, a total of 26 mammal species was recorded in the proposed TBCW project area. This represents notable species richness given the short duration of the survey. It is plausible that a longer survey campaign could document additional species. It is important to note that the surveys were conducted during the dry season when some species may have migrated to other parts of the landscape where standing water is available.

4.4.4.5.6. Conservation Status of Recorded Mammals

In the wildlife checklist provides a complete list of mammal species recorded during the surveys. Most species are classified as *Least Concern* (LC) by the IUCN and at the national level, with the following three exceptions:

1. Giant Forest Hog (*Hylochoerus meinertzhageni*)
 - IUCN status: *Least Concern* (LC)
 - National status: *Endangered* (EN) due to limited occurrence records during the national assessment (MTWA, 2018).
2. Leopard (*Panthera pardus*)
 - IUCN status: *Near Threatened* (NT)
 - National status: *Vulnerable* (VU) (MTWA, 2018).
3. Chimpanzee (*Pan troglodytes*)
 - IUCN and national status: *Endangered* (EN).
 - Approximately 120 individuals, organized into at least six groups, are reported to range in Kaniyo-Pabidi, a key focus for tourism in the area.

The population sizes of the Giant Forest Hog and Leopard within the forest extension are unknown, making it difficult to ascertain the significance of Kaniyo-Pabidi for their conservation. In contrast, Kaniyo-Pabidi is a critical range for Chimpanzees, which likely extend into the broader Budongo Forest block, Murchison Falls National Park, and Rabongo Forest. The potential for other species of conservation concern to inhabit the project area exists but was not confirmed during this survey and is thus not emphasized.

4.4.5. Aviflora

According Byaruhnaga et al (2001) Budongo CFR is an Important Bird Area (IBA), due to two species of birds found in in the forest that are not found elsewhere in East Africa. The forest is the second most ecologically significant forest in Uganda, following Semliki National Park, primarily due to its role in conserving species associated with the Guinea Congo Forests biome (BirdLife International, 2021). Over the years, extensive surveys, including the well-documented work of the Wildlife Conservation Society (WCS), have contributed to the expanding list of documented species within the forest (Plumptre et al., 2007). Notably, *Muscicapa sethsmithi*, once common in mature forest, has become increasingly difficult to locate (BirdLife International, 2021). Similarly, *Illadopsis puvelli* has been recorded in Budongo as a recent addition, with no known occurrences elsewhere in East Africa (Carswell et al., 2005). Other species with restricted distribution in Uganda include *Ceratogymna fistulator*, *Smithornis rufolateralis*, *Ixonotus guttatus*, *Neafrapus*



cassini, *Sylvietta denti*, *Batis ituriensis*, and *Zoothera camaronensis* (Plumptre et al., 2007). Additionally, rare species such as *Pitta reichenowi* and *Parmoptila woodhousei* have been recorded in relevant ornithological surveys in the past. While Budongo qualifies as an Important Bird Area (IBA) based on two key biomes, it also supports species from the Afrotropical Highlands biome, including at least seven species of conservation concern (BirdLife International, 2021). Several tree species within the forest are of conservation concern, including *Cordia millenii*, *Irvingia gabonensis* (Near Threatened), *Milicia excelsa* (Near Threatened), and *Entandrophragma angolense* (Vulnerable) (IUCN, 2023). Threatened mammals found in Budongo include the Endangered chimpanzee (*Pan troglodytes*) and the African elephant (*Loxodonta africana*), though elephant sightings have been infrequent in recent years (Plumptre et al., 2010). The butterfly *Papilio antimachus*, classified as Data Deficient, has also been recorded in the forest (Larsen, 1991).

The NFA is responsible for managing Budongo CFR (NFA, 2022). Illegal pit-sawing posed a major threat to the ecosystem but has been largely mitigated through increased patrolling, benefit-sharing initiatives with local communities, collaboration with local authorities, and awareness programs (Mwavu & Witkowski, 2008). The forest is surrounded by a highly diverse cultural community, including people from the Democratic Republic of the Congo (DRC), some of whom traditionally consume bushmeat from various mammals. While there is no definitive evidence, such practices may pose a threat to key species, including *Pan troglodytes* and *Francolinus nahani* (Plumptre et al., 2010).

Historically, four sawmills depended on Budongo Forest for roundwood supply; however, they are no longer operational, removing a significant pressure on the forest ecosystem (NFA, 2022). Ecotourism, although underdeveloped, has strong potential to support conservation efforts, particularly in areas like the Royal Mile, recognized as Uganda's premier ornithological destination (Rossouw & Sacchi, 1998). In recent years, sugar plantations adjacent to the forest have promoted outgrower schemes, significantly altering species interactions due to the clearance of natural forest patches in the surrounding landscape. This land-use change has led to a clearer delineation between the protected reserve and the cultivated sugar fields, potentially influencing habitat connectivity and ecosystem dynamics (Mwavu & Witkowski, 2008).

4.4.5.1. Ornithological assessment methods

Literature review focussed on the ESIS's produced for infrastructural development and they include the following for which their information seem to be more recent accordingly:

- ESIS (2023). *Biodiversity Survey Report for the Proposed Construction of an Eco-Lodge in Budongo Central Forest Reserve*. Kampala, Uganda.
- ESIS (2023). *Environmental and Social Impact Statement (ESIS) for the Proposed Construction of Budongo Eco-Lodges in Budongo Central Forest Reserve within Murchison Falls National Park*. Kampala, Uganda.
- ESIS (2023). *Environmental and Social Impact Statement (ESIS) for the Proposed Construction of Budongo Eco-Lodges in Budongo Central Forest Reserve within Murchison Falls Protected Area*. Kampala, Uganda.



- ESIS (2017). *Environmental and Social Impact Statement (ESIS) for the Upgrade of Kisanja-Park Junction, Sambiya-Murchison Falls, Buliisa-Paraa, Paraa-Pakwach, Wanseko-Kasenye-Kirango-Bugungu Camp Roads, and Associated Bridges (169 km)*. Kampala, Uganda.

The methods used during the assessment included Timed Species Counts (TSCs) and Point Counts (PCs), which were conducted to cover the main habitats identified during the scoping phase. Each TSC was designed to record all birds observed within a habitat during a one-hour walk, aiming to document as many species as possible within that timeframe, following the approach outlined by Freeman et al. (2003). Species were listed in the order they were heard or seen, with time intervals recorded every ten minutes. Scores were then allocated, ranging from 6 for species recorded in the first ten minutes to 1 for those recorded in the last ten minutes.

While most identifications were made within the project area, Point Counts were positioned along environmental gradients, particularly in elevated areas within the project site. Each PC session lasted for 15 minutes. For improved accuracy in species identification, field guides such as Stevenson & Fanshawe (2002) and the bird atlas by Carswell et al. (2005) were occasionally consulted, with the latter indicating species' likelihood of occurrence in the area.

The TSC scores provided an indication of relative abundance, as referenced in Freeman et al. (2003) and Nalwanga et al. (2012). However, additional attributes were considered to assess the significance of habitats to various species. Some species were noted to be highly specialized, particularly those confined to forest interiors (Bennun et al., 2002), while others were associated with wetlands or grasslands habitats under threat in Uganda. Aerial feeders, such as swallows, were highlighted as a conservation concern due to their dependence on small flying insects, whose populations have been declining. Additionally, migratory species were considered, including Palearctic migrants from Northwest Asia and the Middle East, which either wintered in East Africa (e.g., Northern Wheatear) or passed through en route to other regions (e.g., Barn Swallows). Intra-African migrants, such as certain forest cuckoos, were also recorded. The assessment considered the importance of maintaining favorable conditions across multiple locations for migratory species, with presence and absence data systematically recorded.

The survey also accounted for rare and/or declining species that were red-listed at both global and regional levels, referencing the global conservation list as well as regional classifications by Bennun and Njoroge (1996).

4.4.5.2. Habitat Classification

Bird species were recorded and classified into habitat preference categories based on Bennun and Njoroge (1996), Wilson (2005), and Carswell et al. (2005). The following habitat classifications were used:

- **FF** – Forest specialist (species confined to forest interiors)
- **F** – Forest generalist (species occurring in small forest patches)
- **G** – Grassland species
- **f** – Forest visitors
- **W** – Water specialists (wetland specialists)



- **w** – Water non-specialists (wetland visitors)
- **Ae** – Aerial feeders
- **A** – Afro-tropical migrants (species migrating within Africa)
- **P** – Palearctic migrants (species breeding in Europe or Asia)
- **p** – Species with at least some Palearctic populations

4.4.5.3. Migratory Classifications

The likelihood of birds exhibiting migratory tendencies was assessed based on the Uganda Bird Atlas (Carswell et al., 2005), categorizing species into:

- Afro-tropical migrants
- Palearctic migrants

4.4.5.4. Conservation Status Assessment

All recorded birds were evaluated for conservation concerns using the MTWA (2018) criteria at both global and national levels, with regional conservation concerns referenced from Carswell et al. (2005). The species were categorized into:

- **CR** – Critical (Globally (G-CR) or Regionally (R-CR))
- **EN** – Endangered
- **VU** – Vulnerable
- **NT** – Near Threatened
- **RR** – Regional Responsibility

4.4.5.5. Avifaunal Summary of Results

A total of 39 bird species were recorded, representing approximately 8.4% of Budongo CFR's known avifauna and 4% of Uganda's total bird species. This is a significant tally given the limited survey effort. Of these, 14 species were recorded opportunistically outside the three TSCs (these are indicated with all zeroes in the Appendix). Species identification was based on expert taxonomic assessments and standardized behavioural recordings. Several species were consistently detected across all surveys, both within the TSCs and the PCs, often through their characteristic vocalizations. These included Tambourine Dove (*Turtur tympanistria*), Afep Pigeon (*Columba unicincta*), Dusky Long-tailed Cuckoo (*Cercococcyx mechowii*), African Emerald Cuckoo (*Chrysococcyx cupreus*), White-throated Bee-eater (*Merops albicollis*), Yellow-throated Tinkerbird (*Pogoniulus subsulphureus*), Little Grey Greenbul (*Andropadus gracilis*), Green Hylia (*Hylia prasina*), and Olive-green Camaroptera (*Camaroptera chloronota*), all of which are characteristic forest interior species recorded around the project site. The recorded species were determined to belong to the families of *Accipitridae*, *Phasianidae*, *Turnicidae*, *Rallidae*, *Columbidae*, *Cuculidae*, *Trogonidae*, *Meropidae*, *Bucerotidae*, *Capitonidae*, *Pycnonotidae*, *Turdidae*, *Sylviidae*, *Muscicapidae*, *Monarchidae*, *Nectariniidae*, *Malaconotidae*, *Sturnidae*, *Ploceidae*. These species were present throughout the survey period, with records spanning from November 2024 to January 2025.



As is typical for surveys of this nature, many species were recorded only once, reflecting the forest habitat dominance in detectability and habitat use.

4.4.5.6. Conservation Status of Recorded Birds Species

According to the survey results, a comprehensive list of bird species recorded during the assessment was compiled, including species classified under both national and global IUCN Red List assessments. Notably, all recorded species were classified as Least Concern (LC) according to the IUCN Red List criteria, as verified through both the BirdLife International Data Zone and the IUCN Red List database. This indicates that none of the observed species are currently at significant risk of extinction at either the national or global level.

4.4.6. Herpetofauna Assessment

4.4.6.1. Literature Review

A comprehensive review of existing literature was undertaken to gain insights into the ecological characteristics of the proposed TBCW project area in Kaniyo - Pabidi, with a specific focus on establishing baseline knowledge regarding herpetofauna species within the proposed project site. In addition to that this was supplemented by the field assessment, the herpetofauna specialist engaged in informal consultations with conservation personnel from the National Forestry Authority (NFA), specifically the Forest Rangers stationed at the Kaniyo Pabidi section of Budongo Central Forest Reserve. Given their continuous interaction with the forest ecosystem, the Rangers provided valuable insights into the herpetofauna species frequently encountered during routine patrols. These consultations were instrumental in supplementing field observations, particularly by identifying species that may not have been detected during the sampling period. Discussions focused on species occurrence, frequency of sightings, and morphological descriptions, contributing to a more comprehensive understanding of local herpetofaunal diversity.

4.4.6.2. Field Sampling

Field sampling was conducted in accordance with internationally recognized scientific methodologies and best practices, considering habitat characteristics and logistical considerations. The following standardized survey techniques, as outlined by Heyer et al. (1994), Fellers and Freel (1995), Halliday (1996), and Olson et al. (1997), were employed to assess herpetofaunal presence and distribution within and around the project infrastructure alignment:

- **Visual Encounter Surveys (VES):** This method involved systematic movement through the habitat while visually detecting and recording surface-active herpetofauna. Observations were supplemented by targeted searches under logs, within leaf litter, vegetation, and rock crevices. Identified species were recorded and, where feasible, photographed for further verification.
- **Audio Encounter Surveys (AES):** Amphibian species were identified through species-specific vocalizations, with particular attention to the advertisement calls of breeding males. The number and identity of calling individuals were documented to assess species composition and relative abundance.



- **Dip Netting:** Water bodies such as ponds, pools, and streams were sampled using dip nets to detect the presence of amphibians at various life stages, including adult individuals and tadpoles. All specimens encountered were recorded.
- **Opportunistic Encounters:** Additional herpetofauna observations were documented when species were encountered outside of structured survey efforts, thereby enhancing the dataset with incidental records.

Field surveys were conducted within a 500-meter radius of the proposed canopy walk alignment. Given park management regulations, all sampling activities were restricted to daylight hours. Species identification followed established taxonomic references, including Schiøtz (1975, 1999) and Stewart (1967) for reptiles, as well as Channing and Howell (2006) for amphibians.

Data analysis was undertaken through:

1. Compilation of a species checklist;
2. Assessment of species conservation status using the IUCN Red List (2019) and Uganda's National Red List (Wildlife Conservation Society, 2016); and
3. Critical habitat analysis to evaluate the ecological significance of the project area for herpetofaunal conservation.

4.4.6.3. Methodological Limitations

The study faced limitations related to the timing and seasonality of the survey. Due to park regulations restricting entry and exit beyond 19:00 hours for security and safety reasons, only diurnal surveys were conducted. Additionally, the survey was carried out exclusively during the dry season, which may have influenced species observations. The seasonal stream within the project area had dried up at the time of the study, potentially affecting the distribution of species reliant on water for survival and reproduction.

4.4.6.4. Herpes Results

4.4.6.4.1. Amphibians

No amphibian species were recorded by direct observation. Only one species, the Common African Toad (*Sclerophrys regularis*) was reported by a Tour guide. Amphibians are secretive creatures and they require ample time if a complete species list is to be compiled for any project area. They are also best studied at night. Because of security and safety reasons, the survey was limited to day time hours. No night surveys were undertaken because of the Uganda Wildlife Authority guideline of not being in the park by 19:00hours. Amphibians also have a dual life cycle and because of this fact, most of the amphibians are normally recorded in wet and moist areas. However, by the time of the field survey the seasonal streams were dry.

During literature review, the consultant came across two publications or reports of studies or surveys done in the project area. The studies however, were conducted in the Southern part of Budongo Forest Reserve, which is solely under NFA jurisdiction. The two studies did not include areas of Budongo Central Forest Reserve to the north of the Forest Reserve which are under duo management of NFA and UWA. The publications / reports indicate the occurrence of Thirty-Seven



(37) amphibian species in Budongo Central Forest Reserve. Lukwago *et al* (2020) examined the effect of logging on the amphibian communities in logged areas in Budongo Central Forest Reserve. In their study, Lukwago *et al* (2020) recorded a total of seven (7) amphibian species in logged areas of the Forest Reserve. BIOTA East African Biodiversity Project 2001–2004, documented a total of Thirty-Four (34) amphibian species in Budongo Central Forest Reserve. The species are shown in Appendix 7 of this report. Two species namely *Ameitia nutti* and *Sclerophrys pusilla* were only recorded by Lukwago *et al* in 2020. Five species including *Arthroleptis poecilonotus*, *Leptopelis christyi*, *Leptopelis kivuensis*, *Sclerophrys maculatus* and *Ptychadena anchietae* were recorded by both studies (Lukwago *et al* 2020 and Biota East Africa Biodiversity Project). Thirty (30) species were only recorded by Biota East Africa Biodiversity Project in 2001 - 2004). A full list is shown in Table 4-16 below.

There is no reason to suppose that many of the amphibians recorded by the two studies could not occur in the northern areas of Budongo Central Forest Reserve.

Table 4-16: Showing Amphibian Species

Family	Species Name	Red List Status	Study that Recorded It
Arthroleptidae	<i>Arthroleptis adolfifriederici</i>	Least Concern	Biota East Africa Project
Arthroleptidae	<i>Arthroleptis poecilonotus</i>	Least Concern	Biota East Africa Project & Lukwago <i>et al</i>
Arthroleptidae	<i>Arthroleptis poecilonotus</i>	Least Concern	Biota East Africa Project
Arthroleptidae	<i>Arthroleptis schubotzi</i>	Least Concern	Biota East Africa Project
Arthroleptidae	<i>Arthroleptis stenodactylus</i>	Least Concern	Biota East Africa Project
Arthroleptidae	<i>Leptopelis bocagii</i>	Least Concern	Biota East Africa Project
Arthroleptidae	<i>Leptopelis christyi</i>	Least Concern	Biota East Africa Project & Lukwago <i>et al</i>
Arthroleptidae	<i>Leptopelis kivuensis</i>	Least Concern	Biota East Africa Project & Lukwago <i>et al</i>
Arthroleptidae	<i>Leptopelis oryi</i>	Least Concern	Biota East Africa Project
Bufonidae	<i>Sclerophrys gutturalis</i>	Least Concern	Biota East Africa Project
Bufonidae	<i>Sclerophrys maculatus</i>	Least Concern	Biota East Africa Project & Lukwago <i>et al</i>
Bufonidae	<i>Sclerophrys pusilla</i>	Least Concern	Lukwago <i>et al</i>
Dicroglossidae	<i>Hoplobatrachus occipitalis</i>	Least Concern	Biota East Africa Project
Hemisotidae	<i>Hemisus marmoratus</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Afrixalus laevis</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Afrixalus osorioi</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Afrixalus quadrivittatus</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Hyperolius acuticeps</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Hyperolius balfouri</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Hyperolius cinnamomeoventris</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Hyperolius kivuensis</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Hyperolius langi</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Hyperolius lateralis</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Hyperolius viridiflavus</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Kassina senegalensis</i>	Least Concern	Biota East Africa Project
Hyperoliidae	<i>Phlyctimatis verrucosus</i>	Least Concern	Biota East Africa Project
Phrynobatrachidae	<i>Phrynobatrachus auritus</i>	Least Concern	Biota East Africa Project
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	Least Concern	Biota East Africa Project
Pipidae	<i>Xenopus laevis</i>	Least Concern	Biota East Africa Project
Pipidae	<i>Xenopus muelleri</i>	Least Concern	Biota East Africa Project



Family	Species Name	Red List Status	Study that Recorded It
Ptychadenidae	<i>Ptychadena anchietae</i>	Least Concern	Biota East Africa Project & Lukwago <i>et al</i>
Ptychadenidae	<i>Ptychadena</i> cf. <i>mascareniensis</i>	Least Concern	Biota East Africa Project
Ptychadenidae	<i>Ptychadena chrysogaster</i>	Least Concern	Biota East Africa Project
Ptychadenidae	<i>Ptychadena porosissima</i>	Least Concern	Biota East Africa Project
Ptychadenidae	<i>Ptychadena tellini</i>	Least Concern	Biota East Africa Project
Pyxicephalidae	<i>Ameitia nutti</i>	Least Concern	Lukwago <i>et al</i>
Pyxicephalidae	<i>Amietia angolensis</i>	Least Concern	Biota East African Project study

No species of conservation significance was registered during the two studies. All the species encountered are categorized as least concern according to 2023 IUCN Red List of threatened species. The IUCN regards the species as widespread and common over much of their range (Rödel, 2000). The Mascarene Rocket Frog *Ptychadena mascareniensis* is categorized as data deficient (DD) by the National Red List for Uganda (WCS 2016).

4.4.6.4.2. Reptiles

A total of seven reptiles were recorded in the project area as listed in the Table 4-17 below. Only two species were recorded by direct observation while others were reported by the NFA guides / rangers and the results were confirmed by literature.

Table 4-17: f reptiles recorded through direct and indirect means as well as literature review.

Family	Species name	Common name	IUCN conservation status.	Method of Identification
Boidae	<i>Python sebae</i>	African rock python	Least Concern (CITES appendix II listed)	Reported & Literature
Colubridae	<i>Boaedon fuliginosus</i>	Brown house snake	Least Concern	Reported & Literature
Colubridae	<i>Philothamnus semivariatus</i>	Spotted bush snake	Least Concern	Observed, Reported & Literature
Colubridae	<i>Philothamnus angolensis</i>	Angola green snake	Least Concern	Literature
Elapidae	<i>Naja subfulva</i>	Brown forest cobra	Least Concern	Reported & Literature
Viperidae	<i>Bitis arietans</i>	Puff adder	Least Concern	Reported
Scincidae	<i>Trachylepis maculilabris</i>	Speckle-lipped skink	Least Concern	Observed

None of the reptiles encountered and those reported by the guide are of conservation significance. All the species are listed as least concern by IUCN 2024 Red List of threatened species. The Central Africa Rock Python *Python sebae* is also listed under the Endangered Species Decree of 1985, meaning that international trade of the species is prohibited. The species is listed under CITES Appendix II (Branch 1998). However, in Uganda the species was down listed from Appendix II because the species is still abundant and wide spread in the Country.

4.4.7. Critical Habitat Assessment

This Critical Habitat Assessment (CHA) provides an assessment of proposed canopy walk at Kaniyo-Pabidi project area in order to establish / determine whether it qualifies to be identified as a critical habitat. The approach to this CHA followed the requirements of the International Finance Corporation (IFC), as set out in the IFC guidance notes: (IFC GN6, 2019) on Biodiversity Conservation and Sustainable Management of Living Natural Resources. The IFC PS6 / GN6



(2019) thresholds for determination of critical habitat were applied. The assessment is also based on the information provided in section 4 of this report.

4.4.7.1. Definition of Critical Habitat

Critical habitat is defined in Paragraph 16 of the 2012 version of IFC Performance Standard 6 (IFC PS6) as an area harbouring high biodiversity value. They are areas that are most significant and highest priority areas for biodiversity conservation. This includes areas that meet at least one or more of the following five main criteria:

- 1) Habitat of significance importance to globally or nationally Critically Endangered (CR) or Endangered (EN) species;
- 2) Habitat of significance importance to endemic and/or restricted-range species;
- 3) Habitat supporting globally significant concentrations of migratory and/or congregatory species;
- 4) Highly threatened and/or unique ecosystems; and
- 5) Areas associated with key evolutionary processes.

Critical habitat considers both global and national priority setting systems and builds on the conservation biology principles of 'vulnerability' (degree of threat) and 'irreplaceability' (rarity or uniqueness). Critical Habitat is a subset of natural or modified habitats. Paragraphs 11 and 13 of the IFC PS6 (2012) provide definitions for modified and natural habitats respectively:

Modified Habitats: Modified Habitats are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. Modified habitats may include areas managed for agriculture, forest plantations, reclaimed coastal zones, and reclaimed wetlands. PS6 applies to those areas of Modified Habitat that include significant biodiversity value, as determined by the risks and impacts identification process required in PS1.

Natural Habitats: Natural Habitats are defined by PS6 as "areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition." PS6 indicates that habitats affected by human activities are still considered Natural Habitats if they: "(a) have limited impact on the species composition or ecological function of the habitat; (b) form part of a long term pattern of traditional use, to which native species assemblages have adapted; (c) are no longer prevalent, and the habitat supports a mature and diverse community of predominantly native species; or (d) have not profoundly affected the habitats ability to recover its former ecological characteristics". It recognises that expert inputs may be required to determine whether the character and functions of the habitat remain essentially natural.



Under PS6, if Natural Habitats are identified as part of the assessment, the Project will seek to avoid adverse impacts, in accordance with the mitigation hierarchy. Where Natural Habitats have the potential to be adversely affected by the project, the Project will not implement any project related activities unless:

- 1) There are no technically and financially feasible alternatives; and
- 2) Appropriate mitigation measures are put in place, in accordance with the mitigation hierarchy, to achieve no net loss and, where feasible, preferably a net gain of biodiversity over the long term. When residual impacts remain despite best efforts to avoid, minimize and mitigate impacts, and where appropriate and supported by relevant stakeholders, mitigation measures may include biodiversity offsets adhering to the principle of “like-for like or better.”

However, as specified by GN56 of the IFC’s Guidance Note 6, the determination of critical habitat can include other recognised high biodiversity values which are to be evaluated on a case-by case basis. GN56 provides the following seven examples:

- Areas required for the reintroduction of CR or EN species and refuge sites for these species (habitat used during periods of stress (e.g. flood, drought or fire));
- Ecosystems of known special significance to EN or CR species for climate adaptation purposes;
- Concentrations of Vulnerable (VU) species in cases where there is uncertainty regarding the listing, and the actual status of the species may be EN or CR;
- Areas of primary/old-growth/pristine forests and/or other areas with especially high levels of species diversity;
- Landscape and ecological processes (e.g. water catchments, areas critical to erosion control, disturbance regimes (e.g. fire, flood)) required for maintaining critical habitat;
- Habitat necessary for the survival of keystone species; and
- Areas of high scientific value such as those containing concentrations of species new and/or little known to science.

Furthermore, GN57 states that in general, internationally and/or nationally recognised areas of high biodiversity value will likely qualify as critical habitat, including the following:

- Areas that meet the criteria of the IUCN’s Protected Area Management Categories Ia, Ib and II, although areas that meet criteria for Management Categories III-VI may also qualify depending on the biodiversity values inherent to those sites;
- UNESCO Natural World Heritage Sites that are recognised for their Global Outstanding Value;



- The majority of Key Biodiversity Areas (KBAs), which encompass inter alia Ramsar Sites, Important Bird Areas (IBA), Important Plant Areas (IPA) and Alliance for Zero Extinction Sites (AZE);
- Areas determined to be irreplaceable or of high priority/significance based on systematic conservation planning techniques carried out at the landscape and/or regional scale by governmental bodies, recognised academic institutions and/or other relevant qualified organisations (including internationally-recognised NGOs); and
- Areas identified by the client as High Conservation Value (HCV) using internationally recognised standards, where criteria used to designate such areas is consistent with the high biodiversity values listed in paragraph 16 of IFC PS6.

With IFC Guidance Note 6, projects can only be undertaken in Critical Habitat if a number of criteria are satisfied e.g. there are no other viable alternatives for the project in habitats of lesser biodiversity value; all national laws and international obligations of the host country’s approval for the project in or adjacent to the Critical Habitat has been complied with; there is no likelihood of measurable adverse impacts on the biodiversity values for which the Critical Habitat was designated; there is no anticipated net reduction in a population of any Critically Endangered, Endangered or restricted range species over a reasonable time period; the project will be designed to achieve a net gain of those biodiversity values for which the Critical Habitat was designated, and that a robust appropriately designed long term biodiversity monitoring and evaluation program is integrated in to the Borrower’s management program.

4.4.7.2. Critical Habitat threshold Values

Quantitative thresholds are provided in the IFC Guidance Note 6 (IFC 2019) to assign Critical Habitat into either Tier 1 or Tier 2 for Criteria 1-3. A threshold is a change that occurs, that may disrupt aspects of the species population, productivity, reproduction or habitat in response to a stressor. Both a Tier 1 and a Tier 2 habitat would qualify as critical but the likelihood of project investment in a Tier 1 habitat is generally considered to be substantially lower than in a Tier 2 habitat. The thresholds given by the IFC were obtained from globally standardized numerical thresholds published by the IUCN’s A Global Standard for the Identification of Key Biodiversity Areas and Red List Categories and Criteria (IUCN 2016). Table 4-18 below details the relevant thresholds used in the Critical Habitat assessment for this Project.

Table 4-18: Quantitative Thresholds for Tier 1 and Tier 2 for the different Criterion of Critical Habitat

Criterion	Tier 1	Tier 2
Criteria 1 Endangered or Critically Endangered (CR) Species	<p>(a) The Habitat must sustain ≥ 10 percent of the world population of a CR or EN species/subspecies when there are known and regular occurrences of the species and when such habitat could be considered a discrete management unit for that species.</p> <p>b) Habitat with known and regular occurrences of CR or EN species must correspond to one (1) of ten (10) or fewer discrete management sites worldwide for that species.</p>	<p>(c) Habitat contains the regular occurrence of a single individual of a CR species and/or is a habitat containing regionally important concentrations of a Red List EN species, therefore such habitat could be considered a discrete management unit for that species/subspecies.</p> <p>(d) Habitat is of significant importance for CR or EN species with a wide range and/or whose population distribution is not well known; therefore, the loss of</p>



Criterion	Tier 1	Tier 2
		such habitat could potentially affect the long-term survival of the species (e) It is a habitat containing significant concentrations at the national/regional level of individuals of one or more species included in a national/regional category EN, CR or equivalent
Criteria 2 Endemic species or restricted range species	(a) Habitat is known to sustain ≥ 95 percent of the world's population of a species endemic or restricted to certain areas; therefore, such a habitat could be considered a discrete management unit for that species (e.g. by having an endemic species in a single location).	(b) Habitat is known to sustain ≥ 1 percent but < 95 percent of the world's population of a species endemic or restricted to certain areas; therefore, this habitat could be considered a discrete management unit for that species, based on the available information and/or on the basis of expert judgment.
Criteria 3 Migratory/ congregating species	(a) Habitat is known to sustain, on a cyclical or regular basis, ≥ 95 per cent of the world's population of a migratory or congregating species at any point in its life cycle; that habitat could therefore be considered a discrete management unit for that species.	(b) Habitat known to sustain, on a cyclical or regular basis, ≥ 1 percent but < 95 percent of the world's population of a migratory species or that congregates at any point in its life cycle; therefore, such a habitat could be considered a discrete management unit for that species, where adequate data are available and/or on the basis of expert judgment. (c) Habitat that meets BirdLife International Criterion A4, for bird congregations, and/or Ramsar Criterion 5 or 6 to identify wetlands of international importance. (d) A provisional threshold $\geq 5\%$ of the world's population is set for species with large distributions but dense cores, for both terrestrial and marine species. (e) Places of origin of one or more species contributing ≥ 1 percent of the world's population.

Source: IFC Guidance Note, (IFC 2019).

As specified in PS6 Guidance Note No.62, the internationally agreed numerical thresholds are not yet sufficiently developed for Criteria Four (C4) and Five (C5). The principles of vulnerability and irreplaceability of ecosystems were therefore adopted based on the following aspects:

- Vulnerability is a temporary factor associated with the potential degradation of the ecosystem in response to anthropic impacts and threats.
- The irreplaceability of an ecosystem means the degree by which the loss of values of the ecosystem (whether functioning together or alone) at a site containing threatened or at-risk species or communities diminishes the ability of that species or community to survive.

The best available scientific information and expert opinion was used to guide decision-making for Criterion Four (C4) and Five (C5).



4.4.7.3. Unit of Analysis

The scale at which the critical habitat determination takes place depends on underlying ecological processes for the habitat and species in question and is not limited to the footprint of the Proposed Project. GN65 of IFC’s Guidance Note 6 states that for Criteria 1-3, the determination of critical habitat should be based on a “discrete management unit” (DMU) which is an area that has a definable boundary within which the biological communities have more in common with each other than they do with those outside the boundary. GN65 goes on to provide the following additional guidance on the selection of the DMU:

A discrete management unit may or may not have an actual management boundary (e.g. legally protected areas, World Heritage sites, KBAs, IBAs, community reserves) but could also be defined by some other sensible ecologically definable boundary (e.g. watershed, interfluvial zone, intact forest patch within patchy modified habitat, seagrass habitat, coral reef, concentrated upwelling area, etc.). The delineation of the management unit will depend on the species (and, at times, subspecies) of concern.

4.4.7.4. Project Area of Influence

The Project Area of Influence (AOI) is the spatial geographic area within which the majority of direct and indirect project impacts are anticipated to occur and considers impacts such as habitat loss (temporary and permanent), and hydrological changes and disturbance, including edge effects.

4.4.7.5. Key Biodiversity Areas

For projects in protected areas or regionally or internationally recognised areas (e.g. KBAs), IFC PS6 requires projects to ensure activities are consistent with the legal protection status and management objectives, consult relevant stakeholders and implement additional actions to enhance the conservation area aims and effective management. The IFC PS6 guidance also requires that where projects are located within or adjacent to internationally and/or nationally recognised areas of high biodiversity values, such as Key Biodiversity Areas (KBAs), which encompass Important Bird and Biodiversity Areas (IBAs), these should be mapped and also considered during the CHA.

4.4.7.6. Methodology to Critical Habitat Assessment

4.4.7.6.1. Criterion 1: Critically Endangered and / or Endangered Species

Section 4 on results of the survey, identifies threatened species that are or have the potential to be present within the proposed project area. This has been compiled with reference to the International Union for Conservation of Nature (IUCN) Red List of Threatened Species and the Regional and National Red List status for Uganda. The classification system used by the IUCN Red List for representing the extinction risk of species is presented in Table 4-18 above. Species classified as VU or above on the IUCN RL are often referred to as ‘threatened’ species.

Table 4-19: IUCN Categories of Extinction Risk

IUCN Category	Definition
Extinct in the Wild (EXW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range.
Critically Endangered (CR)	Species facing an extremely high risk of extinction in the wild.



IUCN Category	Definition
Endangered (EN)	Species facing a very high risk of extinction in the wild.
Vulnerable (VU)	Species facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Data Deficient (DD)	Inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status.
Least Concern (LC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

4.4.7.6.2. Criterion 2: Endemic and / or Restricted-Range Species

IFC’s Guidance Note 6 provides the following definitions for Endemic and restricted-range species as follows:

- Endemic species: defined as one that has $\geq 95\%$ of its global range inside the country or region of analysis.
- Restricted-range species:
 - For terrestrial vertebrates, a restricted-range species is defined as those species which have an extent of occurrence of 50,000 km² or less.
 - For marine systems, restricted-range species are provisionally being considered those with an extent of occurrence of 100,000 km² or less.
 - For freshwater systems, standardized thresholds have not been set at the global level. However, an IUCN study of African freshwater biodiversity applied thresholds of 20,000 km² for crabs, fish, and molluscs and 50,000 km² for odonates (dragonflies and damselflies). These can be taken as approximate guidance, although the extent to which they are applicable to other taxa and in other regions is not yet known.
 - For plants, restricted-range species may be listed as part of national legislation. Plants are more commonly referred to as “endemic,” and the definition provided in paragraph GN79 would apply.”

Species listed in section 4 (survey results) were screened to identify whether they meet the definition of either endemic or range-restricted species.

4.4.7.6.3. Criterion 3: Migratory and Congregatory Species

IFC Guidance Note 6 defines migratory and congregatory species as follows:

Migratory species: – “any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem).”

Congregatory species:

- “Species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis;
- Species that form colonies;



- Species that form colonies for breeding purposes and/or where large numbers of individuals of a species gather at the same time for non-breeding purposes (e.g., foraging, roosting);
- Species that move through bottleneck sites where significant numbers of individuals of a species pass over a concentrated period of time (e.g., during migration);
- Species with large but clumped distributions where a large number of individuals may be concentrated in a single or a few sites while the rest of the species is largely dispersed (e.g., wildebeest distributions); and
- Source populations where certain sites hold populations of species that make an inordinate contribution to recruitment of the species elsewhere (especially important for marine species).”

For birds, habitat that meets Birdlife International’s Criterion A4 for congregations and/or Ramsar Criteria 5 or 6 for Identifying Wetlands of International Importance meet the Tier 2 classification for critical habitat.

4.4.7.6.4. Criterion 4: Highly Threatened and / or Unique Ecosystems

IFC Guidance Note 6 defines highly threatened or unique ecosystems as:

- “at risk of significantly decreasing in area or quality;
- with a small spatial extent; and/or
- containing unique assemblages of species including assemblages or concentrations of biome-restricted species.”

A working group was established by IUCN to develop a system of quantitative categories and criteria, analogous to those used for species, for assigning levels of threat to ecosystems at local, regional, and global levels (IUCN, 2016). Ecosystems that fall within the Proposed Project Area and meet the definition of EN or CR according to IUCN (2016) are assumed to meet Criterion 4 for critical habitat. For many habitat types, data on distribution, quality and functioning are lacking. Table 4-20 shows the IUCN Ecosystem Red List criteria used in the habitats recorded in the project area qualify as critical habitats.

Table 4-20: Summary of IUCN Ecosystem Red List Criteria

Criterion	CR	EN
A: Reduction in geographic distribution EN	Reduction in geographic distribution of >80% in any 50 year time period.	Reduction in geographic distribution of >50% in any 50 year time period.
B: Restricted geographic distribution	EOO of <2000 km ² AOO <2 10x10 km grid cells	EOO of <20,000 km ² AOO <20 10x10 km grid cells
C: Environmental degradation	Reduction in an abiotic variable affecting more than 80% of ecosystem in 50 year time period	Reduction in an abiotic variable affecting more than 50% of ecosystem in 50 year time period
D: Disruption of biotic processes or interactions	Reduction in a biotic variable affecting more than 80% of ecosystem in 50 year time period.	Reduction in a biotic variable affecting more than 50% of ecosystem in 50 year time period
E: Quantitative analysis that estimates the probability of ecosystem collapse.	Quantitative analysis that estimates the probability of ecosystem collapse to be >50% in 50 years	Quantitative analysis that estimates the probability of ecosystem collapse to be >20% in 50 years.

4.4.7.6.5. Criterion 5: Key Evolutionary Processes



Evolutionary processes are often strongly influenced by structural attributes of a region, such as its topography, geology, soil and climate over a period of time. IFC Guidance Note 6 suggests that this criterion is defined by:

- “the physical features of a landscape that might be associated with particular evolutionary processes; and/or
- sub-populations of species that are phylogenetically or morphogenetically distinct and may be of special conservation concern given their distinct evolutionary history.”

For the purposes of this assessment, the Proposed Project Area has been screened against the following factors:

- Level of isolation (e.g. islands, mountaintops, lakes are associated with populations that are phylogenetically distinct);
- Extent of endemism (areas of high endemism often contain flora and/or fauna with unique evolutionary histories);
- Spatial heterogeneity;
- Presence of environmental gradients (ecotones produce transitional habitat which has been associated with the process of speciation and high species and genetic diversity);
- Edaphic interfaces; and Connectivity between habitats (e.g. biological corridors).

Criterion 5 is usually considered at a relatively fine scale (TBC and FFI, 2012) and thus the most appropriate unit of analysis is that which may potentially experience direct, primary impacts from the Proposed Project (i.e. the Proposed Project Area).

4.4.7.7. Determining whether Kaniyo-Pabidi is Critical Habitat

The aim of this section is to determine whether Kaniyo-Pabidi is a Critical Habitat. Three key steps were used to determine whether the project area is a Critical Habitat include the following:

- 1) Assembly and review of available information that was presented in section 4.
- 2) Screening of potential Critical Habitat qualifying species in the project area.
- 3) Confirming which biodiversity features qualify as Critical Habitat using IFC PS6 / GN6 thresholds.

4.4.7.7.1. Criteria 1: Critically Endangered and / or Endangered Species

(i) Amphibians

The project area is located in a region which is renowned for its distinctive and unique flora and fauna. The amphibian species recorded during the survey (section 4) were screened to identify species that are classified as Critically Endangered or Endangered. No species of amphibians were identified to be significant globally and nationally (Table 4-21 below).

Table 4-21: Identifying Amphibians recorded in the TBCW area



Scientific Name	IUCN Global Red List status	Regional/National Red List status	Presence in project area	Presence in Area of Influence	Tier	Critical Habitat Triggered?
<i>Arthroleptis adolfifriederici</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Arthroleptis poecilnotus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Arthroleptis poecilnotus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Arthroleptis schubotzi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Arthroleptis stenodactylus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Leptopelis bocagii</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Leptopelis christyi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Leptopelis kivuensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Leptopelis oryi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Sclerophrys gutturalis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Sclerophrys maculatus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Sclerophrys pusilla</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hoplobatrachus occipitalis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hemisis marmoratus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Afrixalus laevis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Afrixalus osorioi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Afrixalus quadrivittatus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius acuticeps</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No



Scientific Name	IUCN Global Red List status	Regional/National Red List status	Presence in project area	Presence in Area of Influence	Tier	Critical Habitat Triggered?
<i>Hyperolius balfouri</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius cinnamomeoventris</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius kivuensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius langi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius lateralis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius viridiflavus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Kassina senegalensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Phlyctimatis verrucosus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Phrynobatrachus auritus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Phrynobatrachus natalensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Xenopus laevis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Xenopus muelleri</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Ptychadena anchietae</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Ptychadena cf. mascareniensis</i>	Least Concern	Data Deficient	Form Literature review	Form Literature review	2	No
<i>Ptychadena chrysogaster</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Ptychadena porosissima</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Ptychadena tellini</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Ameitia nutti</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No



Scientific Name	IUCN Global Red List status	Regional/National Red List status	Presence in project area	Presence in Area of Influence	Tier of	Critical Habitat Triggered?
<i>Amietia angolensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No

(ii) Reptiles

The reptile species recorded during the survey were screened to identify species that are classified as Critically Endangered or Endangered. No species of amphibians were identified to be significant globally and nationally (Table 4-22 below).

Table 4-22: Reptile species recorded in the proposed TBCW Area

Scientific Name	Name	IUCN Global Red List status	Regional/National Red List status	Presence in project area	Presence in Area of Influence	Tier	Critical Habitat Triggered?
<i>Python sebae</i>	African rock python	Least Concern (CITES appendix II listed)	Least Concern (CITES appendix II listed)	Reported & Literature	Reported & Literature	2	No
<i>Boaedon fuliginosus</i>	Brown house snake	Least Concern	Least Concern	Reported & Literature	Reported & Literature	2	No
<i>Philothamnus semivariegatus</i>	Spotted bush snake	Least Concern	Least Concern	Observed, Reported & Literature	Observed, Reported & Literature	2	No
<i>Philothamnus angolensis</i>	Angola green snake	Least Concern	Least Concern	Literature	Literature	2	No
<i>Naja subfulva</i>	Brown forest cobra	Least Concern	Least Concern	Reported & Literature	Reported & Literature	2	No
<i>Bitis arietans</i>	Puff adder	Least Concern	Least Concern	Reported	Reported	2	No
<i>Trachylepis maculilabris</i>	Speckle-lipped skink	Least Concern	Least Concern	Observed	Observed	2	No

4.4.7.7.2. Criterion 2: Endemic and/or Restricted-Range Species

Amphibian and reptile species recorded during the survey of the proposed project area were screened to identify species that are classified as Endemic and/or Restricted-Range Species. No amphibian species nor reptile species were identified to be Endemic and/or Restricted-Range Species. Criterion 2 is therefore not triggered.

4.4.7.7.3. Criterion 3: Migratory and Congregatory Species

This Criterion applies more to birds than any other taxa. No migratory and congregatory amphibian and reptile species were recorded during the survey of the proposed project area (Section 4 results of the survey). Criterion 3 is therefore **not triggered**.



4.4.7.7.4. Criterion 4 Highly Threatened and/or Unique Ecosystems

The proposed Kaniyo-Pabidi canopy walk project area is located in a forest ecosystem. The forest ecosystem habitat contributes to the biodiversity and ecological richness of Budongo Central Forest Reserve. It is therefore important to consider the conservation and sustainable management of the habitat during the canopy walk construction operations to minimize the negative impacts on the local ecosystem.

IFC Guidance Note 6 defines highly threatened or unique ecosystems as:

- “at risk of significantly decreasing in area or quality;
- with a small spatial extent; and/or
- containing unique assemblages of species including assemblages or concentrations of biome-restricted species.”

The proposed Canopy Walk is located within or overlap two designated protected areas or internationally recognised key biodiversity areas (Budongo CFR and Murchison Falls Conservation Area) and therefore Paragraph 20 of criterion 4 would be triggered. The above protected areas fall within the proposed canopy walk project area footprint. However, using the quantitative categories and criteria developed by IUCN for assigning levels of threat to ecosystems at local, regional, and global levels (IUCN, 2016), information / data on the above habitat types including data on distribution, quality and functioning are lacking and criterion 4 is not triggered (Table 4-23 below).

Table 4-23: Screening of Criterion Indicating Highly Threatened and/or Unique Ecosystems

Criterion Indicating Highly Threatened and/or Unique Ecosystems	Remarks	Critical Habitat Triggered?
A: Reduction in geographic distribution	The habitats have not yet suffered high rates of decline, but have not likely declined by 50% or more during across the whole of its geographic range in the next 50 years time period.	No
B: Restricted geographic distribution	More than 20,000 km ² of the identified habitats exist in the region.	No
C: Environmental degradation	Some parts of the habitats are being used by local residents for agriculture. But this has not yet gone to the extent of causing reduction in a biotic variable affecting more than 50% of ecosystem in 50-year time period.	No
D: Disruption of biotic processes or interactions	No data exists to quantify biotic degradation. It is unlikely that disruption of biotic processes of the identified habitats would occur to an extent of causing reduction in a biotic variable affecting more than 50% of ecosystem in 50 year time period	No
E: Quantitative analysis that estimates the probability of ecosystem collapse.	There is no data to conduct a quantitative analysis to estimate the probability of ecosystem collapse over the next 50 years. However, it is	No



	considered unlikely that there will be a 20% or higher probability that the ecosystem would collapse within the next 50 years.	
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Criterion 4 is therefore not triggered as a Critical Habitat on the basis of a Highly Threatened and/or Unique Ecosystems.

4.4.7.7.5. Criterion 5: Key Evolutionary Processes

This criterion is defined by the physical features of a landscape that might be associated with particular evolutionary processes, and/or subpopulations of species that are phylogenetically or morphogenetically distinct and may be of special conservation concern given their distinct evolutionary history (IFC 2012b, paragraph GN95).

The importance of the proposed project area from an evolutionary perspective was assessed by screening its features against factors that indicate importance for evolutionary processes. Table 4-24 below details the factors considered likely to indicate importance for evolutionary processes and their relevance to the proposed project area. In summary, there is no indication that the proposed project area is important for evolutionary processes and therefore critical habitat is not triggered under Criterion 5 of IFC PS6.

Table 4-24: Screening of Criterion Indicating Importance for Evolutionary Processes

Criterion Indicating Importance for Evolutionary Processes	Relevance to Proposed Project Area	Critical Habitat Triggered?
Level of isolation (e.g., islands, mountaintops, lakes are associated with populations that are phylogenetically distinct)	The Proposed Project Area lacks the extreme topography required to isolate populations.	No
Extent of endemism (Areas of high endemism often contain flora and/or fauna with unique evolutionary histories)	Budongo Central Forest Reserve and Murchison Falls Conservation area are well known for hosting a high number and concentration of animals in Uganda. However, its not known having unique evolutionary histories.	No
Spatial heterogeneity	The habitats present in the proposed project area are relatively homogenous.	No
Presence of environmental gradients (ecotones produce transitional habitat which has been associated with the process of speciation and high species and genetic diversity)	The habitats present in the Proposed Project Area are relatively homogenous and lack marked ecotones that could drive evolutionary processes.	No
Edaphic interfaces	The habitats present in the Proposed Project Area are relatively homogenous to that in the region and lack marked edaphic interfaces that could drive evolutionary processes.	No
Connectivity between habitats (e.g. biological corridors).	The habitats within the Proposed Project Area do not provide significant connectivity between other nearby habitats known to be of evolutionary importance.	No

4.4.7.7.6. Criterion 6: Internationally and/or Nationally Recognised Areas

The proposed project area lies within two internationally and /or nationally recognized areas. The two are a designated Central Forest Reserve (Budongo CFR) and a designated conservation area



(Murchison Falls Conservation Area). The two are well known for their high floral and faunal biodiversity. Criterion 6 is therefore triggered on the basis of internationally and / or nationally recognized areas.

4.4.8. IFC PS6 related separation of habitat types

The 2019 IFC Performance Standard (PS) 6 Guidance Note (GN) 26 provides an extensive definition of habitats, including marine and freshwater aquatic regions as well as airspaces. This broad definition contrasts with the traditional ecological view of habitat as the specific location or environment where an organism or population typically lives. Within the framework of development projects, IFC PS6 distinguishes between natural and modified habitats as a preliminary measure to evaluate potential threats within a given landscape.

The IFC PS6 categorizes habitats into modified, natural, and critical based on the biodiversity value assigned to species, ecosystems, and ecological processes. As part of the risk and impact assessment process, IFC PS6 requires developers to create and present a map showing the modified, natural, and/or critical habitats within the project's area of influence to determine the relevance of Performance Standard 6 as provided in Figure 4.11 below. Practically, natural and modified habitats exist on a continuum, from untouched, pristine natural habitats to heavily managed modified habitats. In reality, project sites are frequently located within a mosaic of habitats with varying degrees of human and/or natural disturbance.

Vegetation change characterization of Budongo Central Forest Reserve

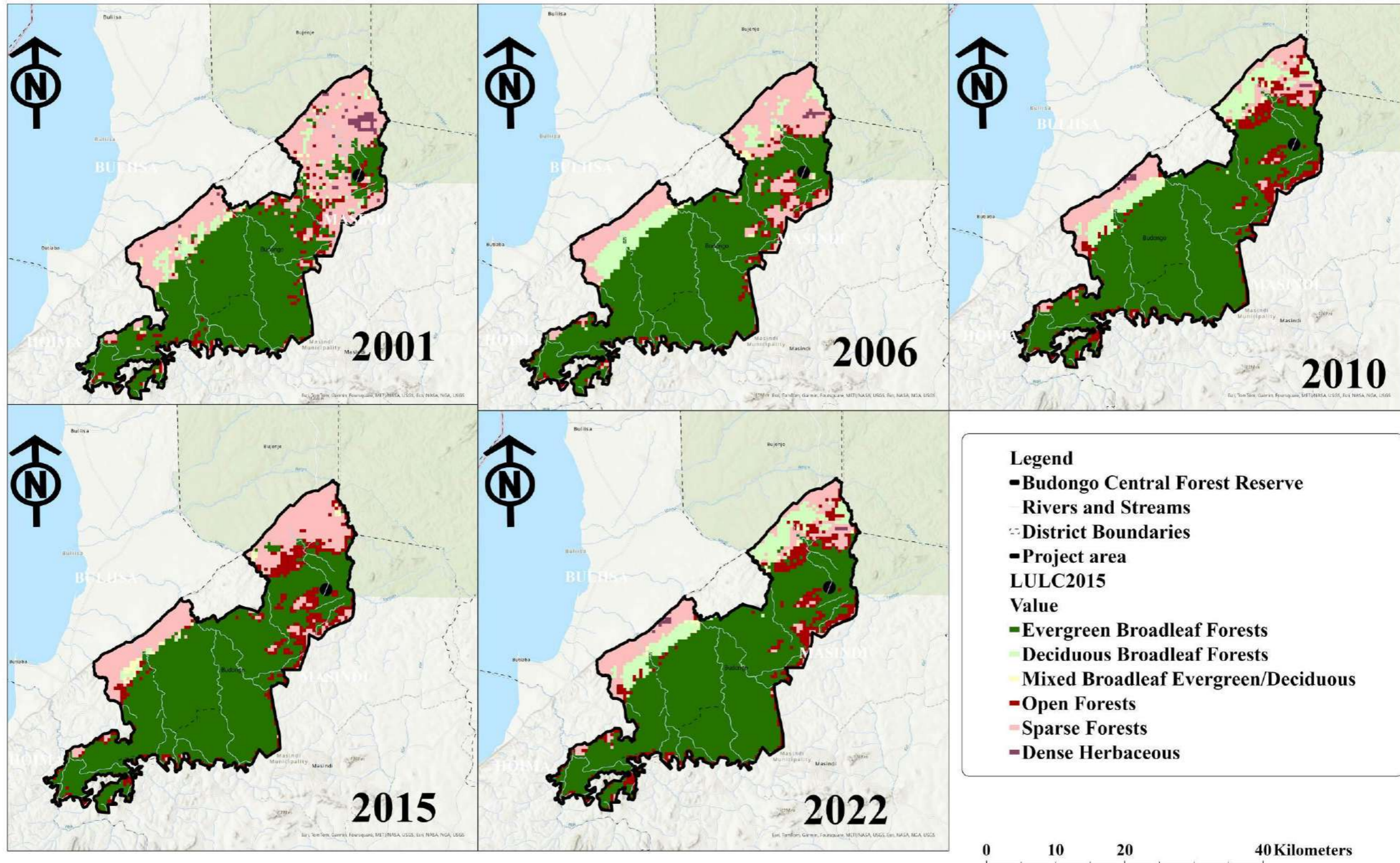


Figure 4-11: Illustration of the Transition period of forest recovery (between 2001 – 2022)



In this case the clients bear the responsibility of accurately delineating the project site in terms of modified and natural habitat. This determination is based on the degree of human-induced disturbance (e.g., presence of invasive species, pollution levels, extent of habitat fragmentation, viability of existing naturally-occurring species assemblages, resemblance of existing ecosystem functionality and structure to historical conditions, degree of other types of habitat degradation, etc.) and the biodiversity values of the site (e.g., threatened species and ecosystems, culturally significant biodiversity features, ecological processes essential for maintaining nearby critical habitats).

The IFC stipulates that the identification of natural habitat should rely on credible scientific analysis utilizing the best available information. This involves assessing and comparing current and historical conditions, incorporating local knowledge and experience. In cases where natural habitats are suspected, a comprehensive map indicating the location and extent of both natural and modified habitats should be part of the risks and impacts assessment. It's important to note that natural habitats should not be assumed to be untouched or pristine; rather, the majority of designated natural habitats likely have experienced some level of historical or recent anthropogenic impact. The key consideration is the degree of impact. If, in the professional judgment of a competent expert, a habitat still predominantly possesses the principal characteristics and functions of a native ecosystem(s), it should be classified as a natural habitat, regardless of some level of degradation, the presence of invasive alien species, secondary forest, human habitation, or other human-induced alterations.

On the other hand, modified habitats are areas that may have a significant proportion of plant and/or animal species of non-native origin or where human activity has substantially altered the area's primary ecological functions and species composition. Examples of modified habitats include areas managed for agriculture, forest plantations, reclaimed coastal zones, and reclaimed wetlands.

Critical habitats are characterized by high biodiversity value, encompassing (i) habitat significantly important to Critically Endangered and/or Endangered species; (ii) habitat of significance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

In line with the IFC definition and considering the linearly proposed 464m TBCW, a credible analysis has been conducted to differentiate between natural and modified habitats. This analysis, appropriate for TBCW development, was based on observed transitions of Budongo CFR for the past two decades. The interpretation was further supported by floral and faunal surveys within and adjacent to the proposed TBCW alignment. Although certain species were identified, it's likely that the fauna, such as mammals and birds, may not be actively using the habitat within the proposed development area. The entire Budongo CFR due to mammalian composition which includes Chimpanzees (*Pan troglodytes*) that is Critically Endangered triggers the forest to be critical habitat, which is already protected under the duo management between UWA and NFA plus other wildlife and environmental laws which have been included in chapter 3 of the report areas affected by the TBCW. It is important to note that, despite the proposal of 464m linearly project the it is a small portion to cause a significant impact on forest biodiversity compared to the are totalling to 82,530ha of coverage.



In the baseline biodiversity studies conducted, the both floral and faunal species of IUCN concern were encountered where possible counted the numbers present in that moment including any activity or behaviour, including some that are currently or may in the future be classified as threatened by the IUCN. This assessment confirms that Budongo CFR is still under the protection management and hence species confirmed therein are protected in the same enabling environment of establishment that trigger the Critical Habitat Classification under the IFC Performance Standard 6 in Budongo CFR. As a precaution, the assessment considered species with IUCN statuses such as Vulnerable, Endangered, Critically Endangered, etc. It also examines species with "questionable" statuses due to potential range extensions or the possibility of them being new to science, following Guidance Notes 79, 89, 90, 94, and 96 of IFC PS6 for further investigation.

According to IFC Performance Standard 6 (PS6), it is crucial to document the presence of potential Critical Habitat Classification trigger species and to spatially represent the key habitats for these species. IFC PS6 Guidance Note (GN) 77 specifies that if estimates of a species' global or local population are not available, expert opinion should be used to assess the significance of the management unit in relation to the global population. Measures such as extent of occurrence, total area of known sites, and area of occupied habitat are essential for this assessment. The information that benchmarks the status of IFC - PS6 in Uganda such as NEMA (2022), National Guidelines for Biodiversity and Social Offsets; MTWA (2018). *Red List of Threatened Species of Uganda 2018*, Ministry of Wildlife, Tourism and Antiquities (MTWA) Kampala; WCS 2016 Report: National Red List for Uganda for the following Taxa: Mammals, Birds, Reptiles, Amphibians, Butterflies, Dragonflies and Vascular Plants; Nationally Threatened Species for Uganda, the current NBSAP were reviewed.

Furthermore, GN 65 of IFC PS6 defines a discrete management unit as an area with a defined boundary where biological communities or management issues are more homogeneous compared to adjacent areas. This unit may not have a formal management boundary but could be defined by ecologically relevant features such as watersheds, forest patches, or coral reefs. The delineation of this unit depends on the species or subspecies of concern. For the case of this project only HFCV of Budongo CFR was considered respectively as there is no any other form of management recognised along the TBCW. Support text to GN 77 provides that the extent of occurrence is the smallest continuous boundary that can encompass all known, inferred, or projected sites of a species, excluding vagrancy. It is often measured using a minimum convex polygon, which includes all sites without internal angles exceeding 180 degrees.

Therefore, species or habitat features that might trigger a Critical Habitat Classification under IFC PS6 need to be mapped in a defensible manner. The recommended approach is to use the "extent of occurrence" to define Discrete Management Units (DMUs) within the area of concern for which were not recorded during the assessment along the 135km linearly infrastructure. Nevertheless, the likelihood of occurrence for species, including terrestrial mammals, aquatic birds, amphibians, and



reptiles, was evaluated based on their spatial habitat use across the entire area. Mammalian and herpetofaunal guilds were not included in this assessment.

The project area was analysed for the critical habitat relevance. A monotony of forest interior habitat type, was the only one that qualifies. The forest encompasses forest hard woody trees as described in the landscape and no any other description was added to explain about the habitat. The use of natural resources within the landscape was described during the engagement meetings of stakeholders recorded for the project's biodiversity baseline assessment, but the impact of the proposed TBCW was not specifically considered. The assessment acknowledged that local communities rely on biodiversity and natural resource provisioning.

No formal degradation assessment was conducted; however, it was noted that the Kaniyo Pabidi landscape improved after production stopped during the Forest Department to go back to colonial times management. The assessment considered the total recovery to 100% canopy closure features and the system's ability to recover was confirmed without changes in the current management that would trigger disturbances over time.

4.5. Socio-Economic Environment

4.5.1. Social survey approach

The survey used both stakeholder engagements and data collection tool to gather social information necessary for the social economic baseline within the project area. A well-designed questionnaire was developed to cover a range of socioeconomic aspects. The social team utilised the questionnaire to gather information on land use, community livelihood, access to water, health services and education, tourism, transport and communication within Kigaragara and Kasenyi villages in Labongo sub county Masindi District. The selection of the samples was based on random selection, which facilitated the collection of both qualitative and quantitative data.

Kasenyi and Kigaragara villages were selected for the survey due to their active participation in the ongoing community tourism initiatives and programs, and also presence of Community Based Organisation and associations that are involved in building capacity for the community in benefiting from tourism development activities.

The survey data collected was analysed to inform impact prediction, mitigation measures, and stakeholder engagement strategies. The findings of the social surveys area discussed in the below sections.

4.5.2. Administrative setup

Masindi District in terms of political authority, is headed by the District Local Council 5 together with the District Council representatives across different genders. Under the district there are chairpersons' local council 3, at the sub-county level, Parish Chief in each sub-county, and chairpersons' local council 1. In terms of security, the Resident District Commissioner who doubles as the Head of Security, and representative of the president in the district. The district technical wing has 12 departments under the management of the Chief Administrative Officer. Masindi District has two



counties, with one Municipality, Ten (10) Rural Sub-counties and Four (4) Town Councils. The district constitutes of Forty -six (46) Parishes, and Three hundred and twenty-five (325) Village Councils. In terms of project location, the proposed facility is to be established in Bujunje County, Budongo Sub-county, Masindi District as summarized in Table 4.25 below.

Table 4-25: Number of Administrative Units by County

Counties	Sub Counties	Number of Parishes	Number of Villages
Buruli	Kimengo	2	10
	Pakanyi	4	39
	Miirya	3	28
	Kijunjubwa	3	13
	Kyatiri TC	2	17
	Labongo	4	35
Bujunje	Budongo	4	30
	Bwijanga	3	37
	Kabango TC	3	17
	Bikonzi	4	40
	Bulima TC	3	19
Total		35	285

Source: Planning unit office 2023

The project site is located within Budongo Forest accessed through Kichumbanyobo gate which is located in Labongo sub-county within Kasenyi Parish while some of the villages bordering the forest in relation to the project site are Kigaragara (6km) and Kasenyi (7km).

4.5.3. Human Population and Demographics

Uganda’s population stands at 45.9m people with average household size of 4.4 people per household and a total of 10,845,119 million households (UBOS, 2024). According to census 2024, Masindi district has an average population growth rate of 1.7 which is below the 3.3 growth rate of Bunyoro region. Masindi has an estimated population of 342,496 people with 170,972 males and 171,524 females and about 340,271 households in the district (NHPC, 2024).

The UBOS 2014 NHPC results indicated that Masindi district had a population of 64,820 people, while the years 2015 to 2020 the population was projected as follows respectively, 66,300, 68,200, 70,100, 72,100, 74,100 and 76,100 people (UBOS, 2020).

4.5.3.1. Ethnicity

Masindi District in Uganda is home to many ethnic groups, including: Banyoro: The dominant tribe, along with the Bagungu, making up about 59.9% of the population. The Banyoro are part of the Bantu ethnic group and speak Runyoro.

- Alur, Jonam, and Aringa: Make up 5.3% of the population.
- Baruli: Make up 4.5% of the population.
- Ma'di: An immigrant population from the West Nile districts of Nebbi and Arua. The Ma'di are part of the Sudanic ethnic group.



Other ethnic groups include people from Rwanda, Kenya, South Sudan, and the Democratic Republic of the Congo have also settled in the district. Masindi District is known for its ethnic diversity and is considered a melting pot of cultures.

The area is known for hosting various migrants from other parts of the country. Results from the household survey indicates that 13.9% of the household had migrated from other parts of the country as illustrated in Table 4-26 below.

Table 4-26: Migrant Status of Household Head

Status	Frequency	Percent (%)
Native	59	81.9
Migrant	10	13.9
Valid Total	69	95.8
Missing (No Response)	3	4.2
Total	72	100.0

In addition, the result of the survey indicated that Banyoro as the main ethnic tribe within the project area at about 34.7%. The survey indicated that some ethnic tribe consider themselves vulnerable within the area and about 47.1 could not reveal their tribe. According to the stakeholder consultations with the Local Council 1 office in areas, there are about 253 people in Kasenyi and 133 people in Kigaragara respectively.

Table 4-27: Ethnic Tribes near the project area

Tribe	Frequency	Percent (%)
Mutoro	6	8.3
Acholi	1	1.4
Kakwa	1	1.4
Langi	1	1.4
Mukiga	1	1.4
Mulugwara	1	1.4
Mululu	1	1.4
Munyankole	1	1.4
Muruli	1	1.4
Okebu	1	1.4
Lugbara	1	1.4
Alur	1	1.4
Munyoro	25	34.7
Valid Total	42	58.3
Missing (No Response)	30	41.7
Total	72	100.0

From the results of the survey, the proponent should liaise with the local council 1 and the Kasenyi Community Tourism Association to ensure that there no discrimination against any tribes during the project implementation. All the minority groups surveyed in this study shall be given equal opportunities in employment.



4.5.4. Land Use and Tenure

Masindi District covers an area of 3,927.4 Sq kms of which 1,139.4 Sq kms is Game Park (National Park and Wildlife reserve), 818.9 Sq kms is covered by forests, 2,271 Sq. Kms is dry land and 517.1 Sq.kms is the area covered by water (MDLG, 2020).

The district has four forms of land tenure below:

- leasehold,
- lubinja- a customary tenure characterized by bonafide occupancy
- customary tenure characterized by bonafide occupancy and customary ownership, and;
- freehold.

The prevalent land use in the district is a mix of subsistence farmland, settlement, forest reserves, wetlands and grassland. Due to hilly terrain, denser settlement and cultivated land is comparatively more in valleys than on hillsides.

From the field survey, the community used its land for subsistence farming, and housing.

4.5.4.1. Land Tenure

BCFR is public land managed by the National Forest Authority. According to the results of the survey, freehold is the dominant land tenure system followed by customary as illustrated in Figure 4-12 below.

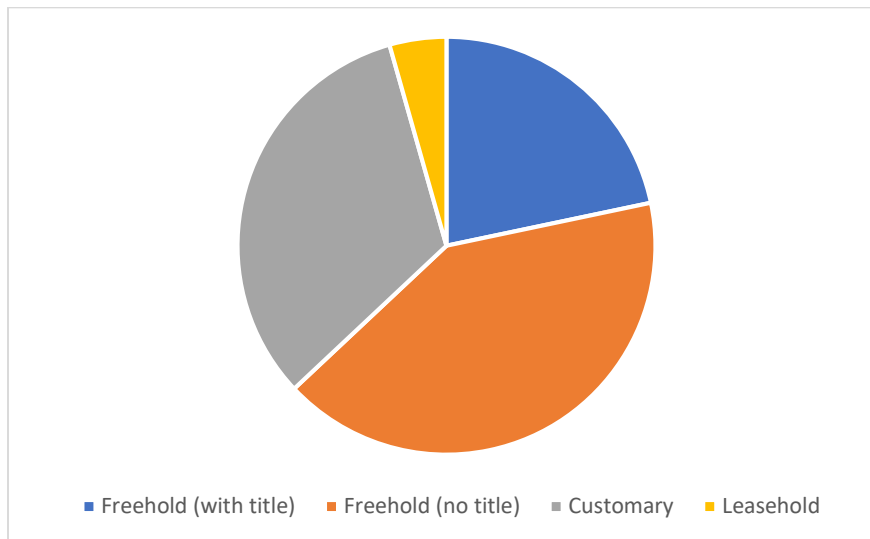


Figure 4-12: Land Tenure for homesteads around the forest

Results have shown that the land size within the community’s adjacent BCFR range from 0,25 to 19 acres. It was established that 63.9% of the households surrounding the forest own the land on which they settle/use as indicated in the Table 4-28 below.

Table 4-28: Households Owning Land



Response	Frequency
Yes	46
No	21
Valid Total	67
Missing (No Response)	5
Total	72

It is also important to note that the communities are mobilised and trained to utilise their land and grow food that can be consumed by tourists in Budongo Forest. Results have shown that the land size within the adjacent community ranges from 0,25 to 19 acres. It was established that 63.9% of the households adjacent to the project area owned land as shown in Table 4-29 below.

Table 4-29: Households Owning Land

Response	Frequency	Percent (%)
Yes	46	63.9
No	21	29.2
Valid Total	67	93.1
Missing (No Response)	5	6.9
Total	72	100.0

It is also important that the communities are mobilised and trained to utilise their land and grow food that can be consumed by tourists in Budongo Forest.

4.5.5. Livelihood Sources

According to the Masindi District Development Plan (2020), the district is entirely an Agricultural District that thrives greatly on food and livestock production. The people solely rely on farming as the major economic activity. Food Crops produced include, cassava, bananas, sweet potatoes, beans, maize among others and the major cash crops grown are coffee, cocoa and key to note Sugar cane production has been taken on as a major economic activity where this has taken on most of the land area coverage in the District and has had an effect on food production. Masindi is the largest maize producing district in the country producing approximately 21,000 tonnes annually. Pakanyi Sub County produces the largest quantity of maize in the District.

Cattle Rearing is majorly practiced in the Sub Counties of Kimengo and some parts of Bwijanga. This being a cattle corridor, farmers have been availed with valley dams though still a few with the intention of ensuring cattle accesses water and for value addition milk processing plants have been put in place to encourage farmers to produce in bulk and access the wider markets (MDLG, 2020).

However, the household survey dwelt much in Kasenyi and Kigaragara in Labongo Sub County and results show that about 61.1 % of the households are engaged in subsistence farming which is a major livelihood activity within the community near the project area. (as shown in Table 4-30 below). It was found out that there was some community agricultural produce that can be bought by the operators of the tourism facilities in Budongo such as Honey and non-agricultural products such as handcraft.

Table 4-30: Livelihood sources within the project area

Livelihood Activity	Frequency	Percent (%)
---------------------	-----------	-------------



Subsistence farming	44	61.1
Commercial farming	15	20.8
Livestock keeping	2	2.8
Trading/Business	4	5.6
Valid Total	65	90.3
Missing (No Response)	7	9.7
Total	72	100.0

The communities grow potatoes, bananas, cassava, maize as we observed in some of their gardens in Kigaragara village. None of the livelihood sources will be affected negatively, its anticipated that the local community will gain positively through sell of their produce to the tourists who will visit the canopy walk.



Figure 4-13: Community farms

4.5.6. Tourism

Kaniyo Papidi is located in the Mid-western part of Uganda approximately 222 Kms from the capital Kampala, in Masindi district. Masindi is one of the tourist destinations in Uganda, receiving quite a huge number of tourists both local, and those from across borders. Currently, the District receives a significant number of tourists a year mainly for leisure, recreation, holidays, Agro tourism tours, faith tours, and others for business. Masindi District is the gateway point to Murchison Falls National Park, the biggest and oldest Park in Uganda. Kichumbanyobo gate is the most preferred and used entrance to the Park. The other tourist attractions are The Royal Mile Budongo Forest, Nyankunyu hills, the district/Bunyoro Historical experience, cultural tourism (MDLG, 2022).

Visitor Numbers and Revenue Collections at Kaniyo Pabidi. The information below illustrates the Quarter 1(July- September 2024) summary of tourist records at Kaniyo Pabidi ecotourism site with tourist activities (Refer to Appendix 9 for Statistics on Tourist Visits)

In terms of community benefits, there is Kasenyi Community Tourism Association (KCTA) which is engaged in mobilizing communities in bee keeping and producing honey, simple traditional handcraft, traditional dance, and cooking local food, and mobilizing labour force required by the facility operators in Budongo ecological forest.

Results from the engagement with the KCTA indicated that Kasenyi and Kigaragara communities received a total of 150 tourists in 2024 with 115 foreigners and 35 locals. With the establishment of the new tourism product, the number is expected to increase.



4.5.7. Community Tourism Programs

There is potential for the district to grow economically, socially and politically if the tourism products are well developed and promoted through efficient and effective investment in the industry. Realizing the contributions of the tourism industry requires initial investment in the industry especially in activities where the local population can be fully engaged. According to Masindi district tourism profile, there is a program for the communities to participate in the programs such as culture and community Tourism. Under culture, there is a lot of potential like traditional wear, traditional dancing, idioms and totems among others, despite being under developed and slowly being eroded. These programs will enhance community tourism and through collaboration with the proposed establishment such as Nature walk canopy.

As presented in 4-31 below, result of the survey found 27.8% of the community was aware of the tourism activities in Kaniyo Pabidi, and 72.2% of the community, expect increased tourism activities in the area. Table 4-32 below indicates the various tourism activities that the community is engaged in the Kaniyo Pabidi forest. It is likely, the activities will increase the tourism benefits to the community.

Table 4-31: Tourism Activities for Community Engagement in Kaniyo Padibi Area

Tourism Activity	Frequency	Percent (%)
Conserve the forest	11	15.3
Bee keeping	7	9.7
Planting trees	12	16.7
People will be employed	10	13.9
Craft making and selling	23	31.9
Traditional dancing	9	12.5

Table 4-32: Community Tourism Awareness

Response	Frequency	Percent (%)
Chimpanzee trekking	26	36.1
Bird watching	7	9.7
Crafts making and selling	20	27.8
Nature walks	3	4.2
Cultural walks	3	4.2
Valid Total	60	83.3
Missing	12	16.7
Total	72	100.0

The different tourists' products will complement and be complemented by the proposed canopy walk, ie adding onto the tourism experience in the district.

4.5.8. Human Wildlife Conflict

Crop raiding is a form of human-wildlife conflict that exist in the form of livestock According to (Grace et al., 2023) wild animals move from their habitats to attack human crops due to the reduction of food supplies in the wild, the loss of their natural habitats, and the presence of preferred crops near their habitats. depredation, property damage, and human injury worldwide (Kilama Luwa et al., 2021).



As shown in Table 4-33 below, results from the stakeholder engagements indicated that the issue of human wildlife conflict is eminent within the communities adjacent to Budongo forest. According to the engagement held with Masindi District Local Government, it was recommended that the communities be involved in the project to have a sense of belongingness. It was raised that the human wildlife conflict can be managed if community engagements are regularly conducted, communities are sensitized on the co-existence with the wildlife. In addition, the district recommended NFA and UWA to put in place an electric fence as a mitigation measure to end the conflict.

In terms of benefits, local communities need to understand why wildlife can destroy their crops and properties and co-exist together. Through stakeholder engagement, it mentioned that the authorities in charge of wildlife should support the communities to establish roadside markets for their produce such that people should have product diversification not entirely depending on agricultural produce only.

In addition, NFA explained that the communities should understand the reporting procedures and report cases to UWA for action. Throughout the engagement the issue continued to surface and the communities seemed not have mitigation measures apart from confronting the wildlife. However, they proposed that UWA should have a program of scaring the Baboons. In terms of reporting and resolving the conflict, there is a need for grievance redress mechanism to manage the conflict arising from the community. Such grievance committee should have local leader, Community Based Organisation working in the area, Authorities UWA, and NFA. To mention is also the community involvement in the tourism activities

Results from the survey show that Baboons animal dominate other wildlife in terms of visiting their community crops and homes at rate of 45.1% and monkeys at 34.4%. This has high impact on the household agricultural produce as well as community livelihood.

Table 4-33: Wildlife animals visiting the community gardens

Response	Frequency	Percent (%)
Elephants	4	6.3
Chimpanzee	15	23.4
Monkeys	22	34.4
Baboons	29	45.3
Total	64	100.0

In addition, the survey results on the best practices of managing human wildlife conflict, 25% of the community believes that electric fence is the better option in keeping the wildlife in their habitat as indicated in Table 4-34. However, there is need for proper engagement to steer co-existence between humans and wildlife.

Table 4-34: Community Recommendation on Human Wildlife Conflict

Response	Frequency	Percent (%)
Electric fence (including electric fences, electric wire, and electric fence construction)	18	25.0



Build trenches on the boundaries (including dig a trench, digging trenches, and trenches)	4	5.6
Community engagement and awareness (including communicating more on wild animals, concentrating awareness, creating awareness, educating people on the uses, education of people, supporting local communities, and supporting locals)	7	9.7
Guarding and guides (including constant guarding, employing guides, and guiding them)	3	4.2
Cooperation between community and forest	1	1.4
Fencing (including fence, fence the park, and fencing)	7	9.7
Government intervention (including government should come in and government should intervene)	2	2.8
Guarding the animals	1	1.4
Increased security (including more security for animals)	2	2.8
Make a fence	1	1.4
Protect the fence	1	1.4
Rangers should take them back	1	1.4
Reserves and boundaries	1	1.4
Scaring animals away from gardens	1	1.4
Should kill them	1	1.4
They increased	1	1.4

4.5.9. Settlement Patterns and Housing

Majority of the population are settled far away from the roads. The district has a spatial population with 74 persons per square kilometer. More than half (52 percent) of the households live in dwelling units constructed with permanent. Households living in semi-permanent dwelling units are about 31.7 percent. Households living in temporary dwelling units are 33.6 percent. Most settlements are driven by the ethnicity and the agricultural activities in the area.

From observation, settlement in the district and specially in the villages near Kichumbanyobo gate, settlement is of mixed nature, linear along roads and scattered/dispersed across the village while in some instances they are nucleated around say a trading center or socio-economic infrastructure. The project will not influence the cost of rental fees in the area since most workers are hoped to be sourced within the local communities.



Figure 4-14: Settlement

4.5.10. Transport and Communication

The Roads in Masindi District are composed of 51km of Tarmacked roads, and 191.6km gravel under the national roads, the total rural district roads are at 389KM of these 206.4Km are good and while



Municipality roads are 364KM of which 60% are fair. Masindi has internet connectivity (relevant for tourists to keep in touch with the world), and the district is covered with mobile telephone communication with exception of Murchison Falls National Park where connectivity is still a challenge (MDLG, 2020).

The Kaniyo Pabidi ecological area is accessible from Masindi-Kisinja-Paraa-Pakwach which is a paved road as shown in Figure 4-15 below. The proposed site for the Nature Walk Canopy in Kaniyo Pabidi is about 6km from Kachumbanyobo Gate to Budongo Café. The site is about 1km from Budongo café on the righthand side from Masindi to Paraa.



Figure 4-15: Approach Road to Kichumbanyobo gate

4.5.11. Education Infrastructure and literacy levels

There are some government schools within the area, where communities attain primary and secondary education. Along the forest edge there is Bokwe Primary School, Kibamba Primary School, and St. Andrew Secondary School At the district level, Masindi currently has a total of 234 Primary Schools, of which 98 are Government Grant Aided schools (69 operate in rural areas and 29 in Masindi Municipal Council). The other 136 Schools are privately owned (MDLG, 2020). Results from the survey in on the level of education in the adjacent communities indicated that the majority of the residents in Kasenyi and Kigaragara had completed primary level education. In terms of vocational skills, it was found that only 5% had attained skills that can be outsourced or enhanced to work in such development project Table 4-35 below illustrates the level of education within the adjacent communities.

Table 4-35: Level of education near the project area

Education Level	Frequency	Percent (%)
None	5	6.9
Primary	31	43.1



Secondary	21	29.2
Tertiary	3	4.2
Vocational Training	5	6.9
Others (Specify)	1	1.4
Valid Total	66	91.7
Missing (No Response)	6	8.3
Total	72	100.0

4.5.12. Health Infrastructure

Masindi District has 3 Health Sub-Districts (HSDS) in Bujenje, Buruli, and Masindi Municipality, and they are headed by Bwijanga HC IV for Bujenje HSD and Masindi Hospital for both Buruli and MMC HSDs. Masindi district remains low in accessing health services and yet it is to achieve Government targets, of a health centre every parish.

Within the project area, Budongo sub county has 1 health centre III and 4 health centre IIs, these are not within a 2 km radius of the project site, hence no anticipated negative impacts to the health facilities and their patients.

As shown in Table 4-36, survey results show that within the local communities there are chronic illness especially Ulcers with prevalence of 63% which is not wide-spread disease. However, according to the household survey it shows that about 10% of households surveyed had an HIV patient. This is categorized as a risk area given that the HIV prevalence is above the national HIV estimate of 5.1%, (Uganda Aids Commission, 2024). The developer will need to develop an HIV management plan and HIV policy as part of implementing the National HIV policy and carry out HIV awareness among the workers, testing and counselling.

Table 4-36: Chronic illnesses within the communities

Type of Chronic Illness	Number of Family Members
Ulcers	63
Sickle cell	5
Diabetes	18
Asthma	12
High blood pressure	18
Tuberculosis	4
HIV/AIDS	10

Additionally, most of the health centres are located far from the project area and therefore they will not add any pressure on the existing local community health infrastructure.

Table 4-37: Distance to Health Centre

Distance	Frequency	Percent (%)
0-1 km	5	6.9
2-3 km	14	19.4



4-5 km	35	48.6
6-7 km	9	12.5
7+ km	6	8.3
Total (Valid Responses)	69	95.8
Missing (No Response)	3	4.2
Total	72	100.0

Source: SSC survey 2025

From Table 4-38 below, the survey also revealed the limiting factors in accessing the health services. From the survey 38.9% mentioned about the lack of medical Doctors in the health centres and 25% are limited by the distance from the household to the health centre. Given that these are key, the developer will have to establish a first aid clinic during the implementation to manage the minor injuries related to construction.

Table 4-38: Limiting factors to Health care

Factor	Frequency	Percent (%)
Cost	10	13.9
Distance	18	25.0
Marriage	2	2.8
Transport	10	13.9
Work	1	1.4
Lack of Medicine/Doctors	28	38.9
Use of Traditional Healers	1	1.4

Source: SSC survey 2025

4.5.13. Water and Sanitation

Within the district, there are various water sources, which include Small lakes, Rivers, springs, wells and wetlands. Rain water is also another source of water as most people collect it in big containers when it rains. River Nile, Kafu, Waki, and Waiga are the most dominant rivers, while Kiyanja and Maiha, are the dominant small lakes in Masindi. There is also quite number of shallow wells, boreholes, and valley dams especially in water stressed area of the district. The total area covered by both water and wetlands is 517.1 Sq.kms. The wetlands are vast ranging from the big Kafu wetlands to very small and seasonal wetlands. The most notable wetlands include Kafu, Ibohe, Nyangahya, Nyakafunjo, Ntooma, Musoma, Kiiha, Kiyanja and Kiizi. These provide the communities with water throughout the year for both domestic and livestock use. However, within Budongo Ecological area, and the nearby communities, there is Romeyo stream which passes near the proposed Canopy walk, and within the communities Udipiyo, Owita, and Kayiguta springs.

As presented in Table 4-39 below, results of the survey found that 77.8% of the local community use boreholes, and 12.5% use protected springs. The development will not affect the water source in anyway.

Table 4-39: Water source for the local community in Kasenyi and Kigaragara

Water Source	Frequency	Percent (%)
Lake	3	4.2
River	3	4.2



Community Borehole	56	77.8
Protected Spring	9	12.5
Tap	1	1.4
Total	72	100.0

Source: SSC survey 2025



CHAPTER 5

5. STAKEHOLDER CONSULTATIONS AND PUBLIC ENGAGEMENT

5.1. Stakeholder Analysis Engagement and Approach

The term "stakeholders" refers to all people and organizations that directly or indirectly influence the program/project, including those who have a vested interest in the protection and management of the environment, such as local communities, businesses, government agencies, NGOs, landowners, and indigenous peoples (USAID, 2016).

The stakeholder analysis commenced during the scoping phase, with the objective of identifying key, primary, and secondary stakeholders relevant to the project. These stakeholders were anticipated to play a critical role throughout both the construction and implementation phases. The analysis sought to assess stakeholder interests, including those who could influence or be affected by the project, while also identifying potential conflicts and risks that could impact project success. Furthermore, the process aimed to uncover opportunities and strategic relationships that could facilitate effective project implementation. The study categorized stakeholders based on their level of involvement across different project phases, ensuring an inclusive approach that enhanced project outcomes. Special consideration was given to minimizing or mitigating potential negative impacts on socially vulnerable and disadvantaged groups, even if such groups were not explicitly recorded during the ESIA.

Following the analysis, the next step involved stakeholder mapping to determine their locations and the most effective means of engagement. The engagement approach was developed in consultation with both the consultant team and the identified stakeholder groups, considering logistical feasibility, geographical accessibility, and mutually agreed-upon timelines to ensure meaningful participation.

Stakeholder engagement was identified as a fundamental aspect of the proposed assessment and was systematically integrated into the ESIA process. A structured consultation plan was devised, ensuring that stakeholder engagement was conducted at both national and local levels. A designated team was tasked with engaging stakeholders based in Kampala, while another specialized team was deployed to Masindi, primarily focusing on local-level consultations. This localized approach facilitated targeted outreach, enabling field teams to visit various households and communities to comprehensively document stakeholder concerns. All issues raised during these engagements were systematically recorded and incorporated into the ESIA report, serving as essential input for impact identification and evaluation.

As part of this process, a detailed stakeholder consultation program was developed and presented to the client in the inception report. This program outlined the identified stakeholders, anticipated concerns aligned with the project's objectives, and proposed measures to address these concerns effectively. The overarching goal of the stakeholder consultation process was to promote information exchange, enhance understanding of diverse perspectives, and foster collaborative relationships essential for project planning, development, and implementation. Specifically, stakeholder



consultations throughout the construction and operational phases were designed to:

- Ensure compliance with established ESIA standards and requirements.
- Provide sufficient and relevant information to enable informed decision-making.
- Facilitate the implementation of effective environmental safeguards to mitigate adverse impacts and prevent irreversible loss of resources and ecosystem functions.
- Adapt the ESIA study to address the specific realities, issues, and circumstances of the proposed project.
- Offer opportunities for interested and affected populations to be informed and involved, ensuring their inputs and concerns were explicitly addressed.

This structured approach aimed to ensure that stakeholder consultations were both meaningful and influential in shaping the project's environmental and social management strategies.

The stakeholder consultation process was initiated in collaboration with the client to address concerns identified during the reconnaissance phase. Additionally, the consultation framework included provisions for issuing advance notifications to inform stakeholders of the upcoming engagement and ensure their preparedness. The primary method of consultation was structured stakeholder meetings, organized with relevant groups wherever feasible and necessary. To maintain transparency and accountability, comprehensive records of all meetings were systematically documented. These records included attendance registers (annexed), detailed meeting minutes (summarized in the corresponding chapter), and sign-off documents, particularly for key stakeholders such as Ministries, Departments, and Agencies (MDAs see the description below). This documentation served as verifiable evidence of stakeholder engagement, ensuring that any future contestations could be addressed with empirical data.

To enhance stakeholder participation and ensure compliance with international best practices, the consultation process was designed in accordance with Environmental and Social Standard 10 (ESS10) of the Environmental and Social Framework (ESF) on Stakeholder Engagement and Information Disclosure. During these consultations, discussions centered on the proposed project, including the methodology for identifying and assessing environmental and socio-economic impacts. Where applicable, mitigation measures were formulated and proposed to address potential adverse effects:

- **Decision Makers:** Government authorities at the national, regional, and local levels.
- **Community Representatives:** Elected officials and representatives from Non-Governmental Organizations (NGOs).

A multi-faceted stakeholder engagement strategy was developed, incorporating diverse communication approaches tailored to the specific needs and preferences of each stakeholder group. Some stakeholders were anticipated to participate in focus group discussions (FGDs) (as captured in pictorial evidence), while others were engaged through one-on-one meetings. The analysis of social data and stakeholder feedback was structured to integrate both qualitative and quantitative methodologies, with findings primarily presented in tabular format. Stakeholder consultation data were expected to capture stakeholder classifications, their relevance to the proposed project, consultation



objectives, and the concerns and perspectives expressed during engagements. Where applicable, emerging recommendations were to be documented alongside proposed mitigation measures for any identified adverse impacts.

The ESIA methodology was designed to prioritize meaningful public consultation and engagement, ensuring the inclusion of key stakeholders who were not initially involved during the scoping phase. Additional consultations were planned to address follow-up issues identified in the scoping phase, while a review of the initial consultation process was incorporated to enhance the effectiveness of the detailed study. A significant number of key stakeholders were actively engaged, and their inputs were integrated into the formulation of mitigation measures, management strategies, and monitoring frameworks. The outcomes of these public consultations have been comprehensively documented in this ESIA report, with verification of stakeholder participation substantiated through signed attendance and registration sheets.

From the perspective of appropriate project implementation, the purpose of stakeholder analysis is to understand who (people or organizations) have a relationship with the program/project, to learn the characteristics of that relationship, and to control that relationship in order to ensure the success of the program/project.

Table 5-1: Stakeholder analysis

Stakeholder	Importance	Relevance to the Project
National Environment Management Authority (NEMA)	High	[High] NEMA is the authority to proceed ESIA process and issue the approval of ESIA
Uganda Wildlife Authority (UWA) Including site office	High	[High] The project area is in the Murchison Falls National Park. UWA has a responsibility to manage such protected areas appropriately and issue approval on the development inside of such protected areas in accordance with the Wildlife Act 2019
National Forest Authority (NFA)	High	[High] NFA is the project proponent and recognizes the need of the project
Ministry of Water and Environment (MWE)	High	[High] MWE is mandated to receive the project grant on behalf of the NFA supervises its implementation...
Ministry of Gender, Labour, and Social Development (MOGLSD)	Medium	[Medium] MOGLSD is mandated to handle gender, culture, occupational health and safety, labor issues, and community issues. MOGLSD shall be in a position to support these where necessary on these matters in the project.
Ministry of Tourism, Wildlife and Antiquities (MTWA)	Medium	[Medium] (MTWA) formulate and implement policies, strategies, plans, and programs that promotes tourism, wildlife, and cultural heritage conservation for socio-economic development and transformation of the country
Uganda Tourism Board (UTB)	High	[High] UTB is mandated to foster cooperation among key stakeholders in the tourism sector, market tourism sector, encourage investment in the sector, promote education, training, and research, develop, and monitor standards in the tourism sector



Stakeholder	Importance	Relevance to the Project
Masindi District Local Government.	High	[High] Masindi district has a tourism plan for the district and experience in other tourism products in the area. The project will perhaps increase the revenues from royalties, as well as tourism destination district.
Kasenyi and Kigaragara Communities from Kasenyi Parish, Labongo Sub-County Masindi District.	High	[High] People in Kasenyi and Kigaragara are active participants in the ongoing community tourism initiatives and programs; Presence of Community Based Organisations and associations that are involved in tourism development and related activities. Additionally, they expect job opportunities from the project during the construction.
Kasenyi Community Tourism Association	High	[High] The association member are interested in the positive impacts of the tourism product in the area and how to benefit from the development.

The purpose of conducting a stakeholder analysis is to know who has a relationship with the program/project, to know the characteristics of that relationship, and to control that relationship to make the program/project successful.

The team profiled the key stakeholders influencing and influenced by the Project, impacted or impacting the project and attempted to inquire about pertinent issues among the key stakeholders and communities close to the proposed project areas. The objective was to obtain their views on potential impact and mitigation measures that will inform the detailed studies and final interventions to mitigate the impacts. Apart from the client, no other stakeholders will be directly impacted by the project. This is because the development site is located more than 10 km within the protected forest, under the management of the National Forestry Authority (NFA). All other stakeholders will have only indirect interactions with the project, either through regulatory oversight or participation at various stages of its implementation.

The stakeholders within the project area were identified. Below is the result of the analysis on major stakeholders identified:

5.2. Stakeholder consultations, issues raised & feedback given

5.2.1. Consultations with Ministries, Departments and Agencies (MDAs)

During the stakeholder engagement, consultation meetings, and focused group discussions were held with various stakeholders identified during the scoping and as guided in the approval of the terms of reference by the National Environment Management Authority. The opinions, questions, and answers expressed during the discussion session are presented in the summary table 5.2 below

Table 5-2: Consultations with Ministries, Departments and Agencies (MDAs)

No	Entity engaged / Date of engagement	No. of persons engaged			Comments/concerns raised	Responses provided
		M	F	T		
1.	National Forest Authority (Jan 27, 2025)	3	1	5	-Who is responsible for revenue collection for this project?	-Understand the legal mandate of NFA vs the mandate of UWA
					-Requested the team to get the updated forest management plans,	we will avail you the designs



No	Entity engaged / Date of engagement	No. of persons engaged			Comments/concerns raised	Responses provided
		M	F	T		
					-How do you intend to ensure the safety of the tourists on the canopy, and the animals	We need a forest bases infrastructure insurance policy for the canopy walk
					Are there any programs running in this area that you would wish the team to pay attention to?	-NFA, there is going to be an ecotourism site in Busingiro
2.	Uganda Wildlife Authority (Jan 20, 2025)	2	3	5	-What is the nature, size, and length of the canopy walk?	details of the project design, including materials and selected hanging trees, are included in the project report,
					-What materials are you going to use in construction?	The design team has not concluded on the type of materials to be used.
					-Have you benchmarked for similar canopy projects	Reference was made on Nyungwe Canopy Walk in Rwanda
					-The inclusion of a comprehensive list of animal species in the report.	A detailed list of animal species will be produced during baseline surveys.
					UWA is mandated to generate tourism revenue. Who will collect the revenues.	Further consultations with NFA will be conducted for clarification on revenue management and access.
3.	Ministry of water & Environment (Jan 27, 2025)	5	3	8	Where is the canopy walk located? What is the size, accessibility, auxiliary components if they are there? What is the nature of the landscape is it a wetland or dry area?	-The site is accessible 6 kms from from Kachumbanyombo gate to Budongo café and 1km inside. The total length is 464 meters, complete. The area was selected because it's of interest such as abundance of (Mahogany and Cynometra) trees specis.
					What mode of stakeholder's engagements did you use in the field?	-We used three approaches; Stakeholder meetings, Focused group discussions and household survey questionnaires.
					How is the project going to handle the social concerns such as gender-based violence, HIV?	The project will develop an HIV Policy, and formulate a grievance rederess committee.
					Are there any other animals other than Chimps?	Yes reported by our night camera includede porcupines, Leopard, Dyke, monkeys to mention.
4.	Department of Occupational Safety and Health (DOSH) in the Ministry of Gender, Labour & Social	1	0	1	what should be expected by the ministry during the implementation phase?	-Carry out aerosol (air, noise dust etc) monitoring before, during and after construction of the proposed project -Employ a health and safety expert on site for the entire proposed project



No	Entity engaged / Date of engagement	No. of persons engaged			Comments/concerns raised	Responses provided
		M	F	T		
	Development (MGLSD) (Jan 28, 2025)					-HIV and Aids sensitization, child labour and sexual harassment should be sensitized the workers and communities. -Rest rooms should be constructed for workers separated male and female -Acquire a work place certificate -The safety of tourist should be key while using this proposed facility -Waste management should be key while using this place
5.	Department of Museums and Monuments (Research, Sites and Monuments and Natural History) Ministry of Tourism, Wildlife and Antiquities (MTWA) (31th January 2025)	2	0	2	-Conduct archaeological survey in the proposed project area and document any archaeological and heritage resources that may be affected.	Archaeological survey was conducted in the project area and the results of the survey will be documented in the report.
					The proposed project should advocate for the preservation of cultural sites and plants of traditional interest especially those that are still used by the local community.	No cultural sites of significance were encountered during the archaeological survey.
					The study team should ascertain the heritage potential of the project area much as it is located within a gazetted area.	No Heritage potential as per the archaeological survey.
6.	UWA Staff at Kichumbanyobo Gate, MFNP (Nov 30, 2024)	1	0	1	Does Kaniyo Padibi Forest receive many tourists given your experience at the gate review of permits and fees collection?	-we have tourists who come purposely to visit Budongo ecological forest.
					what impact will the proposed establishment of the nature canopy walk have in the area?	-It will boost tourism in the Kinyia Padibi ecological area -Increase in tourism products that UWA will sell in the Murchison Falls National Park.
					What are the challenges within the proposed area that the developer needs to take care of or provide mitigation measures?	NFA should be aware that the place has a network problem.
7.	NFA staff in Kaniyo Pabidi Central Forest (Nov 30, 2024)	1	2	3	What are some of the tourism activities within the Budongo Ecological Forest?	We have Chimpanzee Tracking Habituation, Forest Walk, Bird Watching and Filming
					How is the concession managed from your experience?	NFA; As the institution we awarded the concession to GLS and we also have a Management Plan which is also a guiding document.



5.2.2. Consultations with Masindi District Local Government

Date of engagement	No. of persons engaged		
Jan 20, 2025	M	F	T
	15	2	17

Table 5-3: Summary of the opinions and responses from the district engagement

No	Comments / concerns raised	Responses provided
1.	Is it going to be the first kind of tourism product in the area?	Yes, we do not have any as of now.
2.	NFA does not share revenues even when this new development is going to be a new tourism product in the district.	NFA does not have structures like the Uganda Wildlife Authority. However, NFA has been giving back to the communities through Community Forest management (CFM),
3.	Have you harmonized the gate entry fees with the Uganda National Wildlife Authority?	Anybody going to Kaniyo Pabidi is not supposed to pay any park entrance fees unless the communication is not received.
4.	How can local Communities be supported to benefit from tourism?	-we shall help the community to form women groups, and Kasenyi group -communities should be involved and put at the centre of every development in Budongo ecological forest
5.	How can local tour guides be supported to meet the qualifications or standards set in place?	NFA will apply for a site guide and train the guides from the local community, and after attaining the minimum requirements,
6.	The oil road ie Kasinja-Paraa road destroyed the tree canopy.	No further destruction was undertaken or will be associated with this project.

5.2.3. Consultations with Tourism Associations & Agencies

Table 5-4: Summary of the opinions from the discussion with touring agencies

No	Entity engaged / Date of engagement	No. of persons engaged			Comments/concerns raised	Responses provided
		M	F	T		
1.	Uganda Tourism Board (UTB) (Jan 23, 2025)	1	0	1	What would be your major area of concern?	Avoid degrading the different species of high conservation within that area
					Do you have considerations for communities?	The proponent will explain to people the benefits of what this canopy project will bring to the community.
					Could you share with us your views?	-Ensure to come up with best, and safe design that are protecting the environment
2.	Uganda Safaris Guides Association (USAGA) (Dec 19, 2024)	3	0	3	What are your concerns regarding the development of Nature Based Canopy?	-Concerned on how waste management will be handled while the proposed project is function
					What would you recommend?	The nearby communities need to have a direct contract with the proposed project in order to benefit



No	Entity engaged / Date of engagement	No. of persons engaged			Comments/concerns raised	Responses provided
		M	F	T		
					What are the impacts?	Domestic tourism might not be achieved.
3.	Exclusive Sustainable Tourism Operators (ESTOA) (Jan 30, 2025)	1	0	1	What will be the impact of the nature-based canopy?	-He was happy about the proposed project that it will create more activities and more options for tourism operators
					What are your major concerns?	-Safety of animals during construction -Waste management has to be key while construction and usage time -Schools and organized groups nearby should have a free access to this place
4.	Kasenyi Community Tourism Association (KCTA) (Jan 21, 2025)	1	0	1	what is the criteria of joining the association?	-The group is registered with the district local government. -We have 40 members 18 females and 22 males -Pay membership of 10,000 and 5,000 below 18years
					which tourist activities is the group involved in	-Community members are involved in craft making, apiary, trail cutters, traditional dances and games.
					Do you think that the proposed canopy will have an impact on the group/community	-It will increase on the number of tourists thus providing a market to apiary products, and crafts
					Do you think the group has benefited from tourism/ Budongo CFR?	-Some Group members are being trained by Budongo Café, tourists provide market to crafts and honey. -UWA supported group in establishing apiary project
5.	Staff at Budongo Café (Nov 30, 2024)	1	0	1	Could you give a brief description of the operations at the Great Lake Safaris in Budongo ecological area?	-We operate a Café Budongo which is under the Great Lakes Foundation. -The foundation empowers the youth to get hotel and tourism skills.
					Do workers stay within the Budongo ecological forest?	-Workers who come from very far are accommodated within the lodge. However, there are workers from nearby communities
					What are common illnesses within the area that workers may need to be oriented about in the area?	Malaria is the most common disease in the area.



5.2.4. Consultations with Local Communities around the Proposed Project Area

Table 5-5: Summary of the opinions, concerns and recommendations from the local communities

No	Community engaged / Date of engagement	No. of persons engaged			Comments/concerns raised	Responses provided
		M	F	T		
1.	Kasenye Local Community (Jan 20, 2025)	34	28	62	Communities are faced with issues of human wildlife-conflict -Guarding the gardens and domestic animals against wildlife.	Communities should work hand in hand with UWA to chase animals from the communities.
					Put in place an electric fence to hinder wild animals from invading the communities.	Measures will be put in place to restrict animals from accessing community
					communities want job opportunities	Full mobilization of labor will be made by the contractor at construction phase
					Land conflict between UWA and the affected communities,	Local leadership shall work with NFA to ensure that boundaries are put in exact areas to avoid conflicts.
					Can NFA create free canopy walk day for communities	This will be brought to the attention of the top management.
2.	Kigaragara community at Kigaragara village (Dec 01, 2024)	11	0	11	what are the challenges ahead that may require new developers in the Kaniya Padibi Forest?	There are a lot of restrictions for instance you cannot get out any time you want or come to the site passed 7:00pm.
					Have you benefited from the Budongo Ecological Forest?	Budongo Ecolog Lodge normally uses workers from Kigaragara villages for the prevailing jobs Boundary openings such as 1. Clearing Trails 2. Use our youth as tour guides -They always provide support to the community with Goats and Tents in case someone has passed on.
					Wildlife animals such as baboons destroy our crops, they also come to our homes and eat chicken,	we take note of the issue you raised and we shall discuss it with UWA and NFA during our engagement.
3.	Kigaragara community at Kigaragara Trading Centre (Jan 20, 2025)	14	4	18	The ladies in the community collect firewood every weekend, won't the proposed project limit the community	The proposed project will not stop any member from picking firewood and that will continue however they



No	Community engaged / Date of engagement	No. of persons engaged			Comments/concerns raised	Responses provided
		M	F	T		
					from collecting the firewood?	should follow the regulations of NFA as usual
					. Shall the community be allowed to host the tourists while the numbers increase?	-Hosting of tourists will be accepted but after training of the communities on how to host
					The proposed project won't it limit traditional medicine heavers from the forest?	-traditional medicine harvest will continue because the proposed project is covering a small area in the forest which cannot stop other activities
					NFA should allow the local community to have a tourism market day in a month and also increase in the days of accessing the forest reserve	-We will consult further on the requests made by community member and will provide responses.



CHAPTER 6

6. ANALYSIS OF ALTERNATIVES

6.1. Introduction

A combination of alternatives that were considered during the ESIA include TBCW route/site alternative, design/technology alternative, operations/management alternative, no project alternative and action alternative as presented below. A presentation and analysis of these alternatives is meant to provide a comprehensive understanding of potential impacts and assess the feasibility of the proposed project. While project alternatives vary in design and approach, they generally fall into one or a combination of the following categories.

6.2. Site location/route options

Several alternative sites were assessed for the proposed Tree-Based Canopy Walk (TBCW) project to ensure an optimal balance between ecological protection, community benefits, technical suitability, and financial viability. The three main sites considered included the Royal Mile within Budongo Central Forest Reserve (BCFR), the Kaniyo–Pabidi section of BCFR, and the Kalinzu Central Forest Reserve. Each site was evaluated against key parameters critical to sustainable development: Environmental Impact, Socio-economic Benefits, Technical Feasibility, Economic/Financial Viability, and Accessibility & Existing Facilities.

The method used for the site selection was the Multi-Criteria Analysis (MCA) as presented in Tables 6.1 and 6.2 below.

Table 6-1: Multi-Criteria Rating Scale (1–5) for the location of the proposed Kaniyo Pabidi Tree Based Canopy Walk

Score	Interpretation	General Meaning	Implication
5 – Excellent	Optimal performance	The site exceeds expectations for this parameter.	Highly favorable; a key strength of the site.
4 – Good	Strong performance	The site meets requirements with minor limitations.	Advantageous and reliable.
3 – Moderate	Adequate performance	The site is acceptable but has notable limitations.	Neutral; may need improvement.
2 – Poor	Substandard performance	The site performs below expectations in this area.	A risk factor; requires mitigation.
1 – Very Poor	Inadequate performance	The site is unsuitable for this parameter.	Major weakness; could compromise viability.

Table 6-2: Parameters and Explanation of Scoring

Parameter	Score 5	Score 4	Score 3	Score 2	Score 1
Environmental Impact	Minimal disturbance; ecosystem integrity preserved; high biodiversity protection.	Low impact; mostly compatible with conservation.	Moderate impact; requires management plans.	High impact; would need mitigation.	Severe, irreversible damage expected.



Parameter	Score 5	Score 4	Score 3	Score 2	Score 1
Socio-economic Benefits	High community benefit, employment, education, and local support.	Good benefit to local economy and awareness.	Moderate benefit; some community interest.	Limited benefit or resistance from stakeholders.	No benefit or active community opposition.
Technical Feasibility	Easily implementable with low technical risk; infrastructure and know-how available.	Feasible with minimal technical challenges.	Some technical difficulties; requires planning.	Complex implementation or engineering gaps.	Very difficult to implement with current capacity.
Economic/Financial Viability	High return on investment, strong business case, donor interest.	Profitable with reasonable investment.	Break-even potential or uncertain viability.	Costly with limited return.	Financially unviable.
Accessibility & Existing Facilities	Easily accessible year-round; has support facilities in place.	Good road access and some facilities.	Access is seasonal or partial infrastructure exists.	Poor access and few/no facilities.	Inaccessible or isolated with no facilities.

Using the criteria and scoring rating in Table 6-1 and Table 6-2 above, a detailed comparison ((i) – (iii)) of these sites helped identify the most feasible and sustainable location for the successful establishment and implementation of the canopy walk project.

- **Highest Score (5):** Indicates the site is excellent for the given parameter. If a site consistently scores 5 across multiple parameters, it suggests a **strong candidate for selection**.
- **Middle Score (3):** Indicates the site meets minimum standards but may require **significant improvement or risk mitigation**.
- **Lowest Score (1):** Suggests the site is **unsuitable** in that parameter and would likely compromise the sustainability or feasibility of the project.

(i) Kalinzu Central Forest Reserve

Kalinzu Central Forest Reserve, though a biodiverse area, faces major limitations for hosting a TBCW. The remote location and absence of supporting infrastructure would necessitate substantial investments in roads, facilities, and marketing to attract tourists. Environmental impacts would be significant due to new construction needs. Technical feasibility is low, with unsuitable forest structure for lightweight, tree-based systems without extensive intervention. Although long-term socio-economic benefits could emerge, the initial financial outlay and operational risks are prohibitive.

Conclusion: Kalinzu Forest is unsuitable for the proposed TBCW at this time due to high environmental risks, technical challenges, and poor financial feasibility.

(ii) Royal Mile, Budongo Central Forest Reserve (BCFR)



The Royal Mile, renowned for its rich biodiversity and global birding reputation, was considered as an alternative site for the TBCW. However, its ecological sensitivity raises concerns about potential disturbances from increased visitor numbers and infrastructure development. Although socio-economic benefits could arise from added tourist activity, the risk of overcrowding and degradation of the unique forest experience is high. Technically, the variable tree spacing and denser understory would complicate installation. Financially, significant investments would be required for visitor management and environmental mitigation measures.

Conclusion: While attractive for tourism, the Royal Mile’s ecological fragility and technical constraints render it a less favourable option for immediate TBCW development.

(iii) Kaniyo–Pabidi Section, Budongo Central Forest Reserve (BCFR)

The Kaniyo–Pabidi section of BCFR presents an optimal site for the proposed Tree-Based Canopy Walk (TBCW) owing to its minimal environmental disturbance, strong mature trees (Mahogany and Ironwood), and favorable topography. The presence of supportive infrastructure — including storage facilities, conservation accommodation, and established tourist trails — greatly enhances technical and operational feasibility. Accessibility is excellent via the Masindi–Pakwach Road, a major tourist artery, which, coupled with proximity to Murchison Falls National Park, strengthens the site's financial viability. Socio-economic benefits are significant, leveraging NFA’s Collaborative Forest Management programs that directly engage local communities.

Conclusion: Kaniyo–Pabidi offers the best overall balance of low environmental impact, technical suitability, strong community linkages, and economic viability.

Table 6-3: Evaluation of Site Location/Route Alternatives of the 3 different sites

Criterion	Royal Mile (Budongo CFR)	Kaniyo–Pabidi Section	Kalinzu Central Forest Reserve
Environmental Impact	7/10	9/10	6/10
Socio-economic Benefits	7/10	8/10	6/10
Technical Feasibility	6/10	9/10	5/10
Economic/Financial Viability	6/10	8/10	4/10
Accessibility & Existing Facilities	6/10	9/10	4/10
Total Score	32/50	43/50	25/50

General observation:

After technical, environmental, socio-economic, and operational analysis as presented above, the Kaniyo–Pabidi section emerged as the most feasible location. Thus, considering all environmental, socio-economic, technical, and financial factors, Kaniyo–Pabidi was scored the highest (43/50) and selected as the most suitable site for immediate implementation.

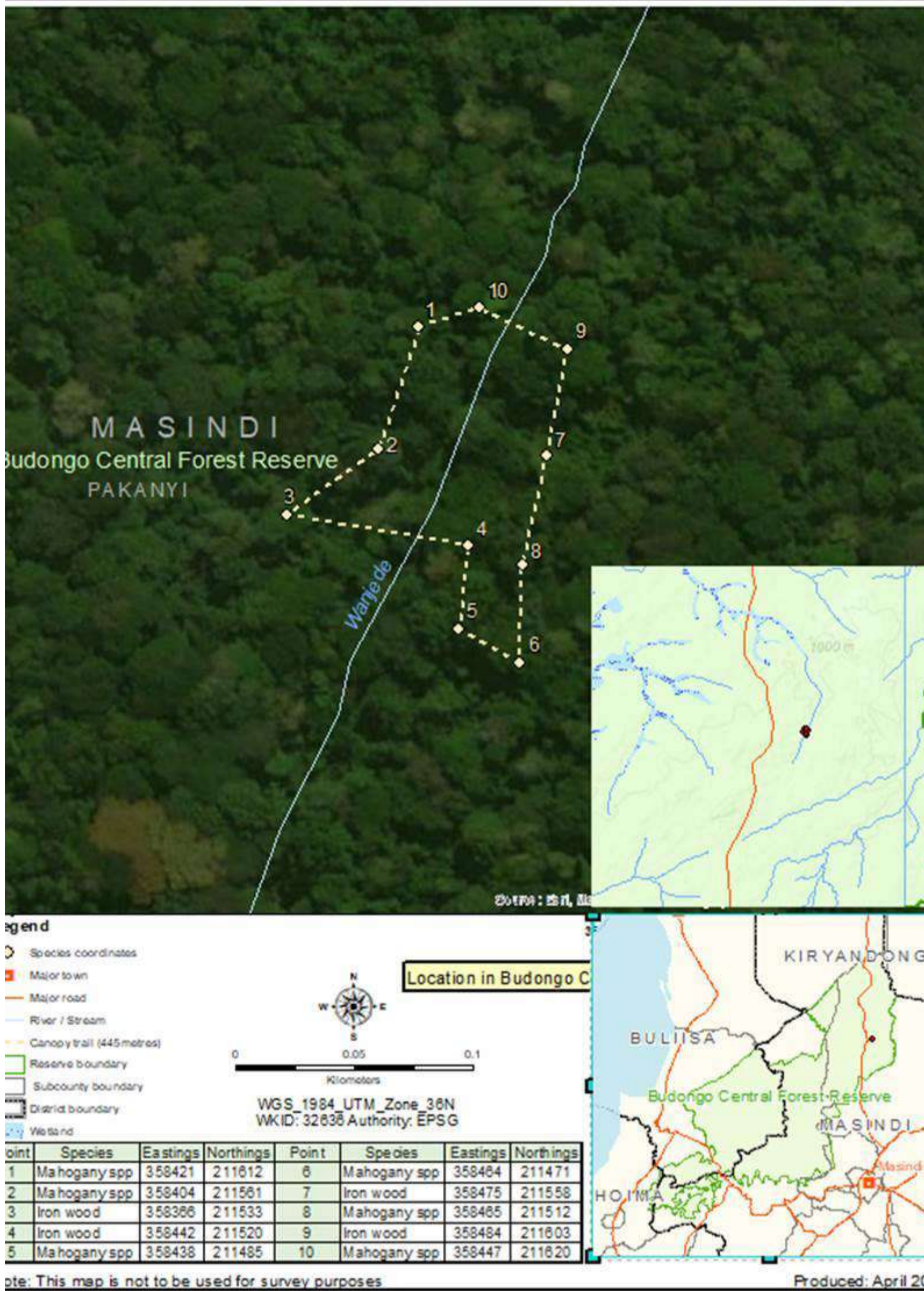


Figure 6-1: Site location and route options to the proposed TBCW



A review of the feasibility report and extensive engagements with the client and key stakeholders, the ESIA team were informed that the final site/route was chosen based on the following considerations:

- *Proximity to Infrastructure:* the site is conveniently located 1km from Masindi Pakwach - existing road, through Budongo Café facilities, and other essential services, ensuring logistical efficiency.
- *Reduced Disturbance from External Factors:* it is situated at a sufficient distance from the Masindi–Pakwach road, Budongo Café, and Ecolodge, minimizing exposure to traffic noise, including vehicles from Albertine region that transport oil waste.
- *Mature Forest Canopy:* The presence of numerous fully grown, giant trees enhance both structural feasibility and ecological integrity.
- *Scenic and Immersive Views:* – The location offers exceptional panoramic views from within the mid-canopy, enriching the visitor experience.

The design-build architectural team will propose renovations and upgrades to the existing infrastructure to integrate key amenities such as restrooms and research towers, among other facilities. These improvements will enhance functionality while aligning with the site's eco-tourism and conservation objectives.

6.3. Operation alternatives

For management and maintenance, three options were presented to the ESIA team.

- **Option One:** The NFA would operate the canopy walkway and associated facilities. This would require the recruitment, training, and ongoing management of specialized staff from which NFA can grow their eco-tourism operations throughout the NFA's forest reserves.
- **Option Two:** To modify the current concession agreement to build upon the success of the relationship with the current operator who has over a decade of site-specific expertise and a healthy working relationship with the NFA. This would see NFA support and reward the commitment of a concessionaire who has demonstrated their ability to successfully operate and grow eco-tourism with the NFA.
- **Option Three:** To create a blended operation, whereby NFA and the existing operator work together to further develop the destination over an extended period with the addition of “high end” lodging as well as satellite eco-tourism attractions throughout BCFR. This would see shared management and operational roles as well as co-operation and commitment to sharing risk and reward by jointly investing in the destination.

To ensure that appropriate expertise and experience is brought to the project with the goal of building capacity over a minimum 5 to 10-year period, it is recommended that the current concessionaire and NFA build upon their relationship (concession/joint venture) to implement and operate the canopy walkway, as well as the proposed additional park infrastructure. This could be done under a new social enterprise or a revised concessionaire agreement whereby both parties will work closely to establish an effective eco-tourism management and an operational team for the site.



6.4. Design/technology alternatives

In selecting the most appropriate design and technology option for the proposed tree-based canopy walk, five alternatives were carefully considered based on Environmental, Socio-economic, Technical, and Economic/Financial factors. These options included Steel Cable and Suspension Bridge Systems, Wooden Boardwalk Structures, Concrete Pillar-Supported Walkways, Hybrid Systems (Steel-Wood Combinations), and the Lightweight Aluminium System. Each alternative was assessed for its potential environmental footprint, contribution to local employment and skills development, technical performance in terms of durability and adaptability to forest dynamics, and overall cost-effectiveness over the project life cycle (in the analysis presented from (a) to below). This analysis informed the selection of the most sustainable and feasible solution as presented in sections (a) – (e) and Table 6-4 below.

(a) Steel Cable and Suspension Bridge Systems

Steel cable and suspension bridge systems offer high strength and durability, making them suitable for long spans. However, they cause significant environmental disturbance through the installation of anchoring pylons and cables, potentially harming trees and soil. Socio-economically, while they create employment, local participation is limited due to the specialized skills required. Financially, these systems demand high construction and maintenance costs, reducing their overall feasibility.

(b) Wooden Boardwalk Structures

Wooden boardwalk structures provide a more moderate environmental footprint but still cause some disturbance through ground posts and tree attachments, with the additional risk of rot affecting local ecosystems. They present a socio-economic advantage by using local labour extensively for both construction and maintenance. Technically, they offer moderate durability but are vulnerable to weathering and pests, and financially, they involve moderate initial investment but high ongoing maintenance costs.

(c) Concrete Pillar-Supported Walkways

Concrete pillar-supported walkways are highly durable but introduce significant and permanent environmental disturbances, fundamentally altering the natural landscape. Socio-economically, they offer minimal opportunities for local labour participation and require highly specialized technical expertise. Although structurally robust, they lack flexibility to adapt to tree growth and environmental changes, while financially, they impose very high construction costs and offer low adaptability, making them less sustainable.

(d) Hybrid Systems (Steel-Wood Combinations)

Hybrid systems combining steel and wood seek to balance strength and aesthetic appeal but cause moderate to high environmental disturbance depending on the design. They offer moderate socio-



economic benefits by involving local labour, though some technical specialization is necessary. Technically, they strike a balance but are maintenance-intensive due to risks of wood decay and steel corrosion. Economically, they demand high initial investment and variable maintenance costs, leading to moderate feasibility.

(e) Lightweight Aluminum System (Selected Option)

The lightweight aluminum system excels across all evaluation criteria, causing minimal environmental disturbance through manual installation that protects trees and soil. It maximizes socio-economic benefits by enabling high local labour participation, skills development, and boosting eco-tourism. Technically, it provides a proven, flexible, and durable design that minimizes strain on trees. Financially, it requires moderate upfront investment and maintains low long-term costs, while also enhancing visitor attraction, making it the most feasible and sustainable option.

Table 6-4: Summary of Design/Technology Alternative Considerations for the proposed Tree Based Canopy Walk

Technology	Environmental	Socio-economic	Technical	Economic/Financial	Overall Feasibility
Steel Cable Suspension	2	2	5	2	Low
Wooden Boardwalk	3	4	3	3	Moderate
Concrete Pillar-Supported	1	2	5	1	Low
Hybrid Steel-Wood System	3	3	4	3	Moderate
Lightweight Aluminum System	5	5	5	4	High

*(Scoring: 1 = Very Poor, 5 = Excellent)

General Conclusion:

From the above analysis, the Lightweight Aluminum System (in Lemon Green) emerged as the most feasible option, offering superior environmental protection, socio-economic benefits through community involvement, excellent technical performance, and favorable economic sustainability compared to other design technologies.

6.5. No project Alternative

Under the current assessment, a true "No-Action Alternative" is not applicable, as only a single site within the BCFR specifically the Kaniyo–Pabidi section met the technical and environmental feasibility requirements based on GreenHeart’s evaluation. The proponent, the NFA, is both the project client and the national regulator responsible for forest management across Uganda, including BCFR. If the No-Action Alternative were pursued, the proposed TBCW would not be developed, and the Kaniyo–Pabidi area would remain in its existing natural state without any new tourism product introduced. Consequently, the opportunity to enhance sustainable tourism, promote environmental education, and generate revenue for forest conservation would be foregone.



In addition, GreenHeart would be compelled to seek an alternative site in another area which is not Kaniyo-Pabidi in BCFR, which may not meet the same ecological, tourism, and accessibility criteria. Furthermore, selection of the No-Action Alternative would diverge from NFA's current strategic objectives of promoting ecotourism and sustainable use of forest resources in line with national development policies. Thus, the No-Action Alternative would result in maintaining the status quo, with no advancement towards the intended goal of using the Kaniyo-Pabidi area for responsible tourism development.

As part of the ESIA process, it is essential to assess the "no-project" alternative, which considers the implications of not proceeding with the proposed development. Choosing the no-project alternative would mean maintaining the current conditions in the Kaniyo Pabidi research and ecotourism zone without introducing any additional TBCW development. This option would prevent any potential negative environmental and social impacts associated with the project. However, it would also mean forfeiting anticipated benefits, such as increased tourist numbers, higher revenue generation, improved services, expanded employment opportunities, and enhanced economies of scale linked to the project's implementation. Given that UWA, UTB, the MTWA, and other government policies advocate for the establishment of high-quality tourism products under the IFPA-CD to attract high-end visitors, selecting the no-project alternative does not signify a failure to implement these policies but rather their application in alternative locations.

Stakeholder consultations revealed significant interest in establishing this tourism facility, despite concerns related to safety of the trees and works at height, security, and potential hazards, as noted in public and individual engagements. For NFA, opting for the no-project alternative would mean losing the opportunity to develop the TBCW in Kaniyo Pabidi along with its associated benefits.

6.6. Action option

This alternative entails carrying out the proposed Tree-Based Canopy Walkway (TBCW) project. Its implementation would bring numerous benefits, including the creation of direct employment opportunities, expansion of business ventures, increased revenue from a boost in tourist attractions and visitor numbers, enhancement of local livelihoods through diversification and innovation, and the promotion of learning and research for scholars. However, to address any potential environmental and social impacts, appropriate mitigation measures have been outlined in this ESIA report.

6.7. Environmental considerations

During the construction, operation and maintenance, there will be minimal vegetation clearance to give a view of the canopy structure. However, effort will be made to avoid trees, so that only a few branches will be affected. The cleared vegetation will be lost permanently. However, only a small area will be required to be cleared (about 1.4-1.8m width and 464m loop), no significant impacts or loss of habitats will result. A comparative assessment will be conducted to determine whether any trees need to be replaced with technological alternatives, such as steel bars. If such replacements are necessary, they are unlikely to require an additional ESIA.



The selected site (as described in section 2.5 above) met all environmental suitability criteria, with no identified concerns or ecological constraints warranting disqualification. The final design balances the need for adding to the tourism package anticipated, wildlife conservation and environmental education with the responsibility of minimizing disruptions to natural behaviors and habitat integrity. Canopy walkways utilizing tree-based or low-impact tower systems have demonstrated a positive environmental impact by facilitating controlled access to forest canopies, reducing off-trail disturbance, and supporting conservation-focused tourism, scientific research, and biodiversity education.



CHAPTER 7

7. IMPACT IDENTIFICATION, ASSESMENT AND MITIGATION / ENHANCEMENT MEASURES

7.1. Impact Identification

The ESIA process aims to identify, predict, and evaluate potential impacts associated with the proposed development, ensuring that significant environmental and social risks are appropriately mitigated. Various methodologies are available for impact identification, with impact checklists being a widely used and effective tool, particularly for linear infrastructure projects. Given the relatively short linear nature of this project of 464m in closing a loop, impact checklists were employed as the primary tool for initial assessment.

During stakeholder consultations, this approach facilitated the identification of key planning issues and environmental considerations. Identified impacts were categorized according to the project's lifecycle stages i.e. *construction, operation, and decommissioning* to ensure a structured evaluation of potential effects. The impact assessment followed a systematic approach:

- **Impact Identification:** Initial impacts were documented during field assessments, based on site observations and stakeholder input.
- **Impact Prediction:** Potential impacts were analyzed using an impact correlation matrix to establish relationships between project activities and environmental and social receptors.
- **Impact Significance Evaluation:** A combination of methodologies was applied, including expert judgment, team discussions, stakeholder concerns, and a structured set of criteria.

In addition, the impacts were considered to be significant based on:

- The magnitude and likelihood of the impact and its spatial and temporal extent
- The likely degree of recovery of the affected environment
- The value of the affected environment
- The level of public concern
- Political repercussions of a proposed development

In addition, the impacts were considered to be significant if they were:

- Extensive over time and space;
- Intensive in concentration or proportion to assimilative capacity of the affected area;
- Exceeding environmental standards or thresholds;
- Not complying with environmental policies, land use plans, sustainability strategy;
- Adversely and seriously affecting ecologically sensitive areas;



- Adversely and seriously affecting heritage resources, other land uses, communities or indigenous people's traditions and values.

Mitigation measures and enhancement options were proposed for the significant impacts. The report furnishes information on mitigation and monitoring plans, outlining specific responsibilities to ensure the effective implementation of these measures.

7.2. Impacts Associated with the Construction Phase

The following potential impacts were identified for the construction phase:

Positive impacts

- Increased opportunities for employment and other economic activities linked to TBCW construction

Negative impacts

- Level of wildlife disturbance may increase as a result of frequent construction material manual delivery along the 1km from the Budongo Café to the TBCW proposed area.
- Change in scenic quality due to construction of the TBCW
- Noise pollution due to construction crew presence
- Change of norms and value arising from increased incomes for the few to be added casual workers and professionals who will be employed on the project during the construction phase as well as NFA staff during the operation phase. In case of accommodation opportunities, the norms and values of those offering accommodation during construction and owners of ecotourism facilities/activities will also change.
- Risk of accidents and injuries.

7.3. Impacts associated with Operation Phase

Positive impacts

Benefits to communities resulting from some temporally and permanently employed and other economic activities linked to operation

- Benefits to local economy resulting from opportunities to provide goods and services for the operation near Chumbanyogo gate
- Benefits to national economy arising from increased revenue generation from tourism business and employment opportunities to Ugandans.

Negative impacts

- Level of wildlife disturbance may increase as result of more tourists walking above them
- Change in scenic view due to the construction
- Poor solid waste management along the canopy walk.
- Compatibility with national policies on development of quality of tourism products, facilities for tourism business and increased revenue generation
- Changes in disease patterns and zoonotic risks to human health due to increased presence of humans in the project area.



- Cost to communities arising from increased waste management issues
- Risk of accidents.

7.4. Impacts associated with Decommissioning Phase

The following impacts are likely to occur during this phase:

- Changes in scenic quality due to establishment of TBCW and the movement of workers in and out of the project area hence change in the scenic quality
- Support to national policies that stress on proper handling of TBCW used material and waste during decommissioning
- Once the facility is decommissioned, there will be loss of employment and income to workers and local community businesses, local economy, CFR and the nation (tour guiding, revenue collection and indirect income for local who will have been offering services
- Change in life style quality of workers
- Reduced opportunities to adjacent communities after facility closure

7.5. Impact Evaluation

After identifying and predicting the magnitude, extent, and duration of the impacts, an assessment was conducted to determine their significance. The existing baseline conditions served as a reference for projecting the future scenario i.e. to include operations and closure with the proposed project. These changes were then evaluated against relevant national and sectoral policies, laws, guidelines, and applicable standards. Additionally, stakeholder perspectives were incorporated to ensure a comprehensive assessment of impact significance.

7.6. Evaluation of Impact Significance

The evaluation of impact significance is a fundamental component of impact assessment, directly influencing project costs, regulatory conditions, and the selection of project alternatives. In line with the impact assessment methodology, determining significance ensures that environmental costs are fully integrated into the project's financial framework. For impacts identified as significantly adverse, mitigation measures are developed to minimize their effects. Conversely, enhancement strategies are designed for impacts deemed significantly beneficial. A range of analytical approaches was utilized to assess impact significance, including expert judgment, lessons from comparable projects, and alignment with environmental policies, regulations, management plans, and applicable standards. The assessment adhered to established significance criteria, as outlined in Section 7.1.

Table 7-1: A simple matrix below with the following ratings was used to determine significant impacts:

No	Rating	Description of Rating
1	+3	Very low positive impact to the project or receptor
2	+2	Moderate positive impact to the project or receptor
4	+1	High positive impact (Impact has advantages to the project or receptor)
5	0	No impacts



No	Rating	Description of Rating
6	-1	High negative impact (Impact is disadvantageous to the project or receptor)
7	-2	Moderate negative impacts to the project or receptor
8	-3	Very low negative impacts to the project or receptor

7.7. Impacts Associated with Project Phases

Mitigation and enhancement measures are developed for significant impacts that were rated +3, +2 +1, 0, -1, -2, and -3. In the next sections, significant impacts (positive and negative) associated with each phase of the project are discussed followed by mitigation, enhancement measures and project alternatives.



Table 7-2: Impact Correlation Matrix for the proposed development of the TBCW in Kaniyo Pabidi BCFR

Project phases		Construction Phase										Operation Phase				Decommissioning Phase			
Activities		Recruitment of labour force	Establishment of TBCW	Frequent movements of laborers	Construction traffic	Foundation Construction	Support Structure Installation	TBCW Construction	Safety Features Installation	Finishing	Quality Assurance and Testing	Solid waste disposal	Visitor Pressure	Recruitment of labour	Safety Concerns	Removal of material	Laying off Laborers	Removing of TBCW	Removal of concrete material
Impacts	Impacts Related to Physical Environment																		
Impacts Related to Physical Environment	Compatibility with CFR's FMP	0	0	0	0	0	0	-3	0	0	0	0	0	0	0	0	0	0	0
	Increased human presence	0	-3	-3	-3	0	-3	-3	-3	-3	0	-3	-2	0	-3	-3	0	-3	-3
	Vegetation removal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Visual intrusion/disruption	0	0	0	0	-3	-3	-3	-3	0	0	-3	-2	0	0	-3	0	-3	-3
	Disruption of ecological processes	0	0	0	0	-3	-3	-3	0	0	0	-3	-2	0	0	-3	0	-3	-3
	Structural degradation	0	0	0	0	-3	-3	-3	0	0	0	-3	-2	0	0	-3	0	-3	-3
	Risk of accidents/Incidences	0	0	0	-1	-3	-3	-1	-1	-3	0	0	-1	0	0	-3	0	-1	-1
	Resource consumption	0	0	0	0	-3	-3	0	0	0	0	0	-2	0	0	0	0	0	0
	Structural removal	0	0	0	-3	-3	-3	0	0	0	0	0	-2	0	0	0	0	0	-3
	Residual impact	0	0	0	0	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0
	Noise pollution	0	-3	-3	-3	-3	-3	-3	-3	-3	0	-3	-3	0	0	-3	-3	-3	-3
	Effects on Air quality	0	0	0	0	-3	0	0	0	-3	0	-3	0	0	0	-3	0	-3	-3
	Altered water quality	0	0	0	0	0	0	0	0	0	0	-3	0	0	0	-3	0	-3	-3
	Risk of soil contamination	0	-3	0	0	-3	0	-3	0	-3	0	-3	0	0	0	-3	0	-3	-3
	Ground disturbance	0	-3	-3	0	-3	0	-3	0	-3	0	-3	0	0	0	-3	0	-3	-3
Waste generation & Management	0	-3	-3	0	-2	-3	-3	-3	-3	0	0	-3	0	-3	-3	0	-3	-3	
Impacts Related to Ecological & Biological Environment																			
	Species diversity	0	-3	-3	-3	-3	-3	-3	-3	-3	0	-3	-3	0	0	-3	0	0	-3



Project phases		Construction Phase									Operation Phase				Decommissioning Phase				
Activities		Recruitment of labour force	Establishment of TBCW	Frequent movements of laborers	Construction traffic	Foundation Construction	Support Structure Installation	TBCW Construction	Safety Features Installation	Finishing	Quality Assurance and Testing	Solid waste disposal	Visitor Pressure	Recruitment of labour	Safety Concerns	Removal of material	Laying off Laborers	Removing of TBCW	Removal of concrete material
Impacts Related to Ecological & Biological Environment	Exotic species	0	-3	-3	-3	-3	-3	-3	-3	-3	0	-1	-1	0	0	0	0	0	0
	Disruption of wildlife	0	-3	-3	-3	-3	-3	-3	-3	-3	0	0	-3	0	0	0	0	0	0
	Habitat diversity & loss	0	-3	-3	0	0	-3	-3	0	-3	0	0	-3	0	0	0	0	0	0
	Introduction of invasive species	0	-3	-1	-3	-3	-3	-3	-3	-3	0	-1	-1	0	0	0	0	0	0
	Accidental wildlife disturbance	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0
	Altered prey-predator dynamics	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0
	Loss of nesting sites	0	-2	-2	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0
	Spread of diseases	0	0	-1	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0
	Altered plant - animal interaction	0	-3	-3	0	0	0	0	0	0	0	0	-3		0	0	0	0	0
	Use of local resources	0	-3	-3	-3	-3	-3	-3	-3	-3	0	-3	-3	-3	0	0	0	0	0
	Increased human presence	0	-3	-3	0	0	0	0	0	0	0	0	-2		0	0	0	0	0
Impacts Related to Socio-Economic Environment																			
Impacts Related to Socio-Economic Environment	Job creation	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
	Income generation	3	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0
	Tourism development	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Infrastructure development	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Community engagement	1	0	0	0	0	0	3	0	3	0	0	1	3	0	0	0	0	0
	Social disruption	-3	-3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Loss of livelihoods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	0



Project phases		Construction Phase									Operation Phase				Decommissioning Phase				
		Recruitment of labour force	Establishment of TBCW	Frequent movements of laborers	Construction traffic	Foundation Construction	Support Structure Installation	TBCW Construction	Safety Features Installation	Finishing	Quality Assurance and Testing	Solid waste disposal	Visitor Pressure	Recruitment of labour	Safety Concerns	Removal of material	Laying off Laborers	Removing of TBCW	Removal of concrete material
	Community health & safety risks	0	0	-3	0	0	0	0	0	0	0	0	-3	0	-3	0	0	0	0
	Tourism revenue	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Community development	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Cultural exchange	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Education awareness	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Cultural disruption	0	0	0	0	0	0	0	0	0	0	0	-2	0	0	0	0	0	0
	Overcrowding congestion	0	0	0	0	0	0	0	0	0	0	-3	-2	0	0	0	0	0	0
	Economic dependency	0	0	0	0	0	0	0	0	0	0	0	-3	0	0	0	0	0	0
Impacts associated with the Legal Framework																			
Impacts associated with the Legal Framework	Permitting challenges	-3	-3	0	0	0	0	0	-3	0	0	0	0	0	0	0	-3	0	0
	Violation of laws	-3	-3	0	0	0	0	-3	0	0	0	-3	-3	0	0	0	0	0	0
	Contractual disputes	-3	-3	0	0	0	0	0	0	0	0	0	0	-3	0	0	-3	0	0
	Regulatory compliance	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	0	0	0
	Public safety regulations	0	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0
	Regulatory changes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0
	Restoration obligation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0
	Abandonment liability	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0
	Contractual agreements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0	0
	Closure & access restrictions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3	0



Project phases		Construction Phase										Operation Phase				Decommissioning Phase			
Activities		Recruitment of labour force	Establishment of TBCW	Frequent movements of laborers	Construction traffic	Foundation Construction	Support Structure Installation	TBCW Construction	Safety Features Installation	Finishing	Quality Assurance and Testing	Solid waste disposal	Visitor Pressure	Recruitment of labour	Safety Concerns	Removal of material	Laying off Laborers	Removing of TBCW	Removal of concrete material
	Regulatory enforcement	-3	0	-3	-3	0	0	0	0	0	0	-3	-3	-3	-3	-3	-2	-3	-3



7.7.1. Pre-Construction Phase Impacts (Legal / Regulatory Framework)

7.7.1.1. Permitting Challenges

Obtaining the necessary permits for construction in a protected area can be time-consuming and complex due to stringent environmental regulations and legal frameworks governing land use and conservation. *The impact was rated -3 Low.*

Mitigation measures

- (a) Initiate early engagement and consultation with regulatory authorities responsible for managing the park to understand permit requirements, environmental regulations, and conservation objectives. Seek guidance on the permit application process, documentation requirements, and timelines to streamline the permitting process. Develop a comprehensive project plan that incorporates environmental considerations, habitat assessments, and mitigation measures to address potential impacts on the protected area. Design the project to minimize disturbance to sensitive habitats, species, and ecological resources, which can facilitate permit approval.
- (b) Arrange pre-application meetings with regulatory authorities to discuss project plans, environmental impacts, and permit requirements before formally submitting permit applications. Use these meetings to clarify expectations, address concerns, and identify potential issues early in the process to expedite permit review and approval.
- (c) Retain qualified environmental consultants, permit specialists, or legal counsel with expertise in navigating the permit process for construction in protected areas. Seek assistance from professionals who understand the regulatory landscape, have experience with similar projects, and can provide guidance on compliance requirements.
- (d) Prepare thorough, complete, and accurate permit applications that address all regulatory requirements, documentation needs, and environmental considerations. Provide detailed project descriptions, environmental impact assessments, mitigation plans, and supporting data to facilitate efficient permit review and approval.
- (e) Engage with stakeholders, including local communities, indigenous groups, conservation organizations, and other interested parties, to solicit input, address concerns, and build support for the project. Demonstrate a commitment to environmental stewardship, sustainable development, and responsible land use practices to gain stakeholder buy-in.
- (f) Respond promptly to requests for additional information, clarification, or revisions from regulatory authorities during the permit review process. Maintain open lines of communication and provide requested documentation or modifications in a timely manner to expedite permit approval and minimize delays.
- (g) Commit to strict compliance with permit conditions, environmental safeguards, and mitigation measures specified in approved permits. Implement monitoring programs, reporting requirements, and compliance protocols to ensure adherence to permit conditions throughout the construction phase and beyond.



7.7.1.2. Violation of Environmental Laws

Inadequate compliance with environmental laws and regulations during the construction phase, such as habitat protection laws or regulations related to protected species and the neighbouring community in Kaniyo Pabidi village, can lead to legal challenges, fines, and project delays. *The impact was rated -3 Low.*

Mitigation measures

- (a) Conduct a comprehensive environmental and social impact assessment (ESIA) prior to construction to identify potential environmental risks, impacts, and regulatory requirements. Assess the project's potential effects on habitats, species, water quality, air quality, and other environmental factors to inform mitigation measures and compliance strategies.
- (b) Conduct a thorough review of applicable environmental laws, regulations, permits, and approvals to ensure compliance with relevant requirements. Seek guidance from environmental consultants, legal counsel, or regulatory experts to interpret and understand regulatory obligations and develop strategies for compliance.
- (c) Conduct habitat surveys and species assessments to identify the presence of protected habitats, endangered species, or other sensitive ecological resources within the park. Develop mitigation measures and avoidance strategies to minimize impacts on these resources and comply with habitat protection laws and regulations.
- (d) Implement measures highlighted in the park management plan to protect endangered/threatened species.
- (e) Implement measures such as habitat restoration, species relocation, nesting season restrictions, and exclusion zones to protect sensitive species and comply with regulatory requirements.
- (f) Implement monitoring programs and supervision protocols to oversee construction activities and ensure compliance with environmental laws and regulations. Assign qualified environmental monitors or ecologists to assess compliance with permit conditions, mitigation measures, and best management practices throughout the construction phase.
- (g) Provide training and awareness programs for construction personnel, contractors, and subcontractors on environmental laws, regulations, and compliance requirements. Ensure that all workers are informed about their responsibilities for protecting habitats, species, and natural resources during construction activities.
- (h) Engage with regulatory agencies, conservation organizations, local communities, and indigenous groups to seek input, share information, and address concerns related to environmental compliance during construction. Foster collaboration and transparency to build trust and facilitate compliance with regulatory requirements.
- (i) Develop contingency plans and emergency response procedures to address unforeseen environmental incidents or compliance issues that may arise during construction. Establish protocols for reporting incidents, implementing corrective actions, and communicating with regulatory authorities to minimize the risk of fines, penalties, or project delays.



7.7.1.3. Contractual Disputes

Legal disputes may arise between project developers, contractors, and subcontractors over contractual obligations, project specifications, delays, or cost overruns, leading to litigation and financial liabilities. *The impact was rated -3 Low.*

Mitigation measures

- (a) Ensure that contracts between project developers, contractors, and subcontractors are clear, comprehensive, and accurately reflect the parties' obligations, responsibilities, and expectations. Clearly define project scope, specifications, milestones, deliverables, payment terms, and dispute resolution procedures to minimize ambiguity and potential areas of disagreement. This should be crosschecked periodically to consider and reconsider any unforeseen and foreseen changes.
- (b) Foster open lines of communication and collaboration between project stakeholders throughout the project lifecycle to proactively address issues, resolve disputes, and prevent conflicts from escalating into legal disputes. Schedule regular meetings, progress updates, and project reviews to maintain alignment and transparency among all parties involved.
- (c) Include dispute resolution mechanisms, such as mediation, arbitration, or alternative dispute resolution (ADR) clauses, in contracts to facilitate timely and cost-effective resolution of disputes without resorting to litigation. Specify procedures for initiating, conducting, and resolving disputes through ADR processes to provide a framework for resolving conflicts amicably.
- (d) Implement robust performance monitoring and oversight mechanisms to track progress, quality, and compliance with contractual requirements throughout the project lifecycle. Conduct regular inspections, quality assurance checks, and milestone reviews to identify potential issues early and take corrective action as needed to prevent disputes from arising.
- (e) Establish clear change management procedures to manage modifications, variations, or amendments to project scope, specifications, or timelines during the course of the project. Document changes in writing, obtain necessary approvals, and communicate changes to all relevant parties to minimize misunderstandings and disputes over scope creep or contract modifications.
- (f) Maintain accurate and comprehensive documentation of project-related communications, decisions, agreements, and transactions to establish a clear record of events and actions taken by all parties involved. Keep detailed records of correspondence, meeting minutes, change orders, and project documentation to support claims or defenses in the event of a dispute.
- (g) Conduct legal reviews and risk assessments of contracts, project agreements, and dispute resolution clauses to identify potential legal risks, liabilities, and exposure to litigation. Seek advice from legal counsel with expertise in construction law, contract law, and dispute resolution to ensure that contracts are legally enforceable and adequately protect the interests of all parties.
- (h) Obtain appropriate insurance coverage, such as professional liability insurance, performance bonds, or surety bonds, to protect against potential financial liabilities and



litigation risks arising from disputes or claims related to project performance. Ensure that insurance policies provide adequate coverage for legal defense costs, judgments, and settlements associated with litigation.

7.7.2. Construction Phase Impacts (Biological Environment)

7.7.2.1. Vegetation Removal and tree falls

A treefall or a diseased tree on a tree-based canopy walk can compromise structural integrity, posing a serious safety hazard to visitors. If a primary support tree weakens or collapses, it may lead to the partial or total failure of the walkway, necessitating costly repairs and temporary closure. Additionally, the decay or instability of a tree can disrupt the ecological balance of the surrounding forest, affecting biodiversity and the overall visitor experience.

The impact is rated -3 Low.

Mitigation measures

- (a) Conduct regular tree health assessments to detect diseases and structural weaknesses early.
- (b) Reinforce or replace weakened support trees with engineered structures where necessary.
- (c) Implement a monitoring system with sensors to detect tree movement or instability.
- (d) Establish an emergency response plan, including temporary closures and alternative routes.

7.7.2.2. Introduction of Invasive Species

Construction activities can inadvertently introduce invasive plant species or pests to the CFR area, which may outcompete native species and disrupt ecosystem dynamics. *The impact is rated -1 High.*

Mitigation measures

- (a) Undertake tourists/visitors 'induction/instructions to adhere to the TBCW policies, procedures & rules at all times such as shoes/clothing material crosschecking and disinfect materials before leaving for tracking in the forest trails.
- (b) Employ invasion biology specialist to undertake the daily tourist crosschecking
- (c) Conduct a comprehensive risk assessment to identify potential sources e.g. safety shoes, safety clothing, construction material etc. of invasive species introduction and prioritize areas of concern within and around the construction site. This assessment can guide targeted mitigation efforts.
- (d) Implement measures to prevent the introduction of invasive species by inspecting construction equipment, vehicles, and materials for hitchhiking seeds, propagules, or pests before entering CFR. Train construction personnel to recognize and report invasive species sightings promptly.
- (e) Establish protocols for incoming construction materials and equipment to prevent the unintentional introduction of invasive species. Implement treatment procedures, such as cleaning, disinfection, or heat treatment, for items originating from regions known to harbor invasive species.



- (f) Prioritize and ensure the use of native plant species in revegetation and landscaping efforts within and around the construction site. Restore disturbed areas with locally sourced native plants to enhance habitat quality and reduce the susceptibility of ecosystems to invasion by non-native species.
- (g) Develop vegetation management plans to control invasive species already present within the construction site area. Implement targeted control measures, such as mechanical removal, or biological control, to suppress invasive species populations and prevent their spread.
- (h) Implement regular monitoring programs to detect and assess the presence and abundance of invasive species within and adjacent to the construction site. Utilize citizen science initiatives e.g. ranger and tour guide monitoring, remote sensing technologies, and trained personnel to monitor invasive species dynamics and prioritize management actions.
- (i) Establish biosecurity protocols for construction personnel and vehicles to prevent the unintentional transport of invasive species between construction sites and CFR. Provide training and resources to promote awareness of biosecurity risks and best practices for minimizing invasive species spread.
- (j) Raise awareness among construction personnel, visitors, and local communities about the threats posed by invasive species and the importance of preventing their introduction and spread. Offer educational materials, workshops, and outreach programs to promote responsible behavior and engagement in invasive species management.
- (k) Adopt an adaptive management approach to invasive species management, incorporating feedback from monitoring and research activities to refine mitigation strategies over time. Invest in research to improve understanding of invasive species ecology, dynamics, and control methods applicable to CFR ecosystems.

7.7.2.3. Habitat Loss

Clearing of vegetation and excavation for construction activities can result in the direct loss of habitat for native plant and animal species. This loss can disrupt ecosystems and reduce biodiversity within the protected area. *The impact is rated -3 Low.*

Mitigation measures

- (a) Prioritize habitat preservation and minimization of impacts by carefully planning construction activities to avoid or minimize the clearing of vegetation and disturbance of sensitive habitats. Conduct thorough site assessments and ecological surveys to identify and protect critical habitat areas and biodiversity hotspots.
- (b) Develop vegetation restoration and offsetting plans to compensate for the loss of habitat caused by construction activities. Implement reforestation, revegetation, and habitat enhancement projects in nearby areas to create new habitat and enhance biodiversity, offsetting the ecological impacts of habitat loss.
- (c) Integrate green infrastructure elements into construction designs and site plans to preserve and enhance habitat connectivity, green corridors, and wildlife movement pathways.



Design features such as vegetated buffer zones, wildlife-friendly landscaping, and green roofs to provide habitat refuges and promote ecological connectivity across the landscape.

- (d) Establish exclusion zones or buffer areas around sensitive habitats, critical nesting sites, and protected species habitats to prevent direct impacts from construction activities. Implement fencing, signage, and access restrictions to limit disturbance and preserve undisturbed areas for wildlife conservation.
- (e) Schedule construction activities to minimize disruption to wildlife breeding seasons, migration periods, and critical life stages. Coordinate construction timing and phasing to avoid peak activity periods for sensitive species and minimize habitat disturbance during key ecological events.
- (f) Implement biodiversity monitoring programs to assess the impact of construction activities on native plant and animal species and track changes in biodiversity over time. Use monitoring data to inform adaptive management strategies and adjust construction practices to minimize ecological impacts and protect biodiversity.

7.7.2.4. Disruption of Wildlife

Noise, pollution, and human presence associated with construction activities can disturb wildlife, causing stress, changes in behavior, and displacement from their natural habitats. Sensitive species like elephants, buffalos, forest hogs, angulates among others may be particularly vulnerable to these disturbances. *The impact is rated -3 Low.*

Mitigation measures

- (a) Conduct thorough wildlife surveys and ecological assessments to identify the presence of sensitive species and their habitats within and adjacent to the construction area. Use this information to inform project planning and design measures to minimize impacts on wildlife.
- (b) Establish exclusion zones or buffer areas around known wildlife habitats, migration routes, and critical breeding or feeding areas to minimize disturbance from construction activities. Implement access restrictions, signage, and barriers to prevent intrusion into sensitive wildlife areas.
- (c) Schedule construction activities to minimize noise-generating activities, such as blasting or heavy machinery operation, during sensitive periods for wildlife, such as breeding seasons or critical life stages. Coordinate construction timing to avoid peak activity times for sensitive species and minimize disruption to their behavior and habitats.
- (d) Implement noise and vibration control measures, such as using quieter construction equipment, installing sound barriers, or employing vibration damping techniques, to reduce the impact of construction-related disturbances on wildlife. Limit the duration and intensity of noisy activities to minimize stress and disturbance to sensitive species.
- (e) Implement wildlife monitoring programs to assess the impact of construction activities on sensitive species and monitor changes in behavior, population dynamics, and habitat use. Use monitoring data to identify potential impacts and implement mitigation measures to minimize disturbance and support wildlife conservation goals.



- (f) Provide training and awareness programs for construction personnel to educate them about the presence of sensitive wildlife species, their habitats, and the importance of minimizing disturbance. Train workers in wildlife-friendly construction practices and protocols for responding to wildlife encounters to prevent conflicts and minimize impacts.
- (g) Implement habitat restoration and enhancement projects in and around construction areas to mitigate the loss of habitat and provide alternative habitat features for wildlife. Plant native vegetation, create water sources, and establish wildlife-friendly landscaping to compensate for habitat disturbance and support wildlife populations.

7.7.2.5. Disturbance to nesting sites

Construction activities can disturb nesting sites for birds and other wildlife, leading to abandonment of nests, reduced reproductive success, and population declines for vulnerable species. Some of the wildlife that could be affected include: Birds (songbirds, raptors, waterfowl, and shorebirds), Reptiles (turtles and snakes), Amphibians (frogs), small mammals (rabbits, squirrels, and mice) and invertebrates (butterflies, bees, and dragons) as presented in section 4.2. ***The impact is rated - 3 Low.***

Mitigation measures

- (a) Conduct thorough surveys of the construction area to identify nesting sites and habitats of vulnerable species. This helps in planning and implementing appropriate mitigation measures.
- (b) Establish buffer zones around known nesting sites to minimize disturbance. Fencing or signage can be used to demarcate these areas and prevent access by construction personnel and equipment.
- (c) Schedule construction activities outside of the breeding season for sensitive wildlife species. This reduces the likelihood of disturbing nesting sites and young offspring.
- (d) Implement habitat enhancement measures such as planting native vegetation or installing nest boxes to compensate for any habitat loss resulting from construction activities.
- (e) Conduct regular monitoring of construction sites to ensure compliance with environmental regulations and mitigation measures. This includes monitoring for the presence of nesting birds and other wildlife.

7.7.2.6. Loss of Native Vegetation

Clearing of vegetation for construction purposes can result in the loss of native plant species, including those with ecological importance such as food sources, shelter, and nesting sites for wildlife. ***The impact is rated -3 Low.*** It is anticipated that this impact will be low, since the design has been planned that tree clearing will be avoided hence the python design.

Mitigation measures

- (a) Conduct thorough vegetation surveys prior to construction to identify areas of high ecological value and species of concern. Designate these areas for preservation and avoid clearing whenever possible.



- (b) Implement selective clearing practices that target only the necessary vegetation for construction while preserving as much native vegetation as possible. This may involve using hand-clearing methods or machinery with precision attachments.
- (c) Develop a revegetation plan to restore cleared areas with native plant species after construction is complete. This can help to recreate habitat and ecosystem functions lost during construction.
- (d) Implement invasive species management strategies to prevent the colonization of cleared areas by non-native plants. This may involve regular monitoring and removal of invasive species.

7.7.3. Construction Phase Impacts (Physical Environment)

7.7.3.1. Visual Intrusion

The installation of structures such as towers, platforms, and walkways can alter the visual aesthetics of the landscape, detracting from its natural beauty. This visual intrusion may affect the experience of visitors and compromise the integrity of the protected area. ***The impact was rated -3 Low.***

Mitigation measures

- (a) Design structures to blend harmoniously with the surrounding forest canopy by using relevant materials, colors, and architectural styles that complement the environment as already put in the design.
- (b) Conduct visual impact assessments prior to construction to identify sensitive viewpoints and scenic areas, and adjust the design and placement of structures accordingly to minimize visual intrusion.
- (c) Implement screening or camouflage techniques, such as vegetation planting or strategic placement of structures behind natural features, to visually integrate them into the forest canopy and reduce their visibility from key viewpoints.
- (d) Limit the height, size, and number of structures to minimize their visual prominence and maintain the scale and character of the forest.
- (e) Educate visitors about the purpose and importance of installed structures, as well as the need to preserve the beauty of the forest landscape, through interpretive signage, guided tours, and visitor orientation programs.
- (f) Monitor the visual impacts of installed structures over time and implement adaptive management measures as needed to address any unforeseen impacts or changes in visitor perceptions.

7.7.3.2. Noise Pollution

Construction activities typically generate noise pollution, which can disturb wildlife and disrupt natural behaviors such as breeding, feeding, and communication. This disturbance may have long-lasting effects on the ecological balance of the protected area. ***The impact is rated -3 Low.***

Mitigation measures



- (a) Establish a construction noise management plan that outline specific noise control measures and mitigation strategies to minimize noise levels and duration of exposure.
- (b) Schedule construction activities during periods of low wildlife activity, such as early morning or late evening, to minimize disruption to sensitive species.
- (c) Designate buffer zones or wildlife corridors around elephant routes to minimize direct exposure of wildlife to construction noise.
- (d) Implement regular monitoring of noise levels during construction to ensure compliance with established noise limits and promptly address any exceedances through adjustments to construction practices or equipment.
- (e) Educate construction workers and contractors about the importance of minimizing noise pollution and following noise management protocols to minimize impacts on wildlife and their habitats.
- (f) Incorporate noise reduction measures into the design and layout of construction sites, such as strategic placement of equipment, use of natural barriers, and optimization of construction methods to minimize noise propagation.

7.7.4. Construction Phase Impacts (Socio-Economic Environment)

7.7.4.1. Job Creation

Construction projects require labor, including skilled and unskilled workers, providing employment opportunities for local residents. This can stimulate economic activity and alleviate unemployment in nearby communities.

Enhancement measures

- (a) Prioritize the hiring of local residents for construction jobs, including both skilled and unskilled labor positions. Work closely with local labor unions, job centers, and community organizations to identify and recruit qualified candidates from nearby communities.
- (b) Offer training programs to equip local residents with the necessary skills for employment in the construction industry. Partner with vocational schools and workforce development agencies to provide hands-on training and mentorship.
- (c) Engage with local communities early in the planning stages of construction projects to solicit input, address concerns, and build support for the initiative. Hold community meetings, workshops, and information sessions to provide updates and gather feedback from residents.
- (d) Provide opportunities for local subcontractors, suppliers, and small businesses to participate in construction projects as vendors or service providers. Seek out qualified local firms for subcontracting work and procurement opportunities wherever feasible.
- (e) Implement labor agreements and standards that ensure fair wages, safe working conditions, and equal employment opportunities for all workers involved in the construction project. Adhere to local labor laws, regulations, and industry best practices to protect workers' rights and well-being.



- (f) Promote diversity and inclusion in the construction workforce by actively recruiting and retaining workers from underrepresented groups, including women, minorities, veterans, and individuals with disabilities. Create a welcoming and inclusive work environment that values diversity and fosters mutual respect.
- (g) Negotiate community benefits agreements that outline specific benefits, investments, and commitments to be provided by the project developer in exchange for community support. Ensure that the agreement addresses the needs and priorities of local residents and contributes to long-term community development.

7.7.4.2. Income Generation

Construction activities may generate income for local businesses, such as construction firms, suppliers of materials, equipment rental companies, and hospitality services catering to construction workers.

Enhancement measures

- (a) Implement local procurement policies that prioritize sourcing materials, supplies, and services from local businesses whenever feasible. Establish relationships with local suppliers, manufacturers, and distributors to support the local economy and reduce transportation costs.
- (b) Launch vendor outreach programs to connect local businesses with opportunities to participate in construction projects as suppliers, subcontractors, or service providers. Provide information sessions, networking events, and matchmaking services to facilitate business partnerships.
- (c) Promote supplier diversity by actively seeking out and contracting with minority-owned, women-owned, and veteran-owned businesses for construction-related goods and services. Create supplier diversity programs that encourage inclusivity and support economic empowerment within the community.
- (d) Offer business capacity building programs and workshops to help local businesses strengthen their operations, enhance their competitiveness, and access new markets. Provide training in areas such as financial management, marketing, procurement practices, and quality control.
- (e) Subcontract portions of the construction work to local firms and subcontractors, allowing them to contribute to the project and benefit from the economic opportunities it generates. Break down larger contracts into smaller, more manageable packages to facilitate participation by small and minority-owned businesses.
- (f) Negotiate community benefit agreements that include provisions for supporting local businesses and entrepreneurs affected by the construction project. Allocate a portion of the project budget to fund business assistance programs, grants, loans, or technical support services for local businesses.
- (g) Launch promotional campaigns to raise awareness of local businesses and encourage construction workers and contractors to patronize them. Create directories, maps, and



online platforms that showcase local businesses offering goods and services relevant to the construction industry.

- (h) Collaborate with local equipment rental companies to supply construction machinery, tools, and equipment needed for the project. Prioritize contracts with local rental providers and establish long-term partnerships that benefit both parties.

7.7.4.3. Tourism Development

The construction of a forest TBCW will enhance the tourism infrastructure of the region, attracting visitors and generating revenue for local businesses, accommodations, restaurants, and recreational services.

Enhancement measures

- (a) Launch targeted marketing campaigns to promote the forest TBCW as a must-visit attraction in the region. Utilize a mix of digital marketing, social media, and travel publications to reach potential visitors and generate interest in the destination.
- (b) Collaborate with local accommodations, restaurants, and recreational services to create tourism packages that include access to the forest TBCW. Offer bundled experiences, discounts, and special offers to attract visitors and encourage longer stays.
- (c) Enhance the visitor experience by providing amenities such as rest areas, information kiosks, and guided tours at the forest TBCW site. Partner with local tour operators and guides to offer informative and engaging experiences for visitors.
- (d) local cuisine and culinary experiences at nearby restaurants and eateries, providing visitors with opportunities to sample regional specialties and support local food producers. Promote farm-to-table dining experiences and culinary tours that highlight local ingredients.
- (e) Encourage the development of new accommodations, including hotels, bed and breakfasts, eco-lodges, and campgrounds, to accommodate the influx of visitors attracted by the forest TBCW. Partner with accommodation providers to offer exclusive packages and deals for visitors.
- (f) Highlight nearby recreational activities and attractions that complement the forest TBCW experience, such as hiking trails, wildlife viewing areas, and adventure sports. Create partnerships with local recreational providers to offer discounted access and bundled experiences for visitors.
- (g) Advocate for infrastructure improvements, such as road upgrades, parking facilities, and signage, to enhance accessibility and convenience for visitors accessing the forest TBCW. Work with local authorities and government agencies to secure funding and support for infrastructure projects.
- (h) Establish visitor information centers or kiosks in strategic locations to provide tourists with maps, brochures, and recommendations for local attractions and services. Train staff to provide personalized assistance and answer questions about the forest TBCW and surrounding area.
- (i) Incorporate cultural and heritage experiences into the tourism offerings surrounding the forest TBCW. Partner with local cultural institutions, Uganda museums and Bunyoro



museum, and indigenous communities to offer guided tours, workshops, and cultural performances that showcase the Bunyoro Kingdom's unique heritage.

- (j) Engage with local communities, businesses, and stakeholders to ensure that the benefits of tourism development associated with the forest TBCW are shared equitably. Foster collaboration and partnerships that support sustainable tourism practices and contribute to the long-term prosperity of the region.

7.7.4.4. Infrastructure Improvement

Construction projects often involve the development or improvement of infrastructure such as roads, trails, and visitor facilities, which can benefit local communities by enhancing accessibility and quality of life.

Enhancement measures

- (a) Engage local communities in the planning and design phases of infrastructure projects to ensure that their needs and preferences are considered. Hold public meetings, workshops, and surveys to gather input and feedback from residents.
- (b) Prioritize accessibility improvements in infrastructure projects to ensure that facilities are inclusive and accessible to all community members, including those with disabilities and mobility challenges. Install ramps, sidewalks, and crosswalks to enhance pedestrian accessibility.
- (c) Develop multi-modal transportation infrastructure that accommodates various modes of transportation, including walking, cycling, public transit, and private vehicles. Improve connectivity between residential areas, trading centers, and recreational amenities to enhance mobility options for residents.
- (d) Integrate green infrastructure components into construction projects to enhance environmental sustainability and resilience. Incorporate features such as green spaces, rain gardens, and permeable pavement to manage stormwater, reduce urban heat island effects, and improve air quality.
- (e) Use infrastructure projects as an opportunity to enhance community facilities and amenities, such as parks, playgrounds, community centers, and sports facilities. Create vibrant public spaces that promote social interaction, recreation, and cultural activities.
- (f) Leverage infrastructure development to stimulate local economic development and job creation. Prioritize local hiring, procurement, and subcontracting to maximize economic benefits for residents and businesses in the community.
- (g) Enhance tourism and recreation opportunities by improving access to natural and cultural attractions through infrastructure development. Develop trails, interpretive signage, and visitor facilities to encourage tourism and outdoor recreation while preserving the local environment.
- (h) Implement safety and security enhancements in infrastructure projects to create safer and more secure communities. Install street lighting, traffic signals, and surveillance cameras to improve public safety and deter crime in high-risk areas.



- (i) Preserve and celebrate the cultural heritage and historical significance of the community through infrastructure projects. Incorporate design elements and interpretive signage that highlight local history, landmarks, and cultural traditions.
- (j) Develop long-term maintenance and management plans for infrastructure facilities to ensure their continued functionality and sustainability. Allocate resources for routine maintenance, repairs, and upgrades to extend the lifespan of infrastructure assets and minimize future costs.

7.7.4.5. Community Engagement

The construction phase will involve consultation and collaboration with all stakeholders, specifically providing opportunities for community engagement, capacity building, and participation in decision-making processes.

Enhancement measures

- (a) Host regular workshops and meetings with local communities and other stakeholders to provide updates on the construction project, gather feedback, and address concerns. Create a collaborative environment where community members feel empowered to participate in decision-making processes.
- (b) Provide timely and transparent information about the construction project, including its objectives, timelines, and potential impacts. Make project documents, reports, and plans readily accessible to the public through websites, community meetings, and information centers.
- (c) Provide cultural sensitivity training for project personnel to ensure respectful and inclusive interactions with local communities. Foster understanding and appreciation for local customs, traditions, and cultural protocols throughout the construction process.
- (d) Incorporate traditional knowledge and indigenous perspectives into the planning and implementation of the construction project. Consult with local elders, knowledge holders, and community leaders to identify culturally significant sites, practices, and concerns that should be considered in project design and execution.
- (e) Designate community liaison officers or representatives to serve as points of contact between the construction project team and local communities. These individuals should be familiar with the needs, priorities, and concerns of the community and facilitate communication and collaboration throughout the construction phase.
- (f) Offer capacity building programs and training opportunities for local community members to develop skills and expertise relevant to the construction industry. Provide workshops, apprenticeships, and certification programs in areas such as construction management, safety protocols, and environmental stewardship.
- (g) Prioritize local hiring and procurement in the construction phase to maximize economic benefits for the community. Create job opportunities for local residents in construction-related roles and subcontracting opportunities for local businesses and suppliers.



- (h) Negotiate community benefits agreements that outline specific benefits, investments, and commitments to be provided by the project developer in exchange for community support. Ensure that the agreement addresses the needs and priorities of local communities.
- (i) Establish effective conflict resolution mechanisms to address disagreements or disputes that may arise during the construction phase. Provide avenues for mediation, arbitration, or community dialogue to resolve conflicts in a fair and transparent manner.

7.7.4.6. Increased Human Presence

The construction phase may bring a workforce of 06 – 10 persons; this shall not cause a significant impact to the ecosystem. However, during operation phase, there may be an influx of d visitors to the park, leading to increased human disturbance and pressure on fragile ecosystems. *The impact is rated -3 Low.*

Mitigation measures

- (a) Establish designated zones for construction activities to minimize direct impacts on floral and faunal species. Implement access control measures to restrict the movement of construction workers, equipment, and visitors in ecologically sensitive areas.
- (b) Schedule construction activities to minimize impacts e.g. on breeding seasons or migration periods for wildlife. Avoid construction during peak visitor seasons to reduce cumulative impacts on fragile ecosystems.
- (c) Provide training to construction workers on the importance of minimizing their ecological footprint and adhering to site-specific environmental regulations and guidelines. Raise awareness about sensitive faunal species behaviors, and the significance of the protected area.
- (d) Educate visitors about the ecological values of CFR and the importance of minimizing their impact through interpretive signage, guided tours, and visitor orientation programs. Encourage responsible behaviour, such as staying on designated trails and respecting wildlife viewing guidelines.
- (e) Implement monitoring programs to assess the effectiveness of mitigation measures and detect any unauthorized activities or disturbances. Enforce regulations and guidelines through regular patrols, surveillance, and fines for non-compliance.
- (f) Engage with stakeholders, including local communities and conservation organizations, to solicit input, build partnerships, and foster stewardship of the protected area. Collaborate on conservation initiatives, community-based monitoring, and sustainable tourism development.
- (g) Implement visitor capacity limits and carrying capacity assessments to prevent overcrowding and minimize ecological impacts from excessive human visitation. Use reservation systems, timed entry permits, or visitor quotas to regulate access during peak periods.



7.7.4.7. Community Health and Safety Risks

Construction sites pose health and safety risks to workers, visitors, and nearby residents, including accidents, injuries, exposure to hazardous materials, and occupational health hazards. *The impact is rated -3 Low.*

Mitigation measures

- (a) Provide comprehensive safety training programs for all workers, contractors, and subcontractors involved in the construction project. Ensure that workers are trained in hazard recognition, emergency procedures, and safe work practices relevant to their tasks.
- (b) Conduct regular safety inspections of the construction site to identify hazards, assess risks, and implement corrective measures. Inspections should be carried out by trained safety professionals and involve input from workers and supervisors.
- (c) Develop and implement emergency response plans to address accidents, injuries, and other emergencies that may occur on the construction site. Establish procedures for reporting incidents, evacuating workers, and providing medical assistance as needed.
- (d) Implement proper handling, storage, and disposal procedures for hazardous materials commonly used on construction sites, such as chemicals, solvents, and construction waste. Provide training on the safe handling and disposal of hazardous materials to workers and contractors.
- (e) Establish health monitoring and surveillance programs to monitor the health status of workers and detect early signs of occupation
- (f) al illnesses or injuries. Conduct regular medical examinations, screenings, and health assessments for workers exposed to potential hazards.
- (g) Implement noise and dust control measures to minimize exposure to harmful environmental factors on the construction site. Use engineering controls, such as noise barriers and dust suppression systems, to reduce the spread of noise and airborne contaminants.
- (h) Develop traffic management plans to ensure the safe movement of vehicles, equipment, and pedestrians around the construction site. Implement measures such as traffic signs, barriers, and designated pedestrian walkways to prevent accidents and injuries.
- (i) Install clear and visible safety signage throughout the construction site to communicate hazards, warnings, and safety instructions to workers and visitors. Use pictograms, symbols, and multilingual signage to ensure comprehension by all workers.
- (j) Collaborate with regulatory authorities, such as Occupational Health and Safety Department (OSH), to ensure compliance with applicable safety regulations and standards. Participate in safety inspections, audits, and enforcement actions to maintain a safe and healthy work environment.



7.7.5. Operational Phase Impacts (Legal / Regulatory Framework)

7.7.5.1. Regulatory Compliance

Ensuring ongoing compliance with environmental regulations, zoning ordinances, and other legal requirements during the operation phase can be challenging and may require significant resources for monitoring, reporting, and mitigation measures. *The impact was rated -3 Low.*

Mitigation measures

- (a) Establish a robust compliance management system to monitor, track, and document compliance with environmental regulations, zoning ordinances, and other legal requirements. Implement software tools or databases to centralize compliance data, streamline reporting processes, and facilitate real-time monitoring of regulatory obligations.
- (b) Conduct regular environmental and social audits or assessments to evaluate compliance with applicable regulations, identify potential non-compliance issues, and implement corrective actions. Engage third-party environmental consultants or auditors to provide independent assessments and recommendations for improvement.
- (c) Provide training and capacity building opportunities for staff members responsible for environmental compliance to ensure a thorough understanding of regulatory requirements and best practices. Offer training sessions, workshops, or certification programs on relevant topics such as environmental law, pollution prevention, and regulatory compliance.
- (d) Conduct periodic reviews of legal requirements, permits, approvals, and regulatory obligations to ensure ongoing compliance with environmental regulations, zoning ordinances, and other legal requirements. Stay informed about changes in regulatory frameworks, enforcement priorities, and compliance deadlines that may impact operations.
- (e) Conduct proactive risk assessments to identify potential compliance risks, vulnerabilities, and liabilities associated with environmental regulations and zoning ordinances. Develop risk mitigation strategies and contingency plans to address identified risks and minimize the likelihood of non-compliance.
- (f) Maintain open lines of communication with regulatory authorities responsible for overseeing environmental compliance and zoning enforcement. Proactively engage with regulators to seek guidance on regulatory requirements, address compliance concerns, and resolve any issues or disputes promptly.
- (g) Foster a culture of continuous improvement within the organization to enhance environmental performance, minimize compliance risks, and optimize resource allocation. Establish mechanisms for evaluating and benchmarking environmental performance metrics, setting goals, and implementing corrective actions to drive continual improvement over time.



7.7.5.2. Public Safety Regulations

Compliance with public safety regulations and liability issues associated with visitor accidents or injuries on the TBCW, such as inadequate signage, railing heights, or emergency response procedures, can result in legal liabilities and litigation. *The impact was rated -3 Low.*

Mitigation measures

- (a) Conduct a thorough safety assessment of the TBCW to identify potential hazards, risks, and compliance gaps related to visitor safety regulations. Assess factors such as signage visibility, railing heights, surface conditions, emergency response procedures, and accessibility for visitors with disabilities.
- (b) Implement a schedule for regular inspections and maintenance of the TBCW infrastructure to ensure compliance with safety regulations and standards. Conduct routine checks of signage, railings, structural integrity, and other safety features to identify and address any deficiencies promptly.
- (c) Develop and implement risk management protocols to mitigate potential hazards and risks associated with visitor accidents or injuries on the TBCW. Establish procedures for hazard identification, risk assessment, risk mitigation, and incident reporting to proactively manage safety risks.
- (d) Provide comprehensive visitor education and awareness programs to inform visitors about safety guidelines, rules, and procedures for using the TBCW. Use signage, brochures, orientation sessions, and online resources to communicate safety information effectively and promote responsible behavior.
- (e) Develop and implement emergency response plans and procedures to address potential accidents, injuries, or medical emergencies on the TBCW. Train staff members and volunteers in emergency response protocols, first aid, CPR, and evacuation procedures to ensure a prompt and effective response to incidents.
- (f) Ensure that the TBCW is accessible and inclusive for visitors of all ages, abilities, and mobility levels. Comply with accessibility standards and guidelines for barrier-free design, wheelchair access, handrails, signage, and tactile indicators to accommodate diverse visitor needs.
- (g) Obtain liability insurance coverage to protect against potential legal liabilities and litigation arising from visitor accidents or injuries on the TBCW. Ensure that insurance policies provide adequate coverage for property damage, bodily injury, medical expenses, legal expenses, and other liabilities associated with visitor incidents.
- (h) Conduct regular legal reviews of safety policies, procedures, and liability waivers to ensure compliance with applicable regulations, standards, and best practices. Seek legal counsel to provide guidance on liability issues, risk management strategies, and compliance obligations related to visitor safety on the TBCW.

7.7.5.3. Regulatory Changes

Changes in environmental regulations, land use policies, or protected area management plans during the operation phase may require modifications to the operation or closure of the TBCW,



leading to legal compliance issues and potential disputes with regulatory authorities. *The impact was rated -3 Low.*

Mitigation measures

- (a) Establish a process for regular monitoring and assessment of changes in environmental regulations, land use policies, and protected area management plans that may impact the operation of the TBCW. Stay informed about new developments, updates, or amendments to relevant regulations and policies.
- (b) Maintain open lines of communication with regulatory authorities responsible for overseeing environmental compliance, land use planning, and protected area management. Proactively engage with regulatory agencies to seek clarification on regulatory requirements, discuss potential impacts on the TBCW, and explore options for compliance.
- (c) Adopt an adaptive management approach to accommodate changes in environmental regulations and land use policies while ensuring continued operation of the TBCW. Develop flexibility in operational procedures, management practices, and infrastructure design to adapt to evolving regulatory requirements and minimize compliance risks.
- (d) Conduct risk assessments to identify potential legal compliance issues, regulatory uncertainties, and associated risks arising from changes in environmental regulations or land use policies. Develop contingency plans and mitigation strategies to address potential challenges and ensure timely compliance with regulatory requirements.
- (e) Seek guidance from legal counsel, environmental consultants, or other experts with expertise in environmental law, land use planning, and protected area management. Obtain professional advice on interpreting regulatory changes, assessing compliance obligations, and developing strategies for addressing legal compliance issues.
- (f) Review and update management plans for the TBCW in response to changes in environmental regulations, land use policies, or protected area management plans. Ensure that management plans reflect current regulatory requirements, address emerging conservation priorities, and incorporate adaptive management principles.
- (g) Maintain transparency and communication with stakeholders, visitors, and the public regarding changes in environmental regulations, land use policies, or protected area management plans affecting the TBCW. Provide timely updates, information, and opportunities for stakeholder input to promote understanding and compliance with regulatory requirements.

7.7.6. Operational Phase Impacts (Biological Environment)

7.7.6.1. Disturbance to Wildlife

Increased human presence and activity associated with the operation of the TBCW can disturb wildlife, leading to changes in behaviour, habitat avoidance, and stress. Sensitive species may be particularly vulnerable to disturbance. *The impact is rated -3 Low.*

Mitigation measures



- (a) Develop educational materials and signage to inform visitors about the importance of minimizing disturbance to wildlife. Provide guidelines on appropriate behavior, such as keeping noise levels down, staying on designated paths, and avoiding approaching or feeding wildlife.
- (b) Implement a reservation system or timed entry tickets to control the number of visitors accessing the TBCW at any given time. This helps prevent overcrowding and reduces the likelihood of wildlife disturbance.
- (c) Establish designated viewing areas along the TBCW where visitors can observe wildlife without causing disturbance. These areas should be strategically located to minimize visual and auditory impact on sensitive wildlife habitats.
- (d) Designate certain areas along the TBCW as quiet zones where visitors are encouraged to maintain silence and minimize noise levels. This allows wildlife to remain undisturbed and reduces stress levels, especially for sensitive species.
- (e) Consider implementing seasonal closures during sensitive times such as breeding or nesting seasons to minimize disturbance to wildlife. This allows wildlife to use the area undisturbed during critical life stages.
- (f) Provide training for TBCW staff on wildlife conservation and interpretation techniques. Staff should be knowledgeable about local wildlife species, their habitats, and how to minimize disturbance while interacting with visitors.
- (g) Offer interpretive programs and guided tours focused on wildlife conservation and habitat protection. Educate visitors about the importance of respecting wildlife and minimizing their impact on natural ecosystems.

7.7.6.2. Introduction of Exotic Species

Visitors to the TBCW may inadvertently introduce non-native plant seeds, insects, or pathogens to the protected area, potentially leading to competition with native species, habitat degradation, and altered ecosystem dynamics. *The impact is rated -3 Low.*

Mitigation measures

- (a) Develop educational materials and signage to inform visitors about the importance of preventing the introduction of non-native species. Provide guidelines on proper cleaning of footwear and clothing before entering the protected area and encourage visitors to check for seeds or insects.
- (b) Install boot cleaning stations at the entrance to the TBCW where visitors can brush off dirt, seeds, and insects from their footwear before entering the protected area. Provide brushes, water, and cleaning solutions for visitors to use.
- (c) Place signage at trailheads and entrance points to the TBCW that highlights the importance of preventing the spread of invasive species. Provide information on how visitors can help by cleaning their gear and staying on designated paths.
- (d) Implement a monitoring program to regularly assess the presence of invasive species within the protected area. Train staff and volunteers to identify invasive plants, insects, and pathogens and report any findings for prompt management action.



- (e) Conduct native plant restoration efforts within the protected area to restore habitat and outcompete invasive species. Engage volunteers and local community groups in planting native vegetation and removing invasive plants.
- (f) Implement regular site maintenance activities such as trail grooming and vegetation management to control the spread of invasive species and prevent their establishment within the park.
- (g) Develop and enforce biosecurity protocols for staff, contractors, and researchers working within the park. Require adherence to strict cleaning and disinfection procedures for equipment and vehicles to prevent the spread of invasive species.

7.7.6.3. Spread of Invasive Species

Operation of the TBCW may facilitate the spread of invasive plant species by providing pathways for their dispersal and colonization into previously undisturbed areas. Invasive species can outcompete native vegetation and disrupt ecosystem functioning. ***The impact is rated -1 High.***

Mitigation measures

- (a) Install signage at entry points to the TBCW advising visitors not to bring in any plants, seeds, or plant parts from outside the area. Provide information on the importance of preventing the spread of invasive species and how visitors can help.
- (b) Establish boot cleaning stations at the entrance to the TBCW where visitors can brush off dirt and seeds from their footwear before entering the area. Provide brushes, water, and cleaning solutions for visitors to use.
- (c) Implement regular trail maintenance activities to remove any invasive plants that may be present along the TBCW. Train staff and volunteers to identify invasive species and report any sightings for prompt management action.
- (d) Develop and implement invasive species removal programs to target and control the spread of invasive plants within and adjacent to the TBCW area. Utilize manual removal, mechanical control methods, and targeted herbicide application as appropriate.
- (e) Conduct native plant restoration efforts within and around the TBCW area to restore habitat and outcompete invasive species. Engage volunteers and local community groups in planting native vegetation and removing invasive plants.
- (f) Install physical barriers such as fencing or barriers made from natural materials to prevent the spread of invasive plants from adjacent areas into the TBCW area. Regularly inspect and maintain these barriers to ensure effectiveness.
- (g) Implement an early detection and rapid response program to identify and address new invasive species infestations in the vicinity of the TBCW area. Develop protocols for quickly responding to new invasive species sightings to prevent their establishment and spread.
- (h) Provide educational materials and programs to raise awareness among visitors, staff, and local communities about the threat of invasive species and how they can help prevent their spread. Offer guided walks or interpretive programs focused on invasive species management.



- (i) Partner with local conservation organizations, invasive species experts, and government agencies to develop and implement effective invasive species management strategies. Seek advice and expertise on species identification, control methods, and monitoring techniques.
- (j) Conduct regular monitoring of the TBCW area and surrounding habitats to assess the effectiveness of invasive species management efforts. Monitor changes in vegetation composition and diversity over time and adjust management strategies as needed.

7.7.6.4. Accidental wildlife disturbance

Activities associated with the operation of the TBCW, such as maintenance work, guided tours, or recreational activities, may inadvertently disturb nesting sites, foraging areas, or breeding grounds of wildlife, leading to negative impacts on population dynamics and reproductive success. *The impact is rated -3 Low.*

Mitigation measures

- (a) Implement seasonal restrictions on certain activities, such as maintenance work or guided tours, during critical wildlife breeding or nesting seasons. Adjust schedules to minimize disturbance during sensitive times.
- (b) Conduct thorough surveys to identify and map sensitive wildlife habitats, including nesting sites, foraging areas, and breeding grounds. Use this information to inform activity planning and avoid sensitive areas whenever possible.
- (c) Design and maintain trails and access routes to minimize impacts on wildlife habitat. Use existing pathways and avoid creating new trails through sensitive areas whenever possible.
- (d) Develop protocols for guided tours to minimize disturbance to wildlife. Train guides to recognize signs of wildlife activity and adjust routes or activities accordingly to avoid nesting or breeding areas.
- (e) Provide educational materials and interpretive signage to inform visitors about the importance of minimizing disturbance to wildlife. Encourage visitors to stay on designated paths, keep noise levels down, and avoid approaching wildlife.
- (f) Limit access to sensitive wildlife habitats by controlling visitor numbers and restricting entry during critical periods, such as breeding seasons. Implement reservation systems or timed entry tickets to manage visitor flow.
- (g) Implement a monitoring program to assess the effects of TBCW activities on wildlife populations and habitat use. Conduct research to identify sensitive species and their specific responses to disturbance.
- (h) Implement habitat enhancement measures, such as planting native vegetation or installing nest boxes, to offset any habitat loss or disturbance caused by TBCW activities. Create alternative nesting or foraging opportunities for wildlife.

7.7.6.5. Altered Predator-Prey Dynamics

Increased human presence in the protected area may alter predator-prey dynamics, leading to changes in species interactions and ecosystem structure. Predators may avoid areas of high human



activity, while prey species may experience increased predation risk due to reduced vigilance. ***The impact is rated -3 Low.***

Mitigation measures

- (a) Maintain and enhance natural habitats within the protected area to provide refuge and suitable habitat for both predator and prey species. Ensure a diverse habitat structure to support a variety of species.
- (b) Implement vegetation screening or strategic placement of vegetation to create visual barriers that help prey species detect and evade predators. This can help mitigate the increased predation risk associated with reduced vigilance.
- (c) Design trails and access routes in a way that minimizes disruption to predator-prey interactions. Avoid creating trails that intersect key predator hunting grounds or disrupt prey movement corridors.
- (d) Provide educational materials and interpretive signage to inform visitors about the importance of minimizing disturbance to predator-prey dynamics. Encourage visitors to stay on designated trails, keep noise levels down, and avoid behaviors that may disrupt wildlife behavior.
- (e) Implement targeted predator management strategies, such as habitat restoration or predator deterrents, to mitigate the potential impacts of increased human presence on predator populations. Ensure that management actions are based on scientific evidence and conducted in a humane and ethical manner.
- (f) Implement measures to protect vulnerable prey species from increased predation risk associated with reduced vigilance. This may include providing artificial refuges, such as nest boxes or hiding places, and enhancing habitat features that improve prey detection and escape.
- (g) Establish monitoring programs to assess changes in predator and prey populations, behavior, and interactions in response to increased human presence. Use this information to inform adaptive management strategies and adjust conservation efforts as needed.
- (h) Implement seasonal restrictions on certain human activities, such as hiking or recreational events, during sensitive periods for predator-prey dynamics. Adjust visitor access and activity levels to minimize disruption to wildlife behavior during critical times.
- (i) Conduct research to better understand the specific impacts of increased human presence on predator-prey dynamics in the protected area. Collaborate with researchers, conservation organizations, and local stakeholders to develop and implement effective management strategies.

7.7.6.6. Loss of Nesting Sites

Continued use of the TBCW and surrounding infrastructure may lead to the loss or degradation of nesting sites for birds and other wildlife. This loss can negatively impact reproductive success and population viability for species that rely on specific habitat features for nesting. ***The impact is rated -3 Low.***

Mitigation measures



- (a) Conduct regular habitat assessments to identify nesting sites and critical habitat features for birds and other wildlife within the area surrounding the TBCW. Implement monitoring programs to track changes in habitat quality and nesting site availability over time.
- (b) Designate nesting sites and critical habitat features as protected areas where human disturbance is minimized or prohibited. Install signage and barriers to demarcate these areas and prevent inadvertent disturbance by visitors.
- (c) Implement habitat restoration and enhancement projects to create or improve nesting habitat for birds and other wildlife. This may include planting native vegetation, installing nest boxes or platforms, and creating artificial nesting structures.
- (d) Implement vegetation management practices that promote the growth and maintenance of suitable nesting habitat while minimizing the risk of habitat degradation. Use selective pruning and thinning techniques to maintain habitat structure and diversity.
- (e) Provide educational materials and interpretive signage to raise awareness among visitors about the importance of nesting habitat for birds and other wildlife. Encourage visitors to respect nesting sites and avoid activities that may disturb nesting individuals or their offspring.
- (f) Implement seasonal restrictions on certain activities, such as vegetation maintenance or infrastructure development, during critical nesting periods for birds and other wildlife. Adjust visitor access to minimize disturbance during sensitive times.
- (g) Conduct regular maintenance inspections of infrastructure surrounding the TBCW to identify and address potential nesting site impacts. Repair or replace damaged structures to prevent further habitat degradation.

7.7.6.7. Spread of Diseases

Concentrated human visitation to the TBCW can increase the risk of disease transmission among wildlife populations, particularly if visitors come into close contact with infected animals or their habitats. Disease outbreaks can have significant impacts on population health and dynamics. ***The impact is rated -2 Moderate.***

Mitigation measures

- (a) Protection against spread of diseases should follow NFA/national policies and guidelines.
- (b) Provide educational materials and signage to inform visitors about the potential risks of disease transmission to wildlife and the importance of minimizing contact with wildlife and their habitats. Encourage visitors to maintain a safe distance from wildlife and to follow recommended hygiene practices.
- (c) Install hand hygiene stations at key entry points to the TBCW and along visitor routes. Provide hand sanitizer or handwashing facilities to encourage visitors to clean their hands before and after interacting with wildlife or their habitats.
- (d) Implement visitor monitoring programs to track visitor behavior and compliance with guidelines related to wildlife interaction and disease prevention. Use this information to identify areas of concern and implement targeted interventions as needed.



- (e) Establish wildlife health surveillance programs to monitor for signs of disease outbreaks among wildlife populations in the TBCW area. Collaborate with wildlife health experts and local agencies to conduct regular monitoring and respond promptly to any detected disease threats.
- (f) Develop and implement biosecurity protocols for staff and volunteers working in the TBCW area. Require adherence to strict hygiene practices and provide training on how to minimize the risk of disease transmission between wildlife and humans.
- (g) Conduct regular habitat monitoring to assess the health and resilience of wildlife habitat within the TBCW vicinity. Identify and address any habitat degradation or disturbance that may increase the risk of disease transmission among wildlife populations.
- (h) Develop disease management plans that outline procedures for responding to disease outbreaks among wildlife populations in the TBCW area. Establish protocols for monitoring, reporting, and managing disease incidents in collaboration with relevant stakeholders.
- (i) Collaborate with public health authorities to stay informed about potential disease risks and outbreaks that may affect wildlife populations in the TBCW area. Share information and coordinate response efforts to protect both wildlife and human health.

7.7.6.8. Altered Plant-Animal Interactions

Increased visitation to the TBCW may lead to changes in plant-animal interactions, such as pollination and seed dispersal. Disruption of these interactions can affect plant reproduction, population dynamics, and overall ecosystem resilience. *The impact is rated -3 Low.*

Mitigation measures

- (a) Provide educational materials and interpretive signage to inform visitors about the importance of plant-animal interactions in maintaining ecosystem health and resilience. Encourage visitors to respect natural processes and avoid behaviors that may disrupt these interactions, such as picking flowers or disturbing wildlife.
- (b) Establish designated viewing areas along the TBCW where visitors can observe plant-animal interactions without directly interfering with them. Design these areas to minimize disturbance to wildlife and vegetation.
- (c) Develop visitor guidelines that outline appropriate behavior while visiting the TBCW, including guidelines for interacting with plants and wildlife. Emphasize the importance of staying on designated paths, refraining from touching or disturbing plants, and avoiding feeding wildlife.
- (d) Design trails and visitor routes to minimize trampling and disturbance of vegetation. Use boardwalks, elevated walkways, or gravel paths to direct visitor traffic and protect sensitive plant communities from damage.
- (e) Implement visitor monitoring programs to track visitor behavior and compliance with guidelines related to plant-animal interactions. Use this information to identify areas of concern and implement targeted interventions as needed.



- (f) Implement habitat restoration projects to enhance plant-animal interactions and promote ecosystem resilience. Restore degraded habitat areas, replant native vegetation, and create habitat features that support pollinators and seed dispersers.
- (g) Implement seasonal restrictions on certain activities, such as flower picking or fruit harvesting, during critical periods for plant reproduction and seed dispersal. Adjust visitor access and activity levels to minimize disruption during sensitive times.
- (h) Conduct research to better understand the effects of increased visitation on plant-animal interactions in the TBCW area. Monitor changes in plant reproductive success, seed dispersal patterns, and pollinator abundance to assess the effectiveness of mitigation measures.
- (i) Collaborate with conservation organizations, botanical gardens, and research institutions to develop and implement effective management strategies for protecting plant-animal interactions in the TBCW area. Share knowledge, resources, and expertise to support conservation efforts.

7.7.7. Operational Phase Impacts (Physical Environment)

7.7.7.1. Structural Degradation

Continuous use of the TBCW can lead to wear and tear, resulting in structural degradation over time. This may necessitate regular maintenance and repair activities, which can further disturb the surrounding environment. *The impact is rated -2 Moderate.*

Mitigation measures

- (a) Establish a routine inspection and maintenance schedule for the TBCW to identify and address signs of wear and tear proactively. Conduct regular inspections of structural components, decking, handrails, and support systems to detect any issues early.
- (b) Use durable materials resistant to weathering effects from sun and rain and when constructing or refurbishing the TBCW, NFA should select materials such as treated wood, corrosion-resistant metals of high-quality to prolong the lifespan of the structure and reduce the frequency of maintenance. Good quality durable material should also be safe to walk on in the different seasons.
- (c) Coordinate maintenance activities to coincide with periods of lower visitor traffic or seasonal closures to minimize disruption to TBCW users and surrounding wildlife. Plan maintenance shutdowns during off-peak hours or during the offseason to reduce inconvenience.
- (d) Implement access management protocols to control visitor access to sections of the TBCW undergoing maintenance or repair. Erect signage, barricades, or temporary closures to inform visitors of restricted areas and redirect foot traffic away from work zones.
- (e) Utilize low-impact maintenance techniques and equipment to minimize disturbance to the surrounding environment during repair activities.



- (f) Incorporate sustainable materials and practices into maintenance and repair activities to minimize environmental impact. Use eco-friendly cleaning products, adhesives, and coatings that are non-toxic and biodegradable to reduce pollution and protect wildlife.
- (g) Restore and rehabilitate any areas affected by maintenance or repair activities to mitigate ecological disturbances.
- (h) Communicate with TBCW users and nearby communities about planned maintenance and repair activities in advance. Provide updates through signage, websites, social media, or visitor centers to inform visitors of any temporary closures or alternative routes.
- (i) Monitor the effectiveness of maintenance and repair activities and their impacts on the surrounding environment over time. Collect data on a daily basis on TBCW condition, visitor satisfaction, and ecological indicators to inform adaptive management and improvement efforts.

7.7.7.2. Noise Pollution

Operation of the TBCW, including visitor chatter, footsteps, and associated activities, can contribute to noise pollution in the protected area. Excessive noise can disturb wildlife, disrupt natural behaviors, and detract from the visitor experience. *The impact is rated -3 Low.*

Mitigation measures

- (a) Educate visitors about the importance of minimizing noise and maintaining a respectful atmosphere while using the TBCW. Provide information through signage, interpretive materials, and guided tours on the potential impacts of noise pollution on wildlife and the natural environment.
- (b) Operate in quietness as an interior forest interaction of reduced activity during which visitors are encouraged to minimize noise levels and engage in quiet observation. Develop guidelines for appropriate behavior on the TBCW, including speaking in hushed tones and avoiding loud or disruptive activities.
- (c) Implement visitor capacity limits and timed entry systems to prevent overcrowding on the TBCW and minimize noise congestion. Use reservation systems or ticketing mechanisms to regulate the number of visitors allowed on the walkway at any given time.
- (d) Manage visitor groups to limit the size and spacing of groups using the TBCW simultaneously. Encourage smaller, more intimate tours or staggered entry times to reduce the cumulative noise generated by multiple groups.
- (e) Design the TBCW with noise mitigation in mind, incorporating sound-absorbing materials, strategic placement of barriers, and acoustic baffles to minimize noise propagation. Consider the orientation and layout of viewing platforms to minimize sound transmission to sensitive areas.
- (f) Offer interpretive programs and guided tours focused on nature appreciation and quiet observation to encourage visitors to engage with the environment in a peaceful and contemplative manner. Provide opportunities for sensory experiences, such as birdwatching or listening to natural sounds, to foster appreciation for the natural world without disturbing wildlife.



- (g) Maintain the TBCW infrastructure, including decking, handrails, and viewing platforms, to minimize noise generated by creaking or rattling components. Conduct regular inspections and repairs to address any sources of unwanted noise and ensure a smooth, quiet visitor experience.
- (h) Establish buffer zones or setbacks between the TBCW and sensitive wildlife habitats to reduce the transmission of noise from visitor activities. Preserve natural vegetation and topographic features to serve as acoustic barriers and provide refuge for wildlife.
- (i) Monitor noise levels on the TBCW and surrounding areas to assess compliance with noise guidelines and regulations. Enforce noise ordinances and visitor behavior policies through education, signage, and staff presence to maintain a peaceful environment for wildlife and visitors.

7.7.7.3. Visual Impact

The presence of the TBCW structure and associated infrastructure (e.g., signage, viewing platforms) can alter the visual aesthetics of the landscape, potentially diminishing its natural beauty and scenic value. ***The impact is rated -2 Moderate.***

Mitigation measures

- (a) Design the TBCW structure and associated infrastructure with sensitivity to the surrounding forest landscape's natural features and visual character. Consider the topography, vegetation, and views when siting the walkway, viewing platforms, and interpretive signage to minimize visual intrusion.
- (b) Opt for a low-profile and unobtrusive design for the TBCW structure, using lightweight materials, slender support columns, and minimalistic architecture to blend harmoniously with the natural surroundings. Keep structures below the tree canopy or incorporate elements that mimic tree forms to reduce visual prominence.
- (c) Use natural materials and earth-toned colors for the construction of the TBCW and associated infrastructure to help them blend seamlessly with the landscape. Choose materials that complement the surrounding vegetation and geological features to minimize contrast and visual disturbance.
- (d) Utilize existing vegetation or strategically plant native trees, to screen and buffer the TBCW structure from prominent viewpoints or sensitive visual receptors. Create visual breaks or focal points along the walkway to frame scenic views and enhance the overall aesthetic experience.
- (e) Conduct a viewshed analysis to assess the visual impact of the TBCW from key vantage points and viewpoints within the landscape. Use this information to inform siting decisions, design modifications, and vegetation management strategies to mitigate visual intrusion and preserve scenic views.
- (f) Implement seasonal vegetation management practices to maintain sightlines and preserve scenic views without compromising ecological integrity. Trim or selectively prune vegetation to enhance visibility of the TBCW during peak visitor seasons while allowing for natural regrowth and succession.



- (g) Conduct a visual impact assessment as part of the planning and permitting process to evaluate the potential visual effects of the TBCW on the landscape. Use the assessment findings to identify mitigation measures, design alternatives, or visual enhancements that minimize adverse impacts and enhance visual quality.
- (h) Communicate with visitors and the broader community about the purpose, design rationale, and ecological significance of the CFR TBCW through interpretive signage, guided tours, and public outreach events. Foster appreciation for the landscape's unique beauty and scenic values while promoting stewardship and responsible visitation.

7.7.7.4. Impacts associated with increased human presence

Continuous operation of the TBCW may attract a steady stream of visitors to the protected area, leading to increased human presence and associated impacts such as littering, vandalism, and disturbance to wildlife. *The impact is rated -3 Low.*

Mitigation measures

- (a) Provide educational materials, signage, and interpretive programs to inform visitors about the importance of responsible behavior and the potential impacts of their actions on the environment. Emphasize principles of “*Leave No Trace*” and encourage respect for wildlife and their habitats.
- (b) Implement visitor management strategies such as timed entry systems, visitor quotas, or reservation requirements to regulate the flow of visitors and prevent overcrowding on the forest TBCW. Use signage and online booking systems to communicate availability and encourage staggered visitation.
- (c) Design the TBCW and associated facilities with durability and resilience in mind to withstand continuous use and minimize maintenance requirements. Use sturdy materials, vandal-resistant features, and proactive maintenance practices to deter vandalism and ensure infrastructure integrity.
- (d) Install trash receptacles, recycling bins, and waste collection points along the forest TBCW route to encourage proper disposal of litter and recyclables. Implement regular litter patrols and cleanup efforts to maintain cleanliness and prevent accumulation of debris.
- (e) Utilize visitor monitoring techniques such as trail counters, surveillance solar powered cameras, or visitor surveys to assess visitor use patterns and identify areas of concern. Use this data to inform management decisions and target outreach efforts to address specific visitor behavior issues.
- (f) Recruit volunteers and citizen scientists to assist with monitoring, education, and stewardship efforts related to the forest TBCW and surrounding area. Engage volunteers in litter cleanups, wildlife monitoring, and visitor outreach to foster a sense of ownership and responsibility among the community.
- (g) Increase law enforcement presence and patrols in the protected area to deter illegal activities such as vandalism, theft, or wildlife harassment. Collaborate with local law enforcement agencies to enforce regulations and respond to visitor incidents effectively.



- (h) Offer interpretive programs, guided tours, and ranger-led activities to enhance visitor experiences and foster appreciation for the natural and cultural values of the protected area. Use guided tours as opportunities to educate visitors about responsible behavior and conservation principles.
- (i) Forge partnerships with local communities, businesses, and conservation organizations to promote responsible visitation and support sustainable tourism practices. Involve stakeholders in decision-making processes and leverage community resources for outreach, education, and infrastructure improvements.
- (j) Adopt an adaptive management approach to monitor visitor impacts, evaluate the effectiveness of mitigation measures, and adjust management strategies as needed. Regularly review visitor use data, feedback from stakeholders, and emerging trends to inform decision-making and improve visitor management practices.

7.7.7.5. Risk of Accidents

The TBCW will reach a best forest canopy view off the ground depending on the ground where the different columns will be established, the walk way will hang on the columns, generally the fact that the facility will be raised meters off the ground and is to be established in a wildlife zone, the potential of accidents or incidents needs to be discussed and mitigation measures proposed for implementation.

Accidents or incidents involving visitors on the TBCW can occur, posing risks to both human safety and the surrounding environment. The operation of a TBCW in Kaniyo Pabidi Budongo CFR comes with a number of risks, arising from the presence of wildlife, invasive plant species and pests, as well as from various construction-related and environmental hazards. For example, invasive plant species can grow on TBCW structures, potentially compromising their structural integrity. Roots and vines can penetrate cracks in the decked wood, causing wear and tear. Insects or other pests might infest the wooden or metal parts of the TBCW, leading to damage that weakens the structure and creates safety hazards. Additionally, leaves, seeds, and other debris from invasive plants can accumulate on the walkway, creating slip hazards. Over time, materials used in construction can degrade or fail if not properly maintained, posing risks to visitor safety. Allowing more visitors than the TBCW is designed to handle can stress the structure, increasing the risk of accidents. Overcrowding can lead to panic situations, where people might push or shove, resulting in falls or other injuries. Severe cold weather can make the TBCW slippery or even cause structural damage, posing a risk to visitors. Elevated structures like TBCWs are particularly hazardous during thunderstorms.

As part of design, for tourists, the design of the TBCW provides inclusive opportunities, accommodating all people. The proposed structural design of the TBCW is robust and resilient, capable of supporting considerable weight, such as that of an elephant, (in reference to the fear of likely collapse of the walkway due to weight). Still on the safety of tourists, the TBCW floor shall be made with material that is not easily affected (slippery/ susceptible to mold growth), hence ensuring protection of the users.



It has been proposed that management shall ensure no presence of animals on the TBCW before tourists utilise the TBCW. With the above design proposals, ***the impact is still rated -1 High, but will become moderate with implementation of mitigation measures.***

Mitigation measures

- (a) Put in place assembly point to be used to record data for the persons to be on board and upon return from the TBCW guided tour.
- (b) Establish and enforce safety guidelines and regulations for visitors and any other individuals using the forest TBCW, including age restrictions, weight limits, and behavioral expectations. Clearly communicate safety rules through signage, orientation sessions, and informational materials that should be carried along with during the tours.
- (c) Provide comprehensive visitor orientation sessions or safety briefings before accessing the TBCW to familiarize visitors with potential hazards, emergency procedures, and response and safety equipment. Offer educational materials on proper behavior and risk awareness to enhance visitor preparedness.
- (d) Install safety equipment and infrastructure such as hang points, handrails, guardrails, non-slip surfaces, and emergency call boxes along the TBCW route to minimize the risk of accidents and facilitate emergency response. Regularly inspect and maintain safety features to ensure their effectiveness.
- (e) Develop and implement emergency preparedness and response protocols tailored to the unique challenges of the TBCW environment in consideration of various wet and dry seasons. Train staff and volunteers in first aid, CPR, and emergency evacuation procedures, and establish communication channels for rapid response coordination.
- (f) Provide specialized training for staff responsible for monitoring and supervising visitor activities on the TBCW. Equip staff with the necessary skills and resources to identify potential risk, safety hazards, enforce regulations, and respond effectively to emergencies.
- (g) Utilize surveillance installed cameras data, remote sensors, or visitor counters to monitor visitor activity on the TBCW and detect potential safety concerns in real-time. Implement regular patrols or monitoring routines to ensure compliance with safety guidelines and regulations.
- (h) Implement visitor registration or check-in procedures to track the number of visitors using the TBCW and facilitate accountability in the event of an emergency. Use visitor data to manage capacity, assess risk levels, and optimize safety measures.
- (i) Install reliable communication systems such as two-way radios, emergency phones, or satellite phones along the TBCW route to enable prompt communication between visitors, staff, and emergency responders during critical situations.
- (j) Establish partnerships with local emergency services, including fire departments, search and rescue teams, and medical facilities, to coordinate emergency response efforts and facilitate timely assistance in case of accidents or incidents on the TBCW.
- (k) Conduct thorough post-incident reviews and debriefings following accidents or incidents on the TBCW to prepare Root Cause Analysis (RCAs), and opportunities for improvement



in safety protocols and infrastructure. Implement corrective actions and preventative measures to minimize future risks.

7.7.7.6. Resource Consumption

Operation of the TBCW requires ongoing resource consumption, including energy for lighting, maintenance equipment, and visitor amenities. This consumption can contribute to environmental degradation and carbon emissions. *The impact is rated -2 Moderate.*

Mitigation measures

- (a) Implement a system to monitor energy consumption and carbon emissions associated with the TBCW regularly. Use this data to track progress, identify areas for improvement, and report on environmental performance transparently.

7.7.7.7. Generation of solid and bio-degradable waste

Increased visitor numbers can result in greater generation of waste, including human waste, litter, food packaging, and disposable items. Improper waste management practices can lead to pollution of the protected area, affecting both terrestrial and aquatic ecosystems, as well as human health. *The impact is rated -3 Low.*

Mitigation measures

- (a) Encourage visitors to minimize waste generation by promoting reusable items.
- (b) Develop educational materials and signage to raise awareness among visitors about the importance of waste reduction and proper waste disposal practices. Emphasize the impact of litter on the environment and wildlife.
- (c) Ensure adequate sanitary facilities are in place and kept clean daily. Since this TBCW is located 1km away from Budongo Café and calls of nature will be responded thus far is a necessity.
- (d) Install sufficient waste bins and recycling containers throughout the 464m TBCW, including at entry points, rest areas, and popular viewpoints. Clearly label bins to facilitate proper waste sorting by visitors.
- (e) Implement a schedule for frequent waste collection to prevent overflow and littering. Assign staff or volunteers to regularly patrol the area and pick up any litter.
- (f) Establish composting facilities for organic waste generated within the area, such as food scraps and biodegradable materials. Use composted materials for landscaping or other beneficial purposes.
- (g) Monitor waste management practices regularly and enforce regulations regarding littering and improper waste disposal. Implement fines or penalties for offenders to deter irresponsible behavior.
- (h) Organize volunteer cleanup events and encourage visitor participation in conservation activities. Provide incentives such as discounts or rewards for those who actively contribute to waste reduction efforts.



7.7.7.8. Introduction of exotic species

Visitors to the TBCW may unintentionally introduce exotic plant seeds, insects, or pathogens to the protected area, potentially disrupting native ecosystems and biodiversity. *The impact is rated -1 High.*

Mitigation measures

- (a) Develop educational materials and signage to inform visitors about the importance of preventing the spread of invasive species and pathogens. Provide information on the potential impacts of introducing non-native species to the forest ecosystem and encourage responsible behavior.
- (b) Provide information to visitors before their arrival, such as on your website or through email communications, about the need to clean their clothing, footwear, and gear to remove seeds, insects, and pathogens before entering the protected area.
- (c) Establish designated entry points where visitors can undergo inspections or cleaning procedures to remove seeds, insects, and pathogens from their clothing, footwear, and gear before accessing the TBCW. Provide facilities such as boot brushes, cleaning stations, or footwear disinfection mats.
- (d) Train staff members to identify potential sources of invasive species and pathogens and to educate visitors about the importance of preventing their introduction to CFR area. Staff should also be knowledgeable about local regulations regarding the transport of plants, animals, and other materials.
- (e) Implement regular monitoring and surveillance programs to detect any signs of invasive species or pathogens in the protected area. Encourage visitors to report any sightings of unfamiliar plants, insects, or signs of disease.
- (f) Establish quarantine protocols for incoming plants, soil, or other materials brought into the protected area for research, landscaping, or other purposes. Inspect and treat incoming materials to prevent the introduction of invasive species or pathogens.

7.7.7.9. Conflict with Wildlife

Operation of the TBCW may lead to increased interaction between visitors and wildlife, and wildlife and local community potentially causing stress or disturbance to sensitive species. This interaction can also pose safety risks to both visitors and wildlife. There is also a potential of the product becoming massive hence affecting the ecosystem and leading to migration of some animals. *The impact is rated -2 Moderate.*

Mitigation measures

- (a) Develop and communicate clear guidelines to visitors regarding wildlife viewing etiquette and behavior. Provide information on maintaining a safe distance from wildlife, avoiding feeding or approaching animals, and minimizing noise and disturbance.
- (b) Install signage along the TBCW and at entry points to educate visitors about the importance of respecting wildlife and their natural behaviors. Provide interpretation materials that highlight the significance of local wildlife species and their habitats.



- (c) Establish designated viewing areas along the TBCW where visitors can safely observe wildlife from a distance without causing disturbance. Use viewing platforms or strategically placed observation points to minimize direct contact with sensitive habitats.
- (d) Implement time restrictions or visitor quotas during peak wildlife activity periods to reduce the likelihood of overcrowding and disturbance. Schedule guided tours or educational programs led by trained naturalists to facilitate responsible wildlife viewing.
- (e) Conduct regular monitoring of wildlife populations and behavior patterns to identify any signs of stress or disturbance. Implement adaptive management strategies, such as adjusting visitor access or activity levels, to minimize negative impacts on sensitive species.
- (f) Provide training for staff members or volunteers responsible for managing visitor interactions with wildlife. Equip them with the knowledge and skills to respond appropriately to wildlife sightings, enforce guidelines, and ensure visitor safety.
- (g) Encourage visitors to provide feedback on their wildlife viewing experiences and any observations of wildlife behavior. Use this feedback to refine management strategies and improve visitor education efforts over time.

7.7.8. Operational Phase Impacts (Socio-Economic Environment)

7.7.8.1. Tourism Revenue

The TBCW will attract tourists, leading to increased spending on accommodations, restaurants, transportation, and souvenirs Masindi Town and in the neighbouring local community. This boosts the economy and creates job opportunities in tourism-related sectors. The influx of visitors to the TBCW provides opportunities for cultural exchange as well as interaction between tourists and local communities, fostering understanding, appreciation, and preservation of indigenous cultures and traditions.

Enhancement measures

- (a) Launch targeted marketing campaigns to promote the TBCW as a premier tourist attraction in the region. Collaborate with the UTB, local tourism boards, travel agencies, and online platforms to increase visibility and attract visitors from diverse geographic markets.
- (b) Partner with local accommodations, restaurants, transportation providers, and tour operators to create package deals and bundled experiences that include access to the TBCW. Offer discounts, special offers, and added-value incentives to attract tourists and encourage longer stays.
- (c) Advocate for investments in tourism infrastructure improvements that enhance visitor experiences and support increased visitation to the area. This may include upgrades to roads, parking facilities, signage, and visitor amenities near the TBCW.
- (d) Establish visitor information centers or kiosks near the TBCW entrance to provide tourists with maps, brochures, and personalized recommendations for local attractions, activities, and services. Staff these centers with knowledgeable locals who can offer insider tips and insights.



- (e) Promote local culinary experiences and gastronomic tourism opportunities that showcase the region's unique flavors and culinary traditions. Encourage visitors to dine at local restaurants, cafes, and food stalls offering authentic dishes made with locally sourced ingredients.
- (f) Organize artisan markets, craft fairs, and cultural festivals that highlight local artisans, craftsmen, and cultural heritage. Provide opportunities for visitors to purchase handmade souvenirs, artworks, and locally crafted goods as mementos of their visit.
- (g) Develop community-led tours and immersive experiences that offer visitors a glimpse into the daily life, culture, and traditions of local residents. Offer guided tours of nearby villages, cultural heritage sites, and artisan workshops led by knowledgeable locals. Where possible put in place a transportation way of community members involved in the TBCW services as the distance from the Budongo Café to the nearest communities is distant to save them from any likely incident.
- (h) Emphasize sustainable tourism practices and responsible travel initiatives that minimize negative impacts on the environment, culture, and local communities. Encourage visitors to support businesses that prioritize sustainability and ethical tourism practices.
- (i) Explore opportunities to diversify the tourism offerings in the area beyond the TBCW, such as adventure tourism activities, ecotourism experiences, cultural immersion programs, and agri-tourism initiatives. Develop new attractions and experiences that appeal to a wider range of interests and preferences.
- (j) Invite members of local communities to demonstrate traditional arts and crafts techniques, such as weaving, pottery, basketry, or carving, to visitors. Offer interactive workshops where visitors can learn hands-on skills from skilled artisans.
- (k) Organize regular cultural performances featuring traditional music, dance, storytelling, and theater by local indigenous performers. Host cultural festivals or events that celebrate indigenous heritage and provide opportunities for visitors to engage with local artists and performers.
- (l) Offer guided cultural tours led by members of local communities, providing insights into traditional knowledge, customs, and practices. Allow visitors to visit sacred sites, ancestral lands, and community landmarks while learning about their cultural significance.
- (m) Introduce visitors to traditional cuisine through food tastings, cooking demonstrations, and farm-to-table experiences. Partner with local restaurants, food vendors, and community kitchens to showcase regional specialties and promote sustainable food practices.
- (n) Host language workshops and immersion experiences to teach visitors basic phrases and greetings in the languages spoken by local indigenous communities. Provide opportunities for cultural exchange and language practice through guided conversations and storytelling sessions.
- (o) Develop cultural heritage trails or interpretive routes that highlight important cultural landmarks, historical sites, and traditional gathering places. Install interpretive signage along the trails to provide context and information about the significance of each site.



- (p) Facilitate community homestay programs that allow visitors to stay with local indigenous families and experience daily life in the community firsthand. Encourage cultural exchange through shared meals, storytelling sessions, and participation in community activities.
- (q) Create artisan markets or craft fairs where local artisans can sell their handmade goods directly to visitors. Provide opportunities for artisans to interact with visitors, share stories about their craft traditions, and showcase their cultural heritage.
- (r) Organize cultural exchange events and workshops that bring together members of local communities and visitors for meaningful dialogue and collaboration. Encourage cross-cultural learning, mutual respect, and appreciation for diverse perspectives

7.7.8.2. Local Employment

The operation of the TBCW requires staff for maintenance, guiding tours, ticketing, and other services, providing employment opportunities for local residents and supporting livelihoods in the area. Whereas there are some local community members already employed at the Budongo Café, there will be a need to make additional members to supplement the seasonal need and hence employment.

Enhancement measures

- (a) Establish community employment initiatives focused specifically on recruiting and training local residents for positions at the TBCW. Partner with local community organizations, schools, and job training programs to identify and prepare candidates for employment.
- (b) Create targeted youth employment programs to engage young residents in seasonal or part-time positions at the TBCW. Provide opportunities for students and recent graduates to gain valuable work experience and develop skills relevant to the tourism industry.
- (c) Organize skills development workshops and training sessions to enhance the professional skills and capabilities of local staff employed at the TBCW. Offer training in areas such as customer service, communication, safety protocols, and natural interpretation.
- (d) Establish clear career pathways and advancement opportunities for local staff within the TBCW operation. Provide ongoing support, mentorship, and professional development opportunities to help employees progress in their careers and achieve their goals.
- (e) Work with the Sub-county to ensure that revenue from gate collections is used adequately to help community appreciate wildlife.
- (f) Offer flexible employment arrangements, such as part-time or seasonal positions, to accommodate the diverse needs and schedules of local residents. Provide options for job sharing, flexible hours, and remote work where feasible.
- (g) Provide competitive wages, benefits, and incentives to attract and retain local talent. Offer benefits such as healthcare coverage, retirement savings plans, employee discounts, and performance bonuses to enhance job satisfaction and loyalty.



7.7.8.3. Education and Awareness

The operation of the TBCW can serve as an educational resource, offering interpretive signage, guided tours, and educational programs to raise awareness about the importance of biodiversity conservation and ecosystem protection.

Enhancement measures

- (a) Install informative and engaging interpretive signage along the TBCW route highlighting key aspects of biodiversity, ecosystem dynamics, and conservation. Include information about local flora and fauna, ecosystem services, and conservation challenges.
- (b) Develop and offer a variety of educational programs for visitors of all ages, such as guided nature walks, themed workshops, and interactive presentations. Topics can include biodiversity conservation, habitat restoration, wildlife monitoring, and sustainable land management practices.
- (c) Train knowledgeable interpretive guides to lead guided tours along the TBCW and provide engaging commentary on the surrounding natural environment. Guides can share information about local ecology, species identification, and conservation initiatives.
- (d) Incorporate hands-on activities and interactive exhibits at designated education stations along the TBCW route. Offer opportunities for visitors to engage with natural materials, observe wildlife behavior, and learn about scientific research methods.
- (e) Engage visitors in citizen science initiatives focused on biodiversity monitoring and data collection. Encourage participation in wildlife surveys, habitat assessments, and phenology tracking to contribute valuable data to scientific research projects.
- (f) Collaborate with local schools, universities, conservation organizations, and community groups to expand the educational reach of the TBCW. Develop joint programming, research projects, and outreach initiatives to engage diverse audiences and leverage collective expertise.

7.7.8.4. Cultural Disruption

The influx of tourists and changes in land use patterns can disrupt traditional lifestyles, cultural practices, and social structures of local communities, leading to cultural erosion, loss of identity, and conflicts over resource use and land tenure. *The impact was rated -3 Low.*

Mitigation measures

- (a) Recognize, respect, and preserve the cultural heritage, traditions, and identity of local communities affected by tourism development. Document traditional knowledge, cultural practices, and oral histories to safeguard intangible cultural heritage from erosion and promote intergenerational transmission of cultural values.
- (b) Empower local communities to participate in and benefit from tourism through community-led initiatives that promote cultural authenticity, sustainability, and economic empowerment. Develop culturally immersive tourism experiences, homestays, cultural festivals, or artisanal markets that showcase local traditions, crafts, cuisine, and performing arts.



- (c) Provide cultural sensitivity awareness programs for tourism stakeholders, including tour operators, guides, and visitors, to foster respect, understanding, and appreciation for local cultures and customs. Encourage responsible behavior, cultural exchange, and cross-cultural dialogue to promote positive interactions and minimize cultural misunderstandings or conflicts.
- (d) Involve local communities in participatory tourism planning processes to ensure that tourism development aligns with community priorities, values, and aspirations. Facilitate community consultations, workshops, and visioning exercises to identify opportunities, address concerns, and co-create tourism initiatives that reflect local needs and preferences.
- (e) Promote sustainable natural resource management practices that balance the conservation of natural and cultural heritage with the needs of local communities for livelihoods, food security, and cultural survival. Implement integrated land use planning, zoning regulations, and conservation strategies that protect sacred sites, traditional territories, and culturally significant landscapes from overexploitation or degradation.

7.7.8.5. Overcrowding and Congestion

Popular tourist attractions like the TBCW may experience overcrowding during peak seasons, leading to congestion, noise, littering, and degradation of visitor experience, as well as strain on local infrastructure and resources. *The impact was rated -3 Low.*

Mitigation measures

- (a) Develop and implement visitor management strategies to regulate visitor numbers, control access, and distribute visitor flow more evenly throughout the day or week. Implement measures such as timed entry tickets, reservation systems, or visitor quotas to manage capacity and reduce overcrowding during peak periods.
- (b) Introduce differential pricing or peak season surcharges to incentivize visitors to visit during off-peak periods or shoulder seasons when demand is lower. Offer discounts, promotions, or special offers for visiting during less crowded times to redistribute visitor demand and alleviate pressure on infrastructure and resources during peak seasons.
- (c) Invest in infrastructure upgrades and enhancements to improve visitor facilities, amenities, and services at the TBCW site to accommodate increased visitor numbers more effectively. Expand parking facilities, restroom facilities, picnic areas, and visitor centers to reduce congestion and enhance visitor comfort and satisfaction.
- (d) Launch educational programs, interpretive displays, or guided tours to raise visitor awareness about responsible tourism practices, environmental conservation, and cultural heritage preservation. Encourage visitors to respect site rules, minimize their environmental impact, and contribute to the preservation of the natural and cultural values of the TBCW area.
- (e) Provide visitor education and orientation materials, such as brochures, signage, or multimedia presentations, to inform visitors about site rules, safety guidelines, and recommended behavior during their visit to the TBCW. Emphasize the importance of respecting other visitors, wildlife, and the natural environment to enhance the overall visitor experience.



- (f) Form collaborative partnerships with tourism operators, travel agencies, accommodation providers, and other stakeholders to coordinate visitor arrivals, promote responsible tourism practices, and offer alternative visitor experiences or attractions in nearby areas. Work together to develop sustainable tourism itineraries, packages, or experiences that encourage visitors to explore lesser-known destinations and reduce pressure on overcrowded sites.

7.7.8.6. Increased human-wildlife conflicts

District local government officials and local community feared that *construction of the project could lead to an increase in cases of human-wildlife conflicts which lead to loss of property and lives. The impact is rated -1 high*, because it was raised repeatedly by the stakeholders.

Mitigation measures

- (a) Provide education on human wildlife conflict prevention
- (b) Encourage and sensitize locals to have diverse livelihood sources to minimize reliance on agriculture.
- (c) Train locals in creating and maintaining community tourism so that they benefit from increase in number of tourists to the area.

7.7.8.7. Failure for the community to benefit from the increase in the number of tourists to the area

Local community in Kaniyo Pabidi village feared that as neighbors to the project site, they may not enjoy benefits likely to accrue from increase in tourists. *The impact is rated -1 high*

Mitigation measures

- (a) Encourage and sensitize locals to have diverse livelihood sources.
- (b) Train locals in creating and maintaining community tourism so that they benefit from increase in number of tourists to the area.
- (c) Advertise at different fora community tourism activities in the area.

7.7.8.8. Insecurity

Although a Kaswa Police Post official reported that no rebel or grave cases had been reported in Kaniyo Pabidi in 2023, the increase in number of people (Tourists and workers) and rebel threats in Murchison Falls National Park area, may cause threats of insecurity in the project area. This will cause a threat to safety of tourists, tour guides and operators. *The impact is rated -3 low*

Mitigation measures

- (a) NFA should develop a security plan in liaison with the LCs and the police to curb cases of theft especially of construction materials;
- (b) Collaborate with the local security in the area to curb insecurity and theft.

7.7.8.9. Economic Dependency

Communities of Kasenyi, Kigaragara who are reliant on tourism revenue from the TBCW may become economically dependent on the industry, making them vulnerable to fluctuations in tourist



numbers, economic downturns, and external shocks such as natural disasters or pandemics. *The impact was rated -3 Low.*

Mitigation measures

- (a) Encourage diversification of local livelihoods beyond tourism by promoting alternative economic activities that are resilient to fluctuations in tourist numbers and external shocks. Support initiatives such as agriculture, small-scale manufacturing, handicrafts, eco-friendly industries, or services that provide additional sources of income for community members.
- (b) Promote the consumption of locally-produced goods and services within the community and among tourists to stimulate local economic development and reduce dependency on external markets. Encourage the use of locally-sourced materials, products, foods, and souvenirs to support local businesses, artisans, and entrepreneurs.
- (c) Explore opportunities for market diversification and niche tourism development to attract a diverse range of visitors and reduce reliance on mass tourism. Identify niche markets such as ecotourism, cultural tourism, adventure tourism, or sustainable travel that align with community values, assets, and resources.
- (d) Develop resilience plans and risk management strategies to anticipate and mitigate the impacts of economic downturns, natural disasters, pandemics, or other external shocks on tourism-dependent communities. Establish contingency funds, emergency response protocols, and social safety nets to support community resilience and recovery efforts.
- (e) Prioritize reinvestment of tourism revenues into community development projects, infrastructure improvements, social services, and environmental conservation initiatives that benefit local residents and enhance community resilience. Allocate funds towards projects that diversify local economies, improve livelihoods, and build long-term sustainability.

7.7.9. Decommissioning Phase Impacts (Legal / Regulatory Framework)

7.7.9.1. Restoration Obligations

Legal obligations to restore the site to its original condition or mitigate environmental impacts following decommissioning may require compliance with restoration plans, permit conditions, or regulatory requirements, imposing additional costs and liabilities. *The impact was rated -3 Low.*

Mitigation measures

- (a) Conduct a thorough assessment of restoration requirements, permit conditions, and regulatory obligations early in the decommissioning planning process. Identify potential environmental impacts and restoration needs to develop a clear understanding of the scope and costs associated with compliance.
- (b) Develop comprehensive restoration plans that outline specific actions, timelines, and performance standards for restoring the site to its original condition or mitigating environmental impacts. Implement restoration measures in accordance with approved plans and permit conditions to ensure compliance with regulatory requirements.



- (c) Establish monitoring and reporting mechanisms to track the progress and effectiveness of restoration activities and demonstrate compliance with regulatory requirements. Implement regular site inspections, environmental monitoring programs, and reporting protocols to document restoration efforts and outcomes.
- (d) Conduct periodic reviews of legal obligations, permit conditions, and regulatory requirements to ensure ongoing compliance with restoration obligations. Stay informed about changes in environmental regulations, permit conditions, and best practices for restoration to adapt strategies and procedures accordingly.

7.7.9.2. Contractual Agreements

Fulfilling contractual agreements, warranties, or guarantees related to the decommissioning phase, such as performance bonds, insurance coverage, or indemnification clauses, may be necessary to mitigate financial risks and legal liabilities. *The impact was rated -3 Low.*

Mitigation measures

- (a) Require contractors to obtain performance bonds as a form of financial guarantee to ensure that decommissioning activities are completed according to contractual requirements. Performance bonds provide a source of funds for the project owner to cover the costs of completing decommissioning work if the contractor fails to fulfill their obligations.
- (b) Obtain appropriate insurance coverage, such as liability insurance or environmental impairment insurance, to protect against potential financial losses or legal claims arising from decommissioning activities. Ensure that insurance policies provide adequate coverage for risks related to property damage, bodily injury, pollution liability, and other potential liabilities.
- (c) Include indemnification clauses in contracts with project contractors, or third-party vendors to allocate responsibility for any financial losses, damages, or legal liabilities arising from decommissioning activities. Indemnification clauses specify the obligations of each party to indemnify and hold harmless the other party from certain types of claims or losses.
- (d) Establish financial reserves or contingency funds to cover unforeseen costs, expenses, or liabilities associated with decommissioning activities. Set aside funds during the operational phase of the project to ensure that sufficient resources are available to fulfill contractual obligations and address any unexpected challenges during decommissioning.
- (e) Conduct thorough legal review and due diligence of contractual agreements, warranties, and guarantees related to decommissioning to identify potential risks, liabilities, and contractual obligations. Seek advice from legal counsel with expertise in environmental law, contract law, and risk management to ensure that contractual terms are clear, enforceable, and adequately protect the interests of all parties involved.
- (f) Conduct a comprehensive financial risk assessment to evaluate the potential financial impacts of decommissioning activities and identify strategies for mitigating risks. Consider factors such as cost overruns, regulatory compliance, market fluctuations, and third-party liabilities when assessing financial risks associated with decommissioning.



- (g) Implement robust performance monitoring and oversight mechanisms to track the progress and quality of decommissioning activities and ensure compliance with contractual requirements. Establish procedures for regular reporting, site inspections, and performance evaluations to identify any deviations from agreed-upon standards and take corrective action as needed.
- (h) Include dispute resolution mechanisms, such as arbitration or mediation clauses, in contractual agreements to facilitate timely resolution of any disputes or disagreements that may arise during the decommissioning phase. Establish clear procedures for resolving disputes and addressing claims to minimize delays and mitigate legal costs.

7.7.9.3. Closure and Access Restrictions

Legal restrictions on public access to the decommissioned site, such as land use designations, conservation easements, or protected area regulations, may impose limitations on future land use or development opportunities for the area. *The impact was rated -3 Low.*

Mitigation measures

- (a) Engage with relevant stakeholders, including government agencies, conservation organizations, and local communities, early in the decommissioning planning process to identify potential legal restrictions and assess their implications for future land use. Collaborate with stakeholders to develop mutually acceptable solutions that balance conservation objectives with potential development opportunities.
- (b) Work with regulatory authorities to explore options for flexible land use planning that accommodates both conservation priorities and compatible development activities within the decommissioned site. Seek opportunities to designate certain areas for conservation or recreation while allowing for limited development in other areas where feasible.
- (c) Adopt an ecosystem-based management approach that considers the ecological values and functions of the decommissioned site in land use decision-making. Develop management plans that prioritize the protection and restoration of key habitats, biodiversity, and ecosystem services while allowing for sustainable development activities that are compatible with conservation objectives.
- (d) Explore opportunities to enhance educational and recreational opportunities within the decommissioned site while respecting legal restrictions on public access. Develop interpretive trails, nature walks, or visitor centers that provide opportunities for public engagement with the area's natural and cultural heritage while minimizing ecological impacts.

7.7.9.4. Regulatory Enforcement

Regulatory enforcement actions by government agencies or conservation authorities for non-compliance with decommissioning requirements or environmental regulations may result in fines, penalties, or legal sanctions against project developers or operators. *The impact was rated -3 Low.*

Mitigation measures

- (a) Establish a robust compliance monitoring program to regularly assess project activities against applicable regulations, permits, and decommissioning requirements. Conduct



internal audits and inspections to identify any areas of non-compliance and address them promptly.

- (b) Maintain open and transparent communication channels with government agencies, conservation authorities, and other regulatory bodies involved in overseeing the decommissioning process. Proactively engage with regulators to clarify requirements, address concerns, and seek guidance on compliance obligations.
- (c) Provide training and capacity building opportunities for project developers, operators, and staff members involved in decommissioning activities to ensure a thorough understanding of regulatory requirements and best practices. Empower personnel to effectively implement compliance measures and respond to regulatory inquiries.
- (d) Maintain accurate and up-to-date documentation of all permits, approvals, and compliance-related activities associated with the decommissioning process. Keep detailed records of monitoring data, inspection reports, and corrective actions taken to demonstrate compliance with regulatory requirements.

7.7.10. Decommissioning Phase Impacts (Biological Environment)

7.7.10.1. Vegetation Loss

Decommissioning activities may involve clearing vegetation to access and remove the TBCW components. This can result in the loss of habitat for native flora and fauna, as well as disruption to ecological processes such as nutrient cycling and plant succession. ***The impact is rated -3 Low.***

Mitigation measures

- (a) Conduct a thorough assessment of the vegetation within the decommissioning area to identify sensitive faunal and floral i.e. rare or endangered plant species, and critical wildlife corridors. Use this information to guide the planning and execution of vegetation clearance activities.
- (b) Minimize the extent of vegetation clearance by carefully planning the location and layout of decommissioning activities. Identify alternative access routes and work areas that require minimal disturbance to native vegetation and wildlife habitats.
- (c) Develop a vegetation restoration plan to mitigate the impacts of clearing activities. Prioritize the replanting of species that were assessed by this study and perhaps cleared during the project implementation period areas to restore habitat quality and support ecosystem recovery. Consider using locally sourced plant material to keep the genetic diversity and resilience.
- (d) Implement timing restrictions for vegetation clearance activities to minimize the potential impact on nesting birds, breeding amphibians, and other wildlife during sensitive periods such as the breeding season. Schedule clearance activities outside of peak wildlife activity periods whenever possible.
- (e) Incorporate habitat enhancement measures into the decommissioning process to offset habitat loss and promote biodiversity. Create wildlife habitat features such as brush piles, log piles, and nesting boxes to provide alternative habitat resources for native fauna displaced by vegetation clearance.



- (f) Implement a monitoring program to assess the effectiveness of mitigation measures and track changes in vegetation composition, wildlife abundance, and habitat quality over time. Use monitoring data to inform adaptive management decisions and adjust mitigation strategies as needed.
- (g) Engage with stakeholders, including local communities, conservation organizations, and regulatory agencies, to solicit input and feedback on vegetation clearance and habitat mitigation plans. Incorporate stakeholder perspectives into decision-making processes to enhance transparency and accountability.

7.7.11. Decommissioning Phase Impacts (Physical Environment)

7.7.11.1. Structural Removal

The process of dismantling and removing the TBCW structure and associated infrastructure can involve heavy machinery and equipment, leading to soil compaction, vegetation damage, and habitat disturbance. *The impact is rated -3 Low.*

Mitigation measures

- (a) Develop a detailed dismantling plan that considers the specific characteristics of the site, including sensitive habitats, vegetation, and soil types. Identify areas that require special protection or mitigation measures during the removal process.
- (b) Use manual methods and low-impact techniques whenever possible to minimize the use of heavy machinery and equipment. Consider alternatives such as hand tools, ropes, and pulleys to dismantle and remove the structure without causing excessive soil compaction or vegetation damage.
- (c) Implement measures to protect vegetation and minimize damage during dismantling and removal activities. Use fencing, barriers, or exclusion zones to prevent machinery from entering sensitive areas with valuable or endangered plant species.
- (d) Develop a revegetation and restoration plan to rehabilitate areas affected by soil compaction, vegetation damage, and habitat disturbance. Use native plant species adapted to the local environment to stabilize soils and restore ecosystem function.
- (e) Conduct regular monitoring during the dismantling and removal process to assess the extent of soil compaction, vegetation damage, and habitat disturbance. Implement mitigation measures as needed to address any adverse impacts identified during monitoring.
- (f) Take advantage of the removal process to enhance habitat quality and biodiversity in the area. Consider planting native vegetation, creating wildlife habitat features such as snags or brush piles, and installing erosion control measures to improve overall ecosystem health.
- (g) Engage with stakeholders, including local communities, conservation organizations, and regulatory agencies, to communicate the dismantling and removal plans and solicit feedback. Incorporate input from stakeholders into the planning process to ensure transparency and accountability.



7.7.11.2. Soil Disturbance

Excavation of foundations and anchor points, as well as the removal of walkway materials, can disturb the soil structure and lead to erosion, particularly in areas where vegetation has been cleared.

The impact is rated -3 Low.

Mitigation/ measures

- (a) Implement erosion control practices such as installing silt fences, sediment traps, or erosion control blankets to prevent soil erosion and sediment runoff from the disturbed areas. These measures can help retain soil and sediment on-site and protect adjacent ecosystems and water bodies.
- (b) Prioritize the preservation of existing vegetation in areas where excavation and removal activities will take place. Minimize disturbance to vegetation by carefully planning the location of work zones and using temporary exclusion barriers. After completion of the work, implement revegetation efforts using native plant species to stabilize soil and prevent erosion.
- (c) Implement a phased approach to the dismantling process, focusing on one section of the TBCW at a time to minimize the extent of soil disturbance and erosion. Complete restoration and erosion control measures in each phase before moving on to the next section.
- (d) Develop a stormwater management plan to capture and control runoff from the dismantling site. Use measures such as vegetated swales, infiltration basins, or permeable surfaces to manage stormwater runoff and reduce the risk of erosion and sedimentation in nearby water bodies.
- (e) Establish a monitoring program to assess the effectiveness of erosion control measures and the condition of restored areas over time. Conduct regular inspections and maintenance activities to address any erosion or sedimentation issues that arise during and after the dismantling process.
- (f) Provide training to personnel involved in the dismantling process on erosion control best practices and techniques for minimizing soil disturbance. Assign supervisors to oversee the implementation of erosion control measures and ensure compliance with relevant regulations and guidelines.

7.7.11.3. Visual Disruption

The presence of demolition materials and disturbed terrain during the decommissioning process can alter the visual aesthetics of the landscape, detracting from its natural beauty and scenic value.

The impact is rated -3 Low.

Mitigation measures

- (a) Install temporary screening such as fencing, fabric barriers, or vegetative screens to conceal construction materials and disturbed areas from view. Use natural materials or native vegetation where possible to blend with the surrounding landscape.



- (b) Implement a schedule for the timely removal of construction materials and debris once they are no longer needed. Minimize the duration of their presence on-site to reduce visual clutter and restore the natural aesthetics of the landscape.
- (c) Grade and restore disturbed terrain to its natural contours and vegetation cover as soon as decommissioning activities are completed. Use soil stabilization measures such as erosion control blankets, mulch, and native plantings to promote vegetation regrowth and prevent soil erosion.
- (d) Implement a revegetation and landscaping plan to enhance the visual appeal of the decommissioned area and integrate it with the surrounding landscape. Plant native vegetation, trees, and shrubs to restore natural habitat and improve scenic value.
- (e) Conduct a visual impact assessment to identify key viewpoints, scenic vistas, and visual receptors affected by decommissioning activities. Use this information to prioritize mitigation efforts and focus resources on areas with the greatest visual sensitivity.
- (f) Establish vegetation buffer zones or green belts around the decommissioned area to visually screen and soften the transition between disturbed and undisturbed landscape features. Use a mix of native trees, shrubs, and grasses to create a visually pleasing transition zone.
- (g) Integrate design elements such as landscape features, pathways, seating areas, and interpretive signage into the decommissioned area to enhance its aesthetic appeal and recreational value. Consider incorporating natural materials and textures that complement the surrounding environment.
- (h) Engage with the public and stakeholders to solicit input and feedback on visual mitigation measures and landscape design concepts. Use participatory planning processes to involve community members in decision-making and foster a sense of ownership and stewardship.

7.7.11.4. Noise Pollution

Machinery used during decommissioning activities can generate noise pollution, potentially disturbing wildlife and nearby ecosystems. *The impact is rated -3 Low.*

Mitigation measures

- (a) Consider the use of low-emission machinery powered by cleaner fuels, such as electric or solar powered equipment, where feasible and cost-effective. Replace older, high-emission equipment with newer models that meet stringent emissions standards and environmental performance criteria to minimize air pollution impacts.
- (b) Implement regular maintenance schedules and engine tuning procedures to optimize the performance and efficiency of machinery engines, reducing fuel consumption and emissions of air pollutants. Conduct routine inspections, filter replacements, and emission testing to ensure compliance with emissions regulations and standards.
- (c) Adopt best management practices and operational procedures to minimize machinery idling, optimize engine load factors, and reduce unnecessary fuel consumption during decommissioning activities. Implement efficient work scheduling, route planning, and equipment coordination to maximize productivity while minimizing emissions.



- (d) Implement dust suppression measures, such as watering roads and work areas, using dust control additives, or covering exposed soil surfaces, to minimize fugitive dust emissions from machinery operations during decommissioning activities. Reduce the potential for particulate matter pollution and respiratory health risks for both wildlife and workers.
- (e) Conduct regular air quality monitoring and emissions testing to assess the impact of machinery emissions on local air quality and wildlife habitats. Monitor pollutant concentrations, deposition rates, and ecosystem health indicators to ensure compliance with air quality standards and regulatory requirements.

7.7.11.5. Air Pollution

Machinery used during decommissioning activities can generate air pollution, potentially disturbing wildlife and nearby ecosystems. Diesel emissions from machinery can also contribute to air quality degradation. *The impact is rated -3 Low.*

Mitigation measures

- (a) Utilize machinery equipped with advanced emission control systems, such as diesel particulate filters and selective catalytic reduction, to minimize harmful emissions. Upgrading machinery to newer models that meet stringent emission standards can significantly reduce air pollution.
- (b) Implement routine maintenance schedules and engine tuning procedures to optimize machinery performance and reduce emissions. Regular inspections, filter replacements, and engine tune-ups can ensure that machinery operates efficiently and emits fewer pollutants.
- (c) Consider transitioning to cleaner alternative fuels, such as biodiesel or renewable diesel, which produce lower emissions compared to traditional diesel fuel. This switch can help mitigate air quality degradation while reducing the environmental impact of machinery operations.
- (d) Encourage operators to adhere to best practices that minimize air pollution, such as reducing idling time, maintaining proper engine load, and avoiding unnecessary engine revving. Efficient equipment operation can help decrease emissions and minimize disturbance to wildlife and ecosystems.
- (e) Implement dust suppression measures, such as using water sprayers or dust control agents, to minimize the generation of airborne dust and particulate matter during decommissioning activities. Controlling dust emissions can help mitigate air pollution and prevent respiratory issues for both wildlife and workers.
- (f) Develop comprehensive site management plans that include strategies for minimizing machinery emissions and protecting nearby wildlife habitats. Establish buffer zones between machinery operations and sensitive ecosystems to reduce the risk of disturbance to wildlife.
- (g) Conduct regular monitoring of air quality and wildlife presence to assess the impact of machinery emissions on the surrounding environment. Monitoring data can inform decision-making and help identify areas where additional mitigation measures may be needed.



7.7.11.6. Waste generation

Decommissioning activities can generate significant amounts of waste, including construction debris, metal scraps, and discarded materials. Improper handling and disposal of this waste can lead to pollution of the surrounding environment. *The impact is rated -3 Low.*

Mitigation measures

- (a) Develop a comprehensive waste management plan that outlines procedures for the segregation, handling, storage, transportation, and disposal of different types of waste generated during decommissioning activities. Ensure that the plan complies with relevant regulations and environmental standards. The plan should include revolutionizing composting toilets i.e. the MycoToilet which utilizes Mycelium and Thermophilic Microbes to Quickly Convert Human Waste into Soil with Minimal Energy.
- (b) Prioritize source reduction and waste minimization strategies to reduce the overall amount of waste generated during decommissioning. Implement practices such as salvaging reusable materials, repurposing construction debris, and minimizing packaging to decrease waste generation at the source.
- (c) Establish recycling and material recovery programs to divert recyclable materials, such as metal scraps, wood, and concrete, from landfill disposal. Partner with local recycling facilities or contractors to recycle materials whenever feasible, reducing the environmental impact of waste disposal.
- (d) Implement proper waste segregation practices at the decommissioning site to separate different types of waste streams, such as hazardous materials, non-hazardous materials, and recyclables. Provide designated containers, bins, or storage areas for each waste category and ensure that workers are trained to segregate waste correctly.
- (e) Handle hazardous materials and waste streams, such as chemicals, solvents, and contaminated materials, in accordance with applicable regulations and safety protocols. Use specialized containers, labeling, and handling procedures to prevent spills, leaks, or environmental contamination.
- (f) Dispose of waste materials at licensed facilities that are authorized to handle and treat specific waste streams in compliance with environmental regulations. Ensure that waste disposal contractors are reputable, licensed, and equipped to handle waste safely and responsibly.
- (g) Conduct regular environmental monitoring and inspections to assess the impact of decommissioning activities on soil, water, and air quality. Monitor for pollution indicators such as leachate, runoff, or emissions to detect any environmental contamination resulting from improper waste management practices.
- (h) Ensure adequate sanitary facilities are in place and kept clean daily.



7.8. Risk Assessment

7.8.1. Risk assessment enabler

Pursuant to Section 114 and Subsections (1) – (2) of clauses (a) – (c) of the National Environment Act No. 5 of 2019, the proposed TBCW project is deemed eligible for a Risk Assessment. Furthermore, in accordance with Section 47(2) of the same Act, when cumulative impacts in section 9 next chapter, are foreseen to significantly affect human health or the environment, it is obligatory for the proponent to include the proposal for consideration. This obligation is reinforced by the National Environment (Environmental and Social Assessment) Regulations, 2020, along with its Sub-Regulations (1) – (3). It is thus that the risk assessment is necessary to identify and address any potential negative impacts that the TBCW project might generate during construction, operation, and decommissioning. The recognition and handling of these impacts can be accomplished through the implementation of a risk assessment as covered in the section 7 along with Cumulative Impacts in Section 8. In this case, cumulative impacts may not be reasonably assessed due to the lack of clear plans within the development sector for the coming years. However, the risk of biological invasion remains inevitable and should be considered as a significant concern.

Risk assessment is a process that evaluates the likelihood (probability and exposure) and consequences (magnitude) of positive and negative environmental effects occurring as a result of exposure to one or more hazards. Risk can be described by considering potential events and their consequences, either individually or in combination. It is frequently articulated as the amalgamation of an event's consequences and the likelihood of its occurrence.

In alignment with the risk management framework outlined in the National Environment (Environmental and Social Assessment) Regulations of 2020, essential risk-based assessments have been conducted as a fundamental component of all the ESIS studies. Employing a risk-based methodology to recognize, evaluate, and address the environmental and social risks linked to the project serves to enhance the overall development.

7.8.2. Risk assessment tools

Various tools are accessible for recognizing and evaluating risks, encompassing qualitative, semi-quantitative, or quantitative (numerical) analyses. Irrespective of the specific risk assessment tool employed, they all adhere to a comparable risk management process. The risk matrix concentrates on qualitatively assessing the potential events' risk linked to the construction, operation, and decommissioning of the project. It serves as a visual representation of risk, considering factors such as likelihood (exposure and probability) and consequence.

The qualitative risk assessment and its intended purpose of identifying potential risks associated with an activity involve the use of technical terms. However, these terms may differ from the specialized opinion of the assessor. Through this approach, the assessment process aims to comprehend the potential consequences of a specific activity. Terms like 'catastrophic' and 'critical' are employed to establish a link between qualitative descriptors of consequences, such as fatalities, and the subsequent outcomes, such as damage to reputation.

The obtained results were utilized for pinpointing intolerable risks, prioritizing efforts for risk reduction, and identifying specific areas for in-depth evaluation. This approach is flexible,



accommodating various levels of information and depths of assessment. It can be applied to identify areas for more extensive evaluation as part of an initial screening effort or to succinctly summarize comprehensive systematic studies. Subsequently, a presentation format, inherently suitable for review, was developed.

7.8.3. Identification of risks and Categorization of consequence

The identification of risks has employed diverse methods to guarantee the comprehensive and reliable identification of a series of risks, considering both individual and collective aspects, along with their causes, consequences, and unmitigated consequence. After identifying a potential risky activity, an assessment is conducted to ascertain the aspects of that activity that could lead to an impact on various areas, encompassing effects on humans, the environment, the community, social aspects, or legal matters. This process of evaluating activities that may result in an impact is referred to as the risk cause.

The method employed to conduct risk assessments for the TBCW aligns with the stipulations legal requirements outlined in section 7.1. Utilizing this methodology has enabled the NFA assessment to:

- Recognize risks linked to the construction, operation, and decommissioning phases of the project, ensuring that the ESIA technical study teams are aware of these project risks and can integrate them into their respective section.
- Recognize the individual and combined risks to the receiving (Kaniyo Pabidi) environment connected with the TBCW project.
- Offer a uniform approach and system for rating risks throughout diverse technical study domains, facilitating a comparative evaluation of risks across all study areas.
- Determine the residual risk ratings for the particular activities evaluated, considering the mitigation measures already incorporated into the design or standard operation.
- Recognize risks necessitating supplementary mitigation measures to diminish their residual risk rating to levels deemed acceptable and as low as reasonably achievable.

The list below outlines the process for populating the risk registration within the context of the broader methods for identifying and assessing risks.

- Identify risks - risk title, risk causes, consequences, assumptions, existing controls
- Analyse risks – inherent consequence, consequence, exposure, probability, likelihood, residual risk
- Evaluate risks
- Treat risks.

The risk assessments conducted for the TBCW project address key project elements, including social, biodiversity (wildlife, trees, and tree falls in a 464m long TBCW facility) and security. NFA, with its technical teams, para-military force, and collaborative efforts with Uganda Police Peoples Defense Forces, possesses significant experience and expertise in conducting risk assessments for projects of similar nature. The FMP of CFR identifies risks as part of management actions. However, each protected area under NFA management presents unique risks encompassing social,



landscape, biodiversity, and environmental aspects. Therefore, the methods employed in this assessment only reflect the approach taken for the TBCW project, specifically using the ESIA risk-based approach. The potential environmental and social impacts have been evaluated using this methodology. The specific reasons for this approach are outlined below:

- As for biodiversity, the risk assessment followed the likelihood approach, with the consequence descriptors observed and recorded around the project area accurately correlated to reflect the potential consequences.
- While the risk assessment employed the site observations approach, the consequence and likelihood descriptors were developed into a risk matrix by diverse experts. The purpose of this risk matrix was to compare it against other factors within the TBCW facilities.
- A quantitative risk assessment for injury and fatality risks was conducted in accordance with the proposed establishment. Both qualitative and quantitative risk assessments were taken into account for safety management concerning the proposed height of the TBCW.
- In the Social Impact Assessment approach, the consequence and likelihood descriptors, along with the risk matrix, were compared based on various enabling environments to align with the guidelines of the relevant government MDAs.

7.8.3.1. Assessed Likelihood

After identifying potential risks, their likelihood of occurrence can be assessed by predominantly qualitative means. This assessment involves evaluating the level of exposure to the risk and the probability of the risk causing the calculated consequence, considering the implemented mitigation measures. The accompanying Table 7-3 illustrates the categorization of the likelihood of occurrence, employing estimated quantitative probabilities that denote the expected number of occurrences within a specified timeframe.

Table 7-3: Likelihood matrix



		Risk Exposure						
		Not in 100 years	At least once in 100 years	At least once in 10 years	At least once a year	At least a four times a year	At least once per week	
		E1	E2	E3	E4	E5	E6	
Probability	Not known to occur in a comparable activity internationally but plausible 1 in 100,000 to 1,000,000	P1	0	0	0	0	1	1
	Known to occur in a comparable activity internationally but unlikely 1 in 10,000 to 100,000	P2	0	0	0		1	2
	Has occurred or could occur for this or a comparable activity in Australia 1 in 1,000 to 10,000	P3	0	0	1	1	2	3
	Expected to occur infrequently during this activity 1 in 100 to 1,000	P4	0	1	1	2	3	4
	Expected to occur occasionally during this activity 1 in 10 to 100	P5	1	1	2	3	4	5
	Expected to occur frequently during this activity 1 in 10	P6	1	2	3	4	5	6

A likelihood rating of zero (0) denotes that the likelihood may not be considered credible and the subsequent risk rating is given as 'not credible'. The likelihood is assessed after existing mitigation measures have been identified and is calculated on an exposure to, and probability of, the event occurring.

7.8.3.2. Risk level assignment

The amalgamation of the probability of an event and its corresponding consequence allows the determination of the comprehensive risk level, commonly referred to as the 'residual risk.' The assigned risk level considers the planned safeguards, recognized as 'mitigation measures.' Consequently, the relevant risk level pertains to the 'residual' risk anticipated after the implementation of mitigation measures. Utilizing the calculated scores from the Likelihood Table



7-4 and assessing the consequence category from the preceding table, the unmitigated risk ranking for a specific project activity and/or aspect can be ascertained with the assistance of the subsequent table

Table 7-4: Risk matrix

		Likelihood					
		1 Remote	2 Highly unlikely	3 Unlikely	4 Possible	5 Likely	6 Almost certain
Consequences	6 Catastrophic	Medium	Medium	High	High	Very High	Very High
	5 Critical	Low	Low	Low	High	High	Very High
	4 Major	Low	Low	Low	Medium	High	High
	3 Serious	Negligible	Low	Low	Low	Medium	High
	2 Moderate	Negligible	Negligible	Low	Low	Low	Medium
	1 Minor	Negligible	Negligible	Negligible	Low	Low	Low

7.8.3.3. Risk contours

Risk contouring offers a visual depiction of the proximity of a specific injury or fatality risk concerning the project. If a risk contour extends beyond the project boundary, it is essential to calculate the subsequent change in contours for other ongoing and planned project activities. This cumulative risk assessment is crucial, ideally grounded in existing regulations that encompass Tourism and Wildlife Hazardous Sector Planning, although some of these regulations may not be fully established yet.

7.8.3.4. Treat risks

The assessment team carefully evaluated various potential mitigation measures that maybe applied and document them in the risk registers, along with the resulting treated risk rating. Subsequently, these mitigation measures may undergo review, and the residual risk level is assessed. Risk assessment teams then decide whether treated (residual) risks can be further mitigated, are within acceptable tolerances, or necessitate additional treatment. In cases where further risk reduction is deemed necessary, action plans are formulated. The document also provides a description of proposed mitigation measures for specific aspects of the assessment.

7.8.3.5. Monitor and review

Ongoing monitoring and review are essential to ensure the risk assessments that have been conducted remain relevant. Factors and assumptions that were used are subject to change, such as new risks identified, new mitigation measures implemented, existing mitigation measures removed, new consequence identified and so on. These have the potential to alter the risk rankings, either positively or negatively.

The risk registers require to be put in place and should be reviewed and revised as necessary during the implementation when additional information becomes available through specialist technical reports. The risk assessment process should continue to be reviewed and revised throughout all phases of the Project. As a minimum, these reviews will be done in accordance with the following frequency/events:

- Annual basis



- Emergency incident
- Identification of non-compliance with environmental authority conditions
- Legislative changes (including standards and guidelines)
- New or changed in processes (including addition or removal of mitigation measures)
- When further risk studies are undertaken (e.g. Hazard Identification Study (HAZID), Hazard and Operability Study (HAZOP), job hazard analysis).

NFA should ensure that its risk assessment methodology remains current and reflects operational accepted norms as part of the annual review process. Monitoring of the effectiveness of mitigation measures should also be undertaken throughout all phases of the project. This monitoring should be undertaken through a combination of continuous monitoring (e.g. measuring parameters), and internal and external audits.

7.9. Cumulative impacts

The approved TORs from NEMA for the ESIA also propose the identification of critical environmental concerns not initially foreseen during the preparation of the Scoping Report and assessment TORs. This necessitates an examination of risk assessment and cumulative impacts from other known, existing, or proposed projects, with detailed information provided to the ESIA team. The team employed the following approaches to identify cumulative impacts:

- Identification of current and proposed projects with the potential to impact the Project.
- Review of publicly available information, public engagement, and consultations related to these projects.
- Identification and assessment of cumulative impacts. Notably, this assessment has been conducted qualitatively due to limited available data for a comprehensive quantitative analysis.

While determining cumulative impact, the ESIA team considered the effects arising from small-scale investments within the Project area, such as a stopover restaurant, mini-museum, and information center. Additionally, consideration was given to the cumulative effects of small-scale developments within the Kaniyo Pabidi zone. Therefore, the assessment of risks related to the TBCW project followed a systematic approach to identification and evaluation. The process aligns with the impacts highlighted in specialist studies and involves the following steps:

- Establishing the context
- Identifying risks and hazards
- Analyzing risks
- Evaluating risks
- Treating risks
- Monitoring and reviewing risks

To ensure consistency in the assessment of qualitative risks and facilitate comparisons across the project area, a common risk matrix and scoring system were employed, where applicable. Any



alternate descriptors used in risk assessments for specific study was duly noted in the impact assessment section. Quantitative risk assessments were conducted where sufficient data was available to determine risks associated with identified impacts.

The hazard identification and risk analysis process within the ESIA team engaged subject matter experts from technical disciplines. Some disciplines, as per their norm, utilized risk evaluation methodologies.

The outcomes of both qualitative and quantitative risk assessments were thoroughly discussed. In cases where mitigation measures were necessary to reduce risks to an acceptable level, these measures were identified. Furthermore, the risk assessment process considered not only individual and collective risks associated with the project but also considered the cumulative impacts that other projects (both existing and proposed) might have within the study areas.

All risk assessments were conducted holistically, adhering to the TORs for the ESIA guidance from NEMA. The assessments addressed risks to both biophysical environments within the project area of the TBCW.

7.9.1. Cumulative Impact Assessment

7.9.1.1. The rationale and methods for cumulative assessment

The aim of the cumulative impact assessment is to consider the potential effects of the TBCW, along with other ongoing or planned projects in the region, which could collectively influence a variety of environmental, social, and economic aspects, has been considered. However, this proposal being a biodiversity friendly project its impacts include of direct, indirect, and cumulative were understood as those impacts on natural habitats from a small project.

Ongoing projects are those that have initiated development but involve one or more components not aligned with current or baseline environmental values. For instance, the cumulative impact of land clearing (which will not happen or it may) during the construction phase of the project may be considered part of the existing environment, while air emissions from the operational phase won't be considered part of the TBCW until after the project has been commissioned.

The ESIA team has sought to evaluate these cumulative impacts. The application outlines the methodology employed to determine the projects included in the cumulative assessment and the subsequent evaluation of their impacts.

In the surrounding area of the three project components, there are presently several ongoing projects that may add to cumulative impacts. The selection of additional projects suitable for inclusion in the cumulative impact assessment was determined by:

- The project falls within the designated area of potential influence.
- If the Environmental and Social Impact Assessment (ESIA) for the proposed project has been either completed or is currently underway, or if the project's initial advisory statement has been issued.

Projects meeting these criteria and deemed feasible for impact assessment were considered for inclusion in the cumulative impact assessment. A total of three projects, including the TBCW project, underwent analysis.



- ESIS (2017) the upgrade of; Kisanja-Park junction; Sambiya-Murchison Falls; Buliisa-Paraa; Paraa-Pakwach;Wanseko-Kasenyei-Kirango-Bugungu Camp roads and associated bridges (169km)
- ESIS (2023) Proposed Construction of Budongo Eco Lodges in Budongo Central Forest Reserve Within Murchison Falls Protected Area

Both projects mentioned are classified as high-risk ("red") projects, as they involve significant changes in land cover one in a linear configuration and the other with a localized land take based on site-specific conditions. In contrast, the TBCW project will not alter land cover, as it is designed to utilize existing infrastructure with minimal environmental impact.

The connection between the projects and the TBCW Project, and the potential areas where cumulative impacts might occur, like the skilled labor resource thought all phases. The positions of the projects within the TBCW environment and the surrounding area.

It is important to acknowledge that the status and potentially other details of these projects are subject to plans that may undergo changes in the future. The cumulative impact assessment outlined in this ESIS reflects the information currently available on these projects.

The importance of assessing cumulative impacts on the physical/biological, social, cultural, economic, and environmental aspects of TBCW was examined. This evaluation was based on the methodologies outlined in the respective sections of the ESIS that align with the pertinent environmental or other values.

Table 7-5: Lists of assumed projects planned in and around the area

Project and Proponent & sub/contractor(s)	Project description	Location	Project status	Relationship to the TBCW-in-CFR
NFA	Establishment and operation of research towers	Kaniyo Pabidi	A view proposed by NFA	To be depended on by NFA implementation of the FMP
NFA	Establishment of additional ecolodges	Kaniyo Pabidi Sector project to be proposed in future	A view proposed by NFA	A component that will enhance tourism in the area
NFA	Improvement of the NFA Kaniyo Pabidi campsite to accommodate more tourists	The project will be proposed in future		This component will enhance tourist visits in the community

The cumulative assessment is discussed under the following environmental categories, which generally follow those described in the ESIS:

- Air quality
- Canopy visual amenity
- Forestry ecology
- Noise
- Traffic and transport



- Waste
- Hazard and risk
- Social
- Economic

In certain instances, the evaluation of the aforementioned environmental categories focused solely on projects situated near or proposed within the TBCW-in-CFR project study areas. This limitation arises from the fact that the cumulative impact of specific environmental influences does not extend into the Kaniyo Pabidi zone of CFR. For instance, noise and potential vibration emissions during construction do not combine with those generated by vehicular traffic on the tourism road which seem to only have tourism traffic plus the oil development vehiculation along the transport routes. Nevertheless, some environmental categories require consideration in connection with each project element, as their impacts extend beyond the immediate project study area. An example is greenhouse gas emissions. Given the extensive scale of existing or proposed developments in the region, it becomes necessary to assess the cumulative social and economic impacts on a seasonal basis within the framework of each of the three individual cumulative assessments for the TBCW project. The discussion in (Section 7.9) addresses the nature and importance of potential cumulative impacts on the physical/biological, social, cultural, economic, and built environmental values associated with each of the main elements of the Project.

These sections outline the possible cumulative effects during both the construction and operational phases linked to each element of the Project. The impacts on these values can emerge from factors such as the positioning of project areas, the timing of development plans, and the allocation of services and resources. Although all the previously identified assessed projects, whether existing or proposed, encompass a variety of project types, they can be broadly classified into three groups as follows:

- Biodiversity
- TBCWs construction operation and decommissioning
- Former saw-mill area
- Social

The matrix illustrates the values influenced by various project categories based on the potential for them to be built or operated in close proximity. If the projects are situated in the Kaniyo Pabidi zone of CFR, the cumulative impacts could either worsen adverse effects or amplify positive impacts.

In conducting this assessment, it is assumed that the current projects and those expected to be proposed and developed do not overlap. This assumption is made based on the absence of projects outlined in the district plans, as well as the lack of proposals for tea estates or strategic developments like regional infrastructure, excluding tourism diversification. This approach ensures a conservative evaluation of potential adverse cumulative impacts.



7.10. Decommissioning

7.10.1. Timeline

There is no specific timeframe established for decommissioning the TBCW-in-CFR; however, this ESIA has addressed the procedures for decommissioning and proposed corresponding measures. The document outlines the impacts linked to decommissioning, evaluates them, and puts forth suggested mitigation measures. Consequently, management and monitoring plans encompass facets related to the mitigation measures associated with decommissioning.

The primary challenge will revolve around managing the steel and solid waste generated during the dismantling of the structure and the excavation of concrete, especially considering the project's location in an area originally used for a sawmill. While there is potential for reusing some of the concrete, aligning with Uganda's Circular Economy initiatives, proper handling methods, including waste disposal, must adhere to the Waste Handling Regulations. Disposing of solid waste should follow appropriate procedures and acceptable practices. The approach used to construct the TBCW without harming any trees should be replicated during its dismantling.

While the CFR has its waste handling practices, being 32 km from Masindi Town suggests a collaborative effort in managing municipal waste, as recommended earlier.

7.10.2. Procedure

1. Impact Assessment:

It is in best practice that NFA complies with the National Environment (Environmental and Social Assessment) Regulations, 2020. Nonetheless should the time for the decommissioning be decided;

- Conduct a thorough impact assessment to identify potential environmental, social, and safety impacts associated with decommissioning.
- Evaluate the structural integrity of the TBCW and assess any risks associated with dismantling.
- As a norm according to the establishment the proposed TBCW should be subjected to comply with the National Environment (Audit) Regulations, 2020. It is from the Audit findings that other adjustments will be decided upon during the operations.

2. Stakeholder Engagement:

- Communicate with all stakeholders to keep them informed about the decommissioning process.
- Seek input from stakeholders and incorporate any concerns or suggestions into the plan.

3. Waste Management:

- Develop a comprehensive waste management plan to handle steel, concrete, and other materials generated during dismantling.
- Prioritize reuse of materials where feasible and adhere to Uganda's Circular Economy initiatives.



- Follow Waste Handling Regulations for proper disposal of waste to minimize environmental impact.
- 4. Tree Preservation:**
- Employ the same careful approach used during construction to preserve trees in the vicinity.
 - Collaborate with environmental experts to ensure the protection of flora and fauna during the decommissioning process.
- 5. Safety Measures:**
- Implement safety protocols to protect workers and visitors during decommissioning.
 - Provide necessary training for personnel involved in the dismantling process.
- 6. Documentation:**
- Keep detailed records of the decommissioning process, including impact assessments, waste management records, and safety measures undertaken.
 - Document any unexpected challenges encountered during the decommissioning phase.
 - It may be also important that every month an ESMP monitoring is prepared and eventually accrues to a benchmarking step.
- 7. Monitoring and Reporting:**
- Establish a monitoring plan to assess the environmental and social impacts post-decommissioning.
 - Regularly report progress to park management, local authorities, and other stakeholders.
- 8. Collaboration with Local Authorities:**
- Collaborate with Masindi District's waste management practices and coordinate efforts to manage municipal waste effectively.
- 9. Restoration and Rehabilitation:**
- Develop a plan for the restoration of the decommissioned area, considering the park's natural ecosystem should there be a temporal impact on the surrounding nature.
 - Implement rehabilitation measures to ensure the site returns to its original state as much as possible.
- 10. Closure and Handover:**
- Officially close the decommissioning process with proper documentation.
 - Hand over all relevant records and findings to CFR management for future reference.



CHAPTER 8

8. ENVIRONMENTAL, SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

8.1. Impact Management

Plans for the implementation and monitoring of enhancement and mitigation measures for the proposed project are provided in Table 8-1 below. The Plan indicates institutional responsibilities, time to take the action and estimated costs. The proposed costs are only indicative, should the proposed development proceed with the suggested changes, then NFA will have to work out actual costs and include them in the overall cost of the project. Based on the NEA, Cap 181, NEMA will be responsible to ensure compliance of all the agreed conditions for authorization.



Table 8-1: Plan for Implementation and Monitoring of Environmental and Social Enhancement/Mitigation Measures for the proposed Tree Based Canopy walk

Identified Impact	Impact Sense (Positive / Negative)	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation	Rating & Relative cost (UgX) to change as per inflation of the time
<i>Enhancement measures of positive impacts associated with construction</i>					
Support to national policies	POSITIVE	Government to ensure effective implementation of the policies and laws that promote sustainable tourism in Uganda	NFA UTB MTWA MFPED	During Construction. and beyond	
Change in lifestyle	POSITIVE	- Awareness of savings schemes -Provide on-job training to workers -Support formation about SMEs for the workers	NFA	During construction	
Change in the level of employment	POSITIVE	-Recruitment to consider local communities. -Employment should be on equal opportunities for both gender -Provide on-job training	NFA	During construction	
Economic benefit to local communities	POSITIVE	-Masindi District Council to implement strategies of linking Canopy Walk development with the local economy (e.g. agriculture, livestock, handicraft, construction materials); - Ensure accountability to the public on revenue generated from levies and taxes for the lodge at the local level; -Local communities to acquire relevant skills for hospitality development	Masindi District NFA	During construction	
<i>Enhancement measures associated with the operation phase</i>					
Support to BUDONGO CFR's FMP and policies	POSITIVE	-Promote tourism, locally and internationally; -Ensure the conservation of Budongo CFR and abide by the FMP -Put in place an effective centralized booking system for tourists to control tourism	Budongo CFR	During Operation	



Identified Impact	Impact Sense (Positive / Negative)	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation	Rating & Relative cost (UgX) to change as per inflation of the time
Support to National Policies	POSITIVE	<ul style="list-style-type: none"> -Government to introduce labor laws that would compel NFA to employ local staff with relevant qualifications; -Promote tourism, locally and internationally; -Develop mechanisms that will compel Canopy Walk developers/contractors to procure more goods and services from local service providers; -Develop mechanisms for improving local products; -Provide capacity-building programs for hospitality and tourism 	MTWA UTB Development partners	Operation and beyond	
Change in lifestyle and quality of life	POSITIVE	<ul style="list-style-type: none"> -Provide awareness to workers to initiate income-generating activities and SMEs; -Encourage the establishment of SACCOS at the workplace; -Provide on-the-job training. -Sensitisations about national cultures and values to the workers 			
Increase in levels of employment	POSITIVE	<ul style="list-style-type: none"> -Recruitment to consider local communities -Employment should be on equal opportunities for both gender -On job training. -Encourage the establishment of SACCOS at the workplace -Government to promote the establishment of training institutions on hospitality and tourism management 	NFA Masindi District Local Government MTWA UTB	During operation and beyond	



Identified Impact	Impact Sense (Positive / Negative)	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation	Rating & Relative cost (UgX) to change as per inflation of the time
Level of benefit to National economy	POSITIVE	-Ensure efficient collection of different taxes. -Introduce an effective booking system for tourists for tax collection and monitoring. -Promotion of the tourism industry -Enhance the conservation of tourist destinations in the country -Diversify tourist products (e.g archaeological tourism, cultural tourism, gender tourism, nature tourism)	NFA UTB MTWA MFPED	During operation and beyond	
Economic benefits to local communities	POSITIVE	-Communities to be encouraged to produce quality goods (handicrafts, agricultural and livestock products) & services (hotel services e.g. housekeeping) for the hotels; -Local communities to acquire skills and knowledge relevant for the hospitality and tourism industry; -Ensure good governance & accountability of revenue generated from tourism for local communities	NFA UTB MTWA Masindi District Local Government; Community Development Office -NGOs -CBOs	During Operation	
Change in species and habitat diversity	NEGATIVE	-Habitat restoration -Species monitoring and invasive species control -Implement adaptive management -Collaboration with Conservation Organizations	NFA/Operator	Throughout the project cycle	<i>Low (cost already incorporated in the FMP)</i>
Wildlife harassments	NEGATIVE	-Observe speed limits as per protected area management rules -Adhere to the time of construction -Abide to Budongo CFR regulation	NFA/Operator	During construction	<i>Low (cost already incorporated in the FMP)</i>
Change in scenic quality	NEGATIVE	-Proper waste management -Confine to the core area -Adhere to the time of construction	NFA/Operator	During construction	<i>Low(cost already incorporated in the FMP)</i>



Identified Impact	Impact Sense (Positive / Negative)	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation	Rating & Relative cost (UgX) to change as per inflation of the time
		-Blend canopy walk structures with the forest environment -Adhere to Budongo CFR - FMP and regulations			
Incompatibility with BUDONGO CFR's - FMP and policies	NEGATIVE	-Adhere to Budongo CFR- FMP and policies - Look for an alternative site for the lodge	NFA/Operator	Before construction	High because the FMP will be outdated in a year (NFA to cost the update of the FMP)
Noise pollution	NEGATIVE	-Adhere to the time of construction -Use noise dampening equipment -Some building materials and components to be processed off-site and fixed on-site	NFA/Operator and contractor	During construction	Medium but estimated 4,000,000ugx (every 3 months during construction and operation)
Dust pollution	NEGATIVE	-Adhere to the time of construction	NFA/Operator and contractor	During construction	Low(negligible because this part of forest nature)
Change in population size, values, and norms	NEGATIVE	- Provide awareness to the public on local norms and values - Budongo CFR management to strengthen security and anti-poaching - Budongo CFR to participate in screening workers to weed out known poachers in case there are; - Budongo CFR management to raise awareness among workers in the values of conservation - Adhere to construction time - Budongo CFR to enforce entry regulations -Consider adding conducting community outreaches to the adjacent community	District Community Development Office NGOs/CBOs	During construction	Low (Part of FMP implementation budget)
Increased incidences of diseases and ill health	NEGATIVE	-Medical Support and Sanitation Facilities -Health education per new fleet of visitors -Vector Control: Implement measures to control vectors of disease transmission	NFA/Operator	Throughout the project cycle	High (part of the contractor budget and operational costs)



Identified Impact	Impact Sense (Positive / Negative)	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation	Rating & Relative cost (UgX) to change as per inflation of the time
		-Monitoring and Surveillance to track incidences of diseases among visitors and staff -Staff training: on visitor screening			
Incidences of risks, hazards, and accidents	NEGATIVE	-Adhere to construction time and schedule - Limit the number of vehicles to the site to those for construction only -Avoid construction during the high season -Process some of the materials outside for fixing on-site - Establish a speed limit. Enforcement will be key.	NFA Contractor Tourist vehicles	Throughout the project cycle	<i>Low (part of the contractor budget and operational costs)</i>
Pressure on utilities	NEGATIVE	-Project workers should ensure they pay fairly and timely for services consumed. -Workers may practice water harvesting, and the community is encouraged to do so.	Contractor	During construction	<i>Low(negligible)</i>
Effects of social cohesion	NEGATIVE	-Recruit project workers from within the project area as a strategy of reducing the influx of people. -Sensitize project workers against unnecessary interactions and ensure following the area's cultural norms. -Support the existing health centers in the project area to enhance the provision of services to the increasing population. -Popularize the community grievance mechanism.	Contractor NFA	During construction	<i>Low(partly the cost of construction and NFA implementation budgets)</i>
Mitigation of the impacts associated with the operation phase					



Identified Impact	Impact Sense (Positive / Negative)	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation	Rating & Relative cost (UgX) to change as per inflation of the time
Waste management	NEGATIVE	-Developer to treat all generated waste biologically -Put in place specific personnel to collect, sort, and manage at a generation point within the canopy walk and dispose of following NEMA standards of waste treatment and practices respectively properly all solid waste -Adhere to Budongo CFR waste management regulations and practices.	NFA/Operator	During operation	<i>Medium (partly the cost of construction and NFA implementation budgets)</i>
Change in habitat and species diversity	NEGATIVE	-Treat all waste biologically and as relevant to the site to avoid any species to feed on them -Collect, sort, treat/dispose of waste generated properly -Abide to NFA waste management regulations -Conduct a detailed assessment of the impact of waste on the species and habitat diversity along the Canopy Walk	NFA/Operator	During operation	<i>Low (FMP implementation budget)</i>
Wildlife harassment	NEGATIVE	- Budongo CFR management to consider planned canopy walks based on understood specific wildlife species behavior - Budongo CFR to enforce its LAU on roads - Budongo CFR to revise fees upwards for penalties for offenses regarding off-road driving - Budongo CFR to limit the number of vehicles to the crater - Budongo CFR should consider alternative products apart from game viewing	NFA/Operator	During operation	<i>Low (FMP implementation budget)</i>
Change in scenic value	NEGATIVE	-Collect, sort, treat/dispose of solid/liquid waste properly	NFA/Operator	During operation	<i>Low(FMP implementation budget)</i>



Identified Impact	Impact Sense (Positive / Negative)	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation	Rating & Relative cost (UgX) to change as per inflation of the time
		-Abide to Budongo CFR waste management regulations & design a specific solid and human waste management plan in the Canopy Walk			
Increased incidences of diseases and ill health	NEGATIVE	-Provide awareness to the public on referral pathways for HIV/AIDS and other diseases such as ebola, cholera, etc., - Provide VCT centers		During operation	<i>Medium</i>
Change in the level of population	NEGATIVE	- Budongo CFR to enforce entry regulations -Conduct campaigns on environmental education - Budongo CFR to limit the number of vehicles to the Kaniyo-Pabidi zone -Masindi District Local Government to enforce by-laws on conservation -Develop & encourage workers to form SACCOS -Housing of workers on the Canopy Walk to be managed under NFA accommodation guidelines	NFA	During operation	<i>Low</i>
Increased traffic levels	NEGATIVE	- Budongo CFR management to revise upward penalties for protected area offenses - Budongo CFR management forecasts tourist numbers on the Canopy Walk - Budongo CFR management to commission detailed study on factors causing overcrowding in case of business picking up	Budongo CFR management	During operation	<i>Medium (part of the FMP)</i>
Increased human-wildlife conflicts	NEGATIVE	-Compensate locals who were affected by animal raids in previous years. -Encourage and sensitize locals to have diverse livelihood sources to minimize reliance on agriculture.	NFA Masindi District Local Government	High	<i>Implementation of the FMP budget</i>



Identified Impact	Impact Sense (Positive / Negative)	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation	Rating & Relative cost (UgX) to change as per inflation of the time
		-Train locals to create and maintain community tourism to benefit from the increasing number of tourists in the area.			
Failure of the local community to benefit from the project	NEGATIVE	-Encourage and sensitize locals to have diverse livelihood sources. -Train locals in creating and maintaining community tourism so that they benefit from increase in number of tourists to the area. -Support existing community tourism activities. -Advertise at different fora community tourism activities in the area.	NFA Masindi District Local Government	High	<i>Implemnetation of the FMP budget</i>
Insecurity	NEGATIVE	-Encourage community policing to identify the culprits and to ensure the safety of tourists and project materials; -NFA should develop a security plan in liaison with the LCs and the police to curb cases of theft especially of construction materials; -Collaborate with the local security organs to curb insecurity and theft.	NFA Uganda Police/UPDF Masindi District Local Government	Low	<i>Implemnetation of the FMP budget</i>
Incidences of risks and hazards	NEGATIVE	-Proper disposal of solid waste -Stakeholder-engagement -Regulatory compliance -Regular inspections and maintenance -Data sharing on the safety of the Canopy Walk with management -Emergency preparedness and Response towards wildlife behavior, -Risk Assessment & Management Plan -Visitor monitoring and Capacity management: -Visitor education and interpretation -Staff training and certification	-NFA/ Operator -UTB -Waste handler -MTWA -MGLSD	Once in three months	<i>Low (Implemnetation of the FMP budget)</i>



Identified Impact	Impact Sense (Positive / Negative)	Enhancement /mitigation Measures	Responsible Institution	Time of mitigation	Rating & Relative cost (UgX) to change as per inflation of the time
Compliance with the National Environment (Audit) Regulations, 2020	NEGATIVE	Undertake Environmental & Social Audits as per Regulation 3 sub-regulation 1 - 2	NFA/Operator	Annually throughout the project life cycle	98,000,000/= (UGX)
Mitigation of the impacts associated with Decommissioning					
Change in scenic quality	NEGATIVE	-Proper waste management -Confine to the core area -Adhere to the time of construction -Blend canopy walk structures with the forest environment -Adhere to Budongo CFR - FMP and regulations	NFA/Operator	During decommissioning	<i>Low (Implementation of the FMP budget)</i>
Loss of employment	NEGATIVE	- Proper and timely payments of pension/terminal benefits of workers after services	NFA/Operator	During decommissioning	<i>Low</i>
Dust pollution	NEGATIVE	Contractors during construction will use existing roads and there will be no additional access route that will be added	NFA/Operator Contractor	Throughout project cycle	<i>Low (negligible since is part of forest nature)</i>
Change in lifestyle and quality of life	NEGATIVE	-Proper and timely payments of pension/terminal benefits of workers after services	NFA	During the Operation	
Reduced benefits to communities and the local economy	NEGATIVE	-Provide on-job training for various trades and skills -Awareness about investment opportunities (e.g. SME activities)	-NFA -UTB -MTWA -NGOs -CBOs	Before decommissioning	<i>Low Cost:</i>



8.2. Environmental and Social Monitoring

8.2.1. Baseline monitoring

Ensuring ESIA follow-up and rigorous monitoring is paramount in implementing NEA, Cap 181, and associated legal frameworks in Uganda, without which consistent monitoring, mitigation strategies, and improvement measures become ineffective. The 2020 National Environment (Environmental and Social Assessment) Regulations, the National Environment (Audit) Regulations, and other relevant laws outline the necessary steps to address this issue. There is a direct correlation between the effectiveness of mitigation efforts and the thoroughness of monitoring. This monitoring should encompass assessing compliance and evaluating the impact of mitigation and enhancement measures. NEMA plays an essential role in coordinating, licensing, permitting, and regulating these activities, collaborating closely with pertinent sectors and stakeholders.

Monitoring refers to the systematic collection of data through several repetitive measurements over a long period to provide information on the characteristics and functioning of environmental and social variables in specific areas over time. Four types of monitoring are also relevant to this ESIA. These are (Sadler, 1996).

During both the pre-project and operational phases, environmental parameters are measured to identify natural variations and, if feasible, discern patterns of change.

8.2.2. Impact/effect monitoring

This involves measuring parameters (performance indicators) during the construction, operation, and decommissioning phases to detect and quantify environmental and social changes that may have occurred due to the project. This monitoring offers insights for future projects and lessons that can enhance methods and techniques.

8.2.3. Compliance monitoring

Involves periodic sampling and ongoing measurement to evaluate adherence to standards and thresholds, including those related to waste discharge and air pollution.

8.2.4. Mitigation monitoring

Aims to determine the suitability and effectiveness of mitigation programs designed to reduce or compensate for the adverse effects of the project.

Chapters 6 and 8 offer extensive information on the impacts, enhancement, and mitigation measures. This chapter introduces a proposed monitoring plan. Based on the preceding discussions, numerous components for monitoring will form an integral part of the development project. Thus, monitoring will encompass various aspects, including the potential for enhanced income and lifestyle changes, increased job opportunities, and revenue. Additionally, it will address concerns such as waste management, water usage, dust and noise pollution, heightened traffic within the Kaniyo-Pabidi zone Budongo CFR, and environmental degradation and wildlife disturbance resulting from increased vehicle activity.

Monitoring is essential to assess the effectiveness of enhancement measures and mitigation options and to gather information for future developments and planning processes. Table 8-1 above outlines



the attributes to be monitored, their frequency, institutional responsibilities, and estimated costs. These costs are approximate and will be borne by various stakeholders. NFA-covered costs should be incorporated into the project budget as those covered by other stakeholders, such as NEMA, and Masindi District Local Government, should be treated separately, despite being part of the overall project expenses.

8.3. Workers Grievance Redress Mechanisms

Effective grievance management is a key component of stakeholder engagement. Grievances related to the construction and operation of the TBCW will be addressed through the Grievance Redress Mechanism (GRM) established by NFA. The GRM will be integrated into the FMP and will also play a role in managing grievances related to Canopy Walk operations. Any grievances beyond its scope, particularly those concerning forest sector and range management or issues it cannot resolve, will be referred to the NFA head offices for further action. The NFA, contractor, and operator have established and implemented comprehensive human resources policies covering various workplace aspects. These policies broadly include:

- Workers' code of conduct including the Terms and conditions of employment (including remuneration and benefits)
- Equal employment opportunity and diversity
- Health, safety, and hygiene in the workplace
- Workplace standards and conduct requirements
- Grievance policies
- Employee assistance programs

Contracted parties working with the contractor and operator are generally required to adhere to the same or equivalent standards outlined in the operator's human resources policies.

The NFA is committed to addressing community concerns through active and transparent engagement to ensure that issues are identified and resolved in a mutually satisfactory manner. Additionally, the NFA upholds grievance and dispute resolution processes, requiring the operator to develop formal complaint-handling procedures. These procedures must clearly define the role of contracted parties in resolving complaints.

The NFA, contractor, and operator must be equipped to record and respond to all community complaints from relevant stakeholders and affected community members. The NFA is committed to responding and investigating complaints fairly and transparently, striving for timely and satisfactory resolutions.



CHAPTER 9

9. CONCLUSIONS AND RECOMMENDATIONS

9.1. Conclusion

The Environmental Social Impact Statement (ESIS) has presented a comprehensive assessment of the social, physical and biological conditions of the Kaniyo Pabidi, Budongo Central Forest Reserve – the proposed site for the Tree Based Canopy Walk. The ESIS has further indicated that there will be limited negative impacts that will affect the Environment and Social parameters for Kaniyo Pabidi, Budongo Central Forest Reserve thus the mitigation measures proposed should be able to mitigate the negative impacts and enhance the positive impacts thus the need to implement the proposed Tree Based Canopy Walk at Kaniyo Pabidi, Budongo Central Forest Reserve.

9.2. Recommendations

The ESIA study makes these key recommendations for the implementation and operation of the Tree -Based Canopy Walk (TBCW) project:

1. Economic Linkages & Community Engagement

- Strengthen local economic integration by supporting local businesses and artisans through capacity-building programs.
- Prioritize employment opportunities for local communities, ensuring gender inclusivity and skills development.
- Implement revenue-sharing mechanisms with adjacent communities and District Councils to enhance local benefits.

2. Environmental & Wildlife Protection

- Implement strict environmental monitoring and enforcement of mitigation measures to minimize ecological and wildlife disturbances.
- Develop clear guidelines to prevent wildlife harassment and ensure the safety of both visitors and workers.
- Roll out the Budongo Forest Management Plan (FMP) to support the sustainable development of TBCW.

3. Tourism Management & Promotion

- Establish a well-regulated booking and visitor management system in collaboration with NFA, UTB, and URA to control numbers and optimize revenue collection.
- Promote the TBCW project locally and internationally as a flagship ecotourism initiative under the Forest Management Plan.
- Strive to integrate the marketing of TBCW, Chimpanzee and other products as a Tourism package to optimize benefits.

4. Safety & Risk Mitigation



- Enhance occupational health and safety measures to mitigate risks related to wildlife interactions and construction hazards.
- Implement robust emergency response protocols and visitor safety guidelines to ensure a secure tourism experience.

5. Policy & Institutional Strengthening

- Ensure clear institutional coordination for project implementation, including stakeholder engagement on ESMP execution.
- Encourage government support for labor law enhancements mandating local workforce inclusion in canopy walk operations.
- Support the specialized training of NFA staff and workers in the management of the TBCW to build capacity for sound operations and sustainability.

These recommendations will help ensure the project's long-term sustainability while balancing economic, environmental, and social considerations.



REFERENCES

1. Banana, A. et al. (2012). Sustainable Forest Management in Uganda.
2. Behangana, M., Ayebare, S., Magala, R., Lukwago, W., Ssekisambu, R. S., Alezuyo, C., Sisiria, A., & Hughes, D. F. (2023). Establishing baseline data for herpetofauna in western Uganda, an East African biodiversity hotspot. *Herpetology Notes*, 16(November), 773–789.
3. Biodiversity Survey Report for the proposed construction of Eco-lodge in Budongo Central Forest Reserve. 2023
4. BirdLife International. (2021). *Important Bird Areas factsheet: Budongo Forest Reserve*. Retrieved from www.birdlife.org
5. Bortolamiol, S., Cohen, M., Jiguet, F., Pennec, F., Seguya, A., & Krief, S. (2016). Chimpanzee non-avoidance of hyper-proximity to humans. *The Journal of Wildlife Management*, 80(5), 924-934.
6. Branch B. (2005) A Photographic Guide to Snakes, other reptiles and amphibians of East Africa. – Struik Publishers: Cape Town.
7. Brennum, L., Davies, G., Howell, K., Newing, H., Hoffman, M., Clarke, J., ... & Hawkins, F. (2002). *African forest biodiversity: A field survey manual for vertebrates*.
8. Budongo Forest Reserve Biodiversity Report. Series no. 3. Forest Department. Edited by Howard, P; Davenport, T. and Matthews R. August, 1996.
9. Byaruhanga, A. (2001). *Important bird areas in Uganda*. Nature Uganda, the East African Natural History Society.
10. Carswell, M. (2005). *The bird atlas of Uganda*. British Ornithologists' Club [and] British Ornithologists' Union.
11. Carswell, M., Pomeroy, D., Reynolds, J., & Tushabe, H. (2005). *The Bird Atlas of Uganda*. British Ornithologists' Club.
12. CITES Appendix II of the IUCN Red Category, 2019.
13. Connah, G., Kamuhangire, E., & Piper, A. (1990). Salt production at Kibiro. *Azania: Archaeological Research in Africa*, 25(1), 27–39. <https://doi.org/10.1080/00672709009511406>
14. Eggeling, W. J. (1947). Observations on the ecology of the Budongo Rain Forest, Uganda. *Journal of Ecology*, 34(1), 20–87.
15. ESIS (2017) the upgrade of; Kisanja-Park junction; Sambiya-Murchison Falls; Buliisa-Paraa; Paraa-Pakwach; Wanseko-Kasenyi-Kirango-Bugungu Camp roads and associated bridges (169km)
16. ESIS (2023) Proposed Construction of Budongo Eco Lodges in Budongo Central Forest Reserve Within Murchison Falls Protected Area



17. Esther, B., Moses, M., & Sarah, A. (n.d.). Metropolitan Journal of Social and Educational Research A study on the Impact of Urbanisation on Forest Cover in Uganda, A case study of Busembatia Town Council-Bugweri District
18. Fagan, B. M., & DeCorse, C. R. (2005). *In the beginning: An introduction to archaeology* (11th ed.). Pearson/Prentice Hall.
19. Feder, K. L. (1997). *Field methods in archaeology*. Mayfield Publishing Company.
20. 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.
21. Fidalgo, P., Almeida, R., Caetano, E., Cunha, Á., & Cachim, P. (2022). *Tree top walk at Serralves Park, Portugal*. Paper presented at Footbridge 2022: Creating Experience, Madrid, Spain. <https://doi.org/10.24904/footbridge2022.184>
22. Global Invasive Species Programme. (2003). *GISP: The Global Invasive Species Programme Call to Action*.
23. Goudie, A. S. (2006). *The Geomorphology of Tropical Africa*. Oxford University Press.
24. Grace, T., Zikusooka, E., Ariyo, D., & Kazaara, G. (2023). A Case Study of Sumz Foods Industries (Vol. 2, Issue 6).
25. Guidelines for Environmental Impact Assessment in Uganda, NEMA 1998
26. Halliday, T. R. (1996). Amphibians. In: Sutherland W.J, ed. *Ecological Census Techniques: A Handbook*. Cambridge UK: Cambridge University Press, pp. 205-217.
27. Harvey, C. F., & Parker, A. J. (2000). Metamorphic Petrology of the Bunyoro–Kyoga Series." *Journal of African Earth Sciences*.
28. Hepworth, J. V. (1961). *The Geology of Uganda*. The Geological Survey of Uganda.
29. Heshmati, I. (2019). Forthcoming risk of *Prosopis juliflora* global invasion triggered by climate change: Implications for environmental monitoring and risk assessment. *Environmental Monitoring and Assessment*, 191(72).
30. 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.
31. <https://www.iucn.org/news/species/202103/african-elephant-species-now-endangered-and-critically-endangered-iucn-red-list>
32. <https://www.murchisonfallsnationalparkuganda.com/attractions/kaniyo-pabidi-forest/>
33. <https://www.nfa.go.ug/index.php/11-eco-tourism/97-kaniyo-pabidi-eco-tourism-site#:~:text=Attractions%3A%20Kaniyo%20E2%80%93%20Pabidiis%20a%20natural,Butterflies%2C%20Moths%20and%20Tropical%20Flowers.>
34. ILO Conventions on Occupational Safety and Health
35. ILO Safe Work, ILO Encyclopedia of Occupational Health and Safety (4th Edition), Electronic Version.



36. International Finance Corporation (IFC), (2007). Environmental, Health, and Safety Guidelines
37. International Union for Conservation of Nature (IUCN). (2023). *The IUCN Red List of Threatened Species*. Retrieved from www.iucnredlist.org
38. IPCC (2021). *Sixth Assessment Report: Climate Change 2021 - The Physical Science Basis*. Intergovernmental Panel on Climate Change.
39. IUCN Red List of Threatened Species, (2020).
40. IUCN Red List of Threatened Species, 2024.
41. IUCN. (2024). *IUCN Red List of Threatened Species*. <https://www.iucnredlist.org/>
42. Jones, B. A., & McDermott, S. M. (2018). Health impacts of invasive species through an altered natural environment: Assessing air pollution sinks as a causal pathway. *Environmental & Resource Economics*, 71(1), 23–43.
43. Kilama Luwa, J., Bamutaze, Y., Majaliwa Mwanjalolo, J. G., Waiswa, D., Pilesjö, P., & Mukengere, E. B. (2021). Impacts of land use and land cover change in response to different driving forces in Uganda: evidence from a review. *African Geographical Review*, 40(4). <https://doi.org/10.1080/19376812.2020.1832547>
44. Kingdon, J. (1971-74). *East African Mammals: An Atlas of Evolution*, Vols. I, IIA and IIIB. Academic Press, London.
45. Kingdon, J. (2016). *The Kingdon pocket guide to African mammals*. Bloomsbury Publishing.
46. Kingdon, J. (2020). *The Kingdon pocket guide to African mammals*. Bloomsbury Publishing.
47. Kolinski, L., & Milich, K. M. (2021). Human-wildlife conflict mitigation impacts community perceptions around Kibale National Park, Uganda. *Diversity*, 13(4), 145.
48. Kumar Rai, P., & Singh, J. S. (2020). Invasive alien plant species: Their impact on environment, ecosystem services, and human health. *Ecological Indicators*, 111, 106020. <https://doi.org/10.1016/j.ecolind.2019.106020>
49. Langdale-Brown, I., Osmaston, H. A., & Wilson, J. G. (1964). *The vegetation of Uganda and its bearing on land use*. Uganda Government Printer.
50. Langdale-Brown, I., Osmaston, H. A., & Wilson, J. G. (1964). *The Vegetation of Uganda and its Bearing on Land Use*. Oxford: Oxford University Press.
51. Larsen, T. B. (1991). *The Butterflies of Kenya and Their Natural History*. Oxford University Press.
52. Louppe, D., Ouattara, N., & Coulibaly, A. (1995). The effects of brush fires on vegetation: The case of the savannah-forest transition area in Ivory Coast. *Vegetation Science and Forestry*, 6(3), 15–25.
53. Lukwago, W., Behangana, M., Mwavu, E. N., & Hughes, D. F. (2020). Effects of selective timber harvest on amphibian species diversity in Budongo forest Reserve, Uganda. *Forest*



Ecology and Management, 458(October 2019).
<https://doi.org/10.1016/j.foreco.2019.117809>

54. Masindi District Local Government, 2020. Masindi District development Plan F/Y 2020-2021 to 2024-2025
55. Masindi District Local Government, 2022, Draft Masindi District Tourism Profile, prepared by the Tourism office.
56. McConnell, R. B. (1972). *The Precambrian Rocks of East Africa*. Geological Society of London.
57. Ministry of Tourism, Wildlife and Antiquities. (2018). *Nationally threatened species for Uganda: National red list for Uganda for the following taxa: Mammals, birds, reptiles, amphibians, butterflies, dragonflies, and vascular plants*. Kampala, Uganda.
58. Ministry of Water and Environment. (2003). *National Biomass Study*. Government of Uganda, Kampala.
59. MTWA (2018). *Red List of Threatened Species of Uganda 2018*, Ministry of Wildlife, Tourism and Antiquities (MTWA) Kampala.
60. Mugisha, A. & Nyeko, J. (2004). Forest Management in Uganda: Historical Perspectives and Emerging Issues. *Journal of African Studies*.
61. Mwavu, E. N., & Witkowski, E. T. F. (2008). *Land-use and cover changes (1988–2002) around Budongo Forest Reserve, NW Uganda: Implications for forest and woodland sustainability*. *Land Degradation & Development*, 19(6), 606–622.
62. MWE (2017). Uganda's National REDD+ Strategy and Action Plan was prepared by the
63. MWTA 2018 Nationally Threatened Species for Uganda - National Red List for Uganda for the following Taxa: Mammals, Birds, Reptiles, Amphibians, Butterflies, Dragonflies and Vascular Plants
64. NAPA (2007). *National Adaptation Programme of Action for Uganda*. Ministry of Water and Environment, Uganda.
65. National Environment (Noise Standards and Control) Regulations, 2003.
66. National Forestry Authority (NFA). (2022). *Annual Report on Forest Management and Conservation*. Kampala, Uganda.
67. National. Biodiversity Data-Bank, Makerere University, Kampala.
68. NEMA (2019). *State of the Environment Report for Uganda*. National Environment Management Authority.
69. NEMA now has the National Environment (Air Quality standard Regulation) S.I. No 22 2024 for Ambient air Quality standards and Tolerant Limits.
70. NFA, (2019) Budongo Forest Management Plan (Draft)
71. Ogwang, J., et al. (2020). *Global Register of Introduced and Invasive Species for Uganda*.
72. Olson D.H, Leonard WP, Bury B. R, eds. (1997). *Sampling Amphibians in Lentic Habitats*. Olympia, WA: Soc Northwest Vert Biol.



73. Olson D.H, Leonard WP, Bury B. R, eds. (1997). *Sampling Amphibians in Lentic Habitats*. Olympia, WA: Soc Northwest Vert Biol.
74. Pallister, J. (1995). *Precambrian Geology and Mineral Resources of East Africa*. UNESCO Publication.
75. Paterson, J. D. (2014). History, ecology, and the Budongo Forest of Uganda. *International Journal of Primatology*, 35(4), 179–187.
76. Philip, M. S. (1964). *Working plan for the Budongo Forest*. Uganda Forest Department.
77. Plumptre, A. (2002). *Extent and status of the forests in the Ugandan Albertine Rift*. Wildlife Conservation Society.
78. Plumptre, A. J., Behangana, M., Ndomba, E., Davenport, T., Kahindo, C., Kityo, R., Ssegawa, P., Eilu, G., Nkuutu, D., & Owiunji, I. (2003). *The biodiversity of the Albertine Rift*. Albertine Rift Technical Report No. 3.
79. Plumptre, A. J., et al. (2007). *The Biodiversity of Budongo Forest Reserve, Uganda*. Wildlife Conservation Society.
80. Plumptre, A. J., Reynolds, V., Bakuneeta, C., & Dunn, A. (2010). *Conservation and Research in Budongo Forest Reserve, Uganda*. Budongo Conservation Field Station.
81. Pomeroy, D., Tushabe, H., Mwima, P., & Kasoma, P. (2002). *Uganda ecosystem and protected area characterization: A contribution to strategic criteria for rural investment in productivity program for USAID mission Uganda*. The International Food Policy Research Institute.
82. Pyšek, P., & Richardson, D. M. (2010). Invasive species, environmental change and management, and health. *Annual Review of Environment and Resources*, 35, 25–55.
83. Rai, P. K., Kim, K. H., Lee, S. S., & Lee, J.-H. (2020). Molecular mechanisms in phytoremediation of environmental contaminants and prospects of engineered transgenic plants/microbes. *Science of the Total Environment*, 705. <https://doi.org/10.1016/j.scitotenv.2019.135858>
84. Renfrew, C., & Bahn, P. (1996). *Archaeology: Theories, methods, and practice* (2nd ed.). Thames & Hudson Ltd.
85. Renfrew, C., & Bahn, P. (2008). *Archaeology: Theories, methods, and practice* (5th ed.). Thames & Hudson.
86. Rossouw, J., & Sacchi, C. (1998). *Where to Watch Birds in Uganda*. Uganda Tourist Board.
87. Shackleton, R. T., Shackleton, C. M., & Kull, C. A. (2019). The role of invasive alien species in shaping local livelihoods and human well-being: A review. *Journal of Environmental Management*, 229, 145–157. <https://doi.org/10.1016/j.jenvman.2018.05.007>
88. Slingsby, J. A. (2017). Identifying postfire weather and biological invasion drive species loss in a Mediterranean-type biodiversity hotspot. *Proceedings of the National Academy of Sciences*, 114(18), 4697–4702.



89. Söderman, T. (2006). Treatment of biodiversity issues in impact assessment of electricity power transmission lines: A Finnish case review. *Environmental Impact Assessment Review*, 26(4), 319–338.
90. Soper, R. (1971). Iron Age archaeological sites in the Chobi Sector of Murchison Falls National Park, Uganda. *Azania: Archaeological Research in Africa*, 6(1), 53–87. <https://doi.org/10.1080/00672707109511547>
91. 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.
92. Stevenson, T., & Fanshawe, J. (2004). *Birds of East Africa: Kenya, Tanzania, Uganda, Rwanda, Burundi*. A&C Black.
93. The Constitution of Uganda; (1995) The National Environment (Environmental and Social Assessment) Regulations, 2020.
94. The International Finance Corporation (IFC), 2007: General Environmental, Health, and Safety (EHS) Guidelines;
95. The National Environment Act Cap 181 (previously NEA No.5 of 2019).
96. The Occupational Health and Safety Act, 2006 of Uganda
97. Turyahabwe, N., et al. (2015). Forest Policy in Uganda and the Management of Forest Resources. *African Journal of Ecology*.
98. UBOS, 2020, Statistical Abstract.
99. Uganda Meteorological Authority (2022). *Climate Zones of Uganda*. Kampala: Ministry of Water and Environment.
100. UNFCCC (1992). *United Nations Framework Convention on Climate Change*. United Nations.
101. United States Agency for International Development (USAID). (2014). *Climate change and biodiversity in Uganda*. Tetra Tech ARD.
102. WCS (2016) Nationally Threatened Species for Uganda. Regional Red List. www.nationalredlist.org/files/2016/03/National-Redlist-for-Uganda.pdf
103. WHO Air Quality Guidelines (AQG), 2021
104. Wilson, S.E (ed.) (1995). Bird and Mammal Checklist for Ten National Parks in Uganda.
105. World Bank (2016). Environmental and Social Framework. World Bank, Washington, DC
106. Yanda, P. Z., et al. (2011). *Climate Change and Variability in East Africa*. Springer.



ANNEXES

Annex 1: NEMA Terms of Reference (ToR) Approval Letter for the ESIA Study



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30th December, 2024

The Executive Director,
National Forestry Authority,
P.O. Box 70863 KAMPALA.

Ainabyona

RE: SCOPING REPORT AND TERMS OF REFERENCE FOR UNDERTAKING AN ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CANOPY WALK IN KANIYO PABIDI BUDONGO CENTRAL FOREST RESERVE(ESIATOR/2756/2024/12).

This is in reference to the Scoping Report and Terms of Reference (TOR) for carrying out an Environmental and Social Impact Assessment (ESIA) for the above-mentioned project, which was submitted to this Authority for review and consideration on 17th December 2024.

The Review of the submitted documentation has been concluded and this Authority grants formal **approval** of the said TOR for undertaking the ESIA of the proposed project. In addition to the scope of the study provided in the TOR, you should pay due attention to the following while undertaking the ESIA.

- (i). Provide a comprehensive description of all the proposed project components and activities covering both the construction and operational phases of the project and the size of the workforce.

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ESIA/TOR/2756/2024/12

- (ii). Provide a detailed description of the various potential pollution sources, including the method of handling, containing, and disposing of the different streams of waste and measures for controlling pollution of air, water and land in Budongo Forest Reserve.
- (iii). Ensure that the ecological setting, movement and breeding patterns of all animal and bird species are not affected/alterd by the project operations and activities. The project activities should not lead to loss of biodiversity or affect the movement of animals in the forest reserve.
- (iv). Put in place mechanisms to ensure that noise generated at the project during construction and operational phases of the project does not exceed the levels stipulated in the National Environment (Noise Standards and Control) Regulations, 2003 as this may affect breeding patterns of animals.
- (v). Provide a detailed assessment of health and safety aspects associated with the proposed project and the respective mitigation measures; the walkway routing, construction, and site selection should put into consideration the health and safety of the users. More again, provide insurance for the workers since the project involves the risk of wildlife /animal attacks if any.
- (vi). Materials lifespan analysis should be undertaken to determine how long it will take before any parts of the canopy walk are replaced/repared.
- (vii). Provide coloured Google maps that are clear and well-labelled (preferably each covering A-4 or larger paper size), and GPS coordinates in a UTM system for the proposed project area; as well as coloured photographs depicting the current status of the project area clearly showing the neighbouring environs as well as the distance from any sensitive ecosystems.
- (viii). Provide current baseline data of the project area, including but not limited to biodiversity and how it may be impacted by the project activities taking note of key bio indicators to ecological stress within the area.
- (ix). Provide a well-labelled and legible copy of the proposed site layout plan that shows the areas of sensitivity such as swamps, rivers streams and shows how their integrity will be preserved.
- (x). Carry out comprehensive consultations with all the relevant stakeholders and Lead Agencies including among others, the Uganda Wildlife Authority, the Department of Environmental Affairs under the Ministry of Water and Environment; the Occupational Safety and Health Department (Ministry of Gender Labour and Social Development), Uganda Tourism Board, Masindi District Local Government, and the LC1 leaderships of Bwinamira1, and the respective surrounding local communities. Ensure that the stakeholder

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ES/LAT08/2756/2024/12

views/concerns related to the project development are well-documented and included in the ESIA report.

- (xi). Carry out a comprehensive evaluation of all negative environmental impacts associated with the proposed project activities and the relevant mitigation measures to minimize the identified negative impacts; and provide detailed environmental management/monitoring plans (preferably in table matrix format), to cater for the environmental impacts from the proposed project activities.
- (xii). Carry out a detailed evaluation of alternatives/ options to the project design, and site selection, among other aspects and a justification for selecting the chosen option.
- (xiii). Append to the ESIA report authentic copies of land acquisition and ownership documents or relevant authorization to utilize the land for the said purpose.
- (xiv). Consider any other critical environmental aspects/concerns which, may NOT have been initially foreseen during the preparation of the scoping report and TOR, and include an evaluation of such environmental and social concerns in the ESIA report.
- (xv). Only registered Environmental Practitioners including the team leader should be contracted to undertake the Environmental and Social Impact Assessment in accordance with the provisions of regulation 16(1) of the National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003. The ESIA team should have their signatures appended unto the ESIA report.

Further, in accordance with Regulation 18(1) of the National Environment (Environmental and Social Assessment) Regulations, S.I No. 143/2020, submit to this Authority the estimated cost of the project evidenced by a certificate of valuation of the capital investment of the project, issued by a qualified and registered valuer.

In compliance with regulation 49(2) of the National Environment (Environmental and Social Assessment) Regulations 2020, you are required to make payment of a non-refundable administration fee of 30% (thirty per cent) of the total ESIA fees payable, on submission of the environmental and social impact statement.

This is, therefore, to recommend that you proceed with carrying out the ESIA for the proposed canopy walk. Please note that the **approval of the TOR does not constitute permission** to start implementing any of the proposed project activities as this is not a certificate of approval.

Looking forward to the receipt of a comprehensive ESIA report for the Authority's further action.

Christine Ainabyona
FOR: EXECUTIVE DIRECTOR



ESLAF0R/2756/2024/12

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Christine Ainabyona
For: Executive Director

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Annex 2: Soil Test Results

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DEPARTMENT OF CHEMISTRY

30/1/2025

SOIL ANALYSIS REPORT

LOCATION:36N0358470,UTM0211566,E1000M

1.0 BACKGROUND

This is to certify that soil sample from the above source submitted has been analyzed with the following methods and the corresponding results were obtained

1.1 METHODS OF ANALYSIS

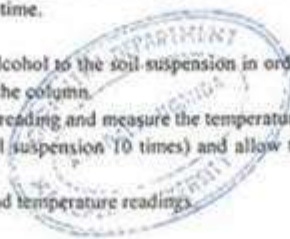
1.1.0 Soil Texture Determination by Hydrometer Method

Calgon (sodium hexametaphosphate) Solution, 10%

Dissolve 100 gm of calgon in 1 litre of distilled water. This solution should not be kept over one month, when too old it loses its dispersing efficiency because it will be converted to another compound.

Procedure

- a. Weight out 50 g of air dry < 2mm soil (100 gm in case of very sandy soil) into a 400 ml beaker.
- b. Saturate the soil with distilled water and add 10 ml of 10% Calgon solution. Allow to stand for 10 minutes
- c. Transfer the suspension to the dispersing cup and make to the mark in the cup with distilled water
- d. Mix the suspension for 2 minutes with an electric high speed stirrer. Use ordinary bottles if a cup is not available. Shake the suspension overnight if no stirrer is available.
- e. Transfer the suspension into a graduated cylinder and rinse remaining soil into the cylinder with distilled water. Insert the hydrometer into the suspension and add water to 1130 ml, then remove the hydrometer.
- f. Cover the cylinder with a tight-fitting rubber bung and mix the suspension by inverting the cylinder carefully ten (10) times. Note the time.
- g. Quickly add 2-3 drops of amyl alcohol to the soil suspension in order to remove froth and after 20 seconds place the hydrometer gently into the column.
- h. At 40seconds, take a hydrometer reading and measure the temperature of the suspension.
- i. Repeat step 6 (mixing of the soil suspension 10 times) and allow the cylinder to stand un disturbed for 2 hours.
- j. After 2hrs take the hydrometer and temperature readings.





- k. Make the necessary temperature corrections (Table 5.1). Temperature affects the hydrometer readings and, because the hydrometer has been calibrated at 68°F (20°C), either correction factors must be Applied or the determination conducted in a temperature controlled room kept at the correct temperature.

%Sand. - After 40 seconds, the sand has settled and the hydrometer reading reflects the grams of silt + clay in 1 litre of the suspension. To calculate the amount sand present in 1 litre of the suspension, subtract this value from the original sample weight. For example, if the hydrometer reading after 40 seconds corrected for temperature is 18.0 g/litre, then silt + clay weigh 18.0 g in the 1 litre soil suspension. Therefore, the sand weighs 50.0 – 18.0 = 32.0 g in the 1 litre suspension (of the original 50.0 gm air-dry soil sample). The percentage sand is calculated by dividing the sand content (32 g) by the total (50 g) and multiplying by 100 as follows

% Clay. After 2 hours, the silt has settled. The hydrometer reading now reflects the clay content of the original suspension. For example, if hydrometer reading after the temperature correction is 4.7 g/litre, then the percentage of clay in the soil is:

%Silt. The silt content is calculated by subtracting the sum of the clay and sand contents from 100%

Soil texture. Once the sand, silt and clay distribution is measured, the soil may be assigned to a texture class based on the soil texture triangle

1.1.1 Bulk Density Determination by the Soil Infill Method

If soil conditions are such that it shrinks and swells, the infill method may be employed:

- In a vessel approximately 10 cm x 10 cm x 10 cm. dry the soil at 105°C for 24 hr and weigh, (W).
- Fill the vessel with dry coarse sand from a known volume of sand. Make sure that the sand surface is level with the adjacent soil surface. Record the volume of sand remaining and hence calculate the volume used to fill the hole, V.

Bulk density (g/cm³) = Dry Weight of removed soil (g) / Volume of replacement sand (cm³)

1.1.2 Organic Matter Determination

Weigh 10 ± 0.1 g of well mixed air dry < 2 mm) manure or compost sample of a known moisture content in a dry porcelain or nickel crucible. Heat slowly in a furnace (raising the temperature setting in steps (100, 200 and 550°C). The final temperature setting of 550°C should be maintained for 8 hours.

Remove the crucible containing a grayish white ash. Cool in desiccators and weigh

The percentage ash and organic matter are calculated by the differences in weight of the crucibles before and after combustion as follows:

$$\% \text{ash} = [(w_3 - W_1) / (W_2 - W_1)] \times 100$$

$$\text{And } \% \text{ organic matter} = 100 - \% \text{ash}$$

Where W1 = the weight of the empty, dry crucible; W2 = the weight of the dry crucible containing manure; and W3 = the weight of the dry crucible containing manure following ignition. Note that the weight of the ash = W3 – W1.



1.1.3 Soil PH and Electroconductivity Determination

1. Add 50 ml deionised water to 20 ± 0.1 g soil.
2. Stir the mixture for 10 minutes; allow standing for 30 min, stirring again for 2 min.
3. Measure the pH of the soil suspension
4. Allow to settle for 1 hr then measure the conductivity of the supernatant liquid. For samples with an EC > 1.0 mS/cm consider saturated paste extract analysis.

5. The Electroconductivity measurement identifies soils which are potentially saline.
6. The Electroconductivity of the saturated paste extract is measured to determine the level of salinity.
7. Dissolve 0.7456 g of KCl in 1000 ml water: 1.412 mS/cm at 25°C
8. Dissolve 7.456 g of KCl in 1000 ml water: 12.900 mS/cm at 25°C.
9. Weigh about 300 ± 25 g soil into a plastic container.
10. Add water to the soil with stirring until it is nearly saturated.
11. Allow the mixture to stand covered for several hours to permit the soil to imbibe the water, and then add more water to achieve a uniformly saturated soil-water paste. At this point the soil paste glistens as it reflects light, flows slightly when the container is tipped, slides freely and cleanly off a spatula, and consolidates easily by tapping or jarring the container after a trench is formed in the paste with the slide of a spatula.
12. After mixing, allow the sample to stand (preferably overnight, but at least 4 hr), and then recheck the criteria for saturation. Free water should not collect on the soil surface, nor should the paste stiffen markedly or lose its glisten. If the paste is too wet, add additional dry soil to paste mixture.
13. Transfer to a Buchner filter funnel fitted with highly retentive filter paper. Apply vacuum, and collect the filtrate. If the initial filtrate is turbid, refilter.
14. Measure the conductivity of filtrate against that of the standards.

1.1.4 Digestion of samples for the determination of N-total (finally measured as NH₄), P, Na, K, Ca, Mg and Zn with H₂SO₄ Se/salicylic acid and H₂O₂

This digestion procedure is for the determination of N-total (finally measured as NH₄), P, Na, K, Ca, Mg and Zn.

Principle

The large part of organic matter is oxidized by H₂O₂ at relatively low temperature. After decomposition of the excess H₂O₂ and evaporation of water, the digestion is completed by conc H₂SO₄ at approximately 300°C under the influence of Se as a catalyst.

Salicylic acid is used to form nitro-salicylic acid compounds in order to prevent loss of free nitrate.

Since CaSO₄ may be formed when cooling after completing the digestion it is necessary to wait 24 hours after the addition of water before Ca analysis. During this period the CaSO₄ will dissolve.

Apparatus

Heating block, for temperatures up to 300°C, with holes for tubes. Destruction tubes made of glass, acid rinsed and dried.

Reagents, all p.a. grade

- a) Conc. H₂SO₄
- b) HP₂ 30%
- c) Se powder
- d) Salicylic acid, powder



- e) Preparation of H_2O_2 -Se mixture
- f) Heat 250 mL of conc. H_2O_2 on a hot plate until fumes will appear ($\pm 300^\circ C$), add 0.88 g Se while mixing. Keep the temperature high. The originally dark coloured suspension turns via green-blue into a clear yellowish solution. Cool down.
- g) Digestion mixture
- h) Dissolve 7.2 g of salicylic acid in 100 ML H_2O_2 - Se mixture at room temperature. The colour will change from blue to yellow/greenish while mixing. This solution should not be stored for more than 48 hours.

Procedure

- i. Weigh about 0.3 g with an accuracy of 0.001 g of the dried material and transfer quantitatively to the destruction tube (do not weigh less than 0.1 g)
- ii. Add 2.5 mL digestion mixture; swirl carefully until all the material is moistened. Prepare also 2 blanks and 2 reference samples
- iii. Allow standing for at least 2 hours, during these period nitro-salicylic acid compounds will be formed
- iv. Place the tube at $100^\circ C$ for at least 2 hours in an oven, during this period the nitrosalicylic compounds will be reduced
- v. Cool the tubes to room temperature and add successively three 1 mL aliquots of H_2O_2 mix carefully after each addition. The reaction is violent, wait until the reaction with H_2O_2 has ceased (± 10 sec) before adding the next portion.
- vi. Place the tube again in the preheated block and heat $330^\circ C$. In the beginning the rack with tubes should be lifted up from time to time to prevent loss of liquid during boiling. The digestion is considered complete when the digests have turned colourless or light yellow; this usually takes about 2 hours
- vii. The digest is diluted with about 15 mL of water, add about five pumice grains, boil (lower the rack with tubes a few cm in the heating block, be careful!) and after cooling made up to 50 ML in a volumetric flask. Mix well, let particles settle for 24 hours, before analysis
- viii. Dilute this digest 20 x prior to N and P analysis with the Tecator-Aquatec system. Calibrate this system with a standard serie of: 0.30 – 0.50 – 0.70 – 1.00 – 1.50 – 2.00 and 2.50 mg $PO_4 P/L$, or

6.00 – 8.00 – 10.00 and 12.00 mgNH/ - *NIL*

Remarks:

- Before weighing, the material should contain a moisture content of 1-2%, so store the material in a dessicator after drying or dry again at $70^\circ C$ before weighing. If this is not done, the sample may contain up to 10% moisture. The use of conc. H_2SO_4 then causes a raise in temperature, which will result in a loss of nitrate.
- The sample is normally dried at $70^\circ C$ in a well-ventilated drying oven during 24 hours. The material is then finely ground, in order to obtain a homogeneous sample from which representative subsamples can simply be taken. As a rule of thumb, the milled material should pass 1 mm sieve when less than 1 gram is to be weighed out. Both drying and milling should be carried out with equipment that does not release elements for which the samples are to be analysed.
- The dried and milled samples should be stored in a cool and dry place in tightly stoppered flasks or in sealed polythene bags, protected against direct sunlight. During storage, the material may attract moisture so that the drying procedure at $70^\circ C$ must be repeated just before weighing out a sample for analysis.
- The analytical results are often referred to "oven-dry" material, which means dried at $105^\circ C$. For



Comparability, therefore, the moisture content should be determined by drying at 105°C and taking the difference with the 70°C dried sample. The drying at 105°C should be done, however, with a separate sample, since this operation may change its chemical composition.

1.1.5 The destruction of soil and sludge for the determination of Cd, Cr, Cu, Pb, Mn, Fe and Zn with atomic absorption technique

1.1.5.1 Apparatus

- Destruction-bloc with destruction tubes of borosilicate glass
- Nichiryo pipet model 3100 with removable tips

1.1.5.2 Reagents

All reagents with a low percentage of heavy metals

- Hydrochloride acid, 37% HCl
- Nitric acid, 65% HNO₃
- Hydrogen peroxide, 30% H₂O₂
- Pumice

1.1.5.3 Glassware

All rinsed with 1 + 1 HNO₃
Measuring cylinder, 500 mL
Measuring cylinder, 50 mL
Funnels with a diameter of 6 cm
1 L flask for the acid-mixture, see note
Volumetric flasks of 250 mL

1.1.5.4 Procedure

- a) Transfer not more than 1.250 g of a ground air-dried sample to the destruction tube, add 50 mL H₂O and three boiling chips
- b) Add 50 mL HCl/HNO₃ 3:1, mix and place a funnel on top of the destruction tube
- c) Heat the tube to 100°C and maintain for 1 hour
- d) Heat to 125°C and maintain for 15 minutes
- e) Heat to 150°C and maintain for 15 minutes
- f) Heat to 175°C and maintain for 15 minutes
- g) Heat to 200°C and add, if necessary (if no volume is left), 5 mL HNO₃
- h) Concentrate to about 5 mL
- i) Add, after cooling, 1 mL 30% H₂O₂ and destruct for 10 minutes. Repeat 1 x
- j) Add, after cooling, 3 mL 30% H₂O₂ and destruct again for 10 minutes
- k) Add 50 mL water and 25 mL HCl, mix and heat till boiling



- l) Cool and transfer the whole sample to a 250 mL volumetric flask, fill up to the mark, mix and let settle during 8t least 15 hours
- m) Measure the absorbance of the clear supernatant.

Note: 1.prepare a fresh acid-mixture and do not close the container

- Duration of procedure steps 1-7 at least 7 hours
- Determine two blanks
- Sludge samples will decompose almost completely

Amount of ions = $\frac{C \times D}{M}$ Where C = Concentration of sample solution
M = mass of sample in grams
D = dilution factor

Or Amount of ions = $\frac{C \times V_1}{V_2}$ Where C = Concentration of sample solution (mg/l)
V₁ = final volume (250)
V₂ = volume of sample

Or Percentage (%) = $\frac{\text{mg/l} \times \text{final volume (lt)}}{\text{Wt(g)}} \times 100$

- The concentration of Nitrites (NO₂), Nitrates (NO₃), Ammonia (NH₃), Phosphates (PO₄³⁻), Sulphates (SO₄²⁻), were then measured using the UV – visible Spectrophotometer test procedures (Shimadzu model 1601) / methods at various wavelengths Viz.: - NO₂ λ_{520nm}& detection limits 0.001, NO₃λ_{570nm}& detection limits 0.001, NH₃ λ_{440nm}& detection limits 0.01, and PO₄³⁻ λ_{640nm}& detection limits 0.01, SO₄²⁻λ_{520nm}& detection limits 0.01.
- ❖ The different metal ions were analysed using Shimadzu model 6200 Atomic absorption spectrometer (AAS); after digestion and taking the measurements at different wavelengths Viz.:-
Na λ_{589nm}& detection limits 0.01, Ca λ_{422.7nm}& detection limits 0.01, Mg λ_{285.2nm}& detection limits 0.01, K λ_{766.5nm}& detection limits 0.01, Pb λ_{283.3nm}& detection limits 0.01, Fe λ_{248.3nm}& detection limits 0.01, Cu λ_{321.8nm}& detection limits 0.01, Zn λ_{213.9nm}& detection limits 0.01, Al λ_{309.3nm}& detection limits 0.01 and Mn λ_{279.5nm}& detection limits 0.001.
- ❖ Chlorides were measured using Mohr's method with AgNO₃.



- l) Cool and transfer the whole sample to a 250 mL volumetric flask, fill up to the mark, mix and let settle during at least 15 hours
- m) Measure the absorbance of the clear supernatant.

Note: 1. prepare a fresh acid-mixture and do not close the container

- Duration of procedure steps 1-7 at least 7 hours
- Determine two blanks
- Sludge samples will decompose almost completely

Amount of ions = $\frac{C \times D}{M}$ Where C = Concentration of sample solution
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Or Amount of ions = $\frac{C \times V_1}{V_2}$ Where C = Concentration of sample solution (mg/l)
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- The concentration of Nitrites (NO₂), Nitrates (NO₃), Ammonia (NH₃), Phosphates (PO₄³⁻), Sulphates (SO₄²⁻), were then measured using the UV – visible Spectrophotometer test procedures (Shimadzu model 1601) / methods at various wavelengths Viz.: - NO₂ λ_{520nm} & detection limits 0.001, NO₃ λ_{570nm} & detection limits 0.001, NH₃ λ_{640nm} & detection limits 0.01, and PO₄³⁻ λ_{640nm} & detection limits 0.01, SO₄²⁻ λ_{520nm} & detection limits 0.01.
- ❖ The different metal ions were analysed using Shimadzu model 6200 Atomic absorption spectrometer (AAS); after digestion and taking the measurements at different wavelengths Viz.:-
Na λ_{589nm} & detection limits 0.01, Ca λ_{422.7nm} & detection limits 0.01, Mg λ_{285.2nm} & detection limits 0.01, K λ_{766.5nm} & detection limits 0.01, Pb λ_{283.3nm} & detection limits 0.01, Fe λ_{248.3nm} & detection limits 0.01, Cu λ_{324.8nm} & detection limits 0.01, Zn λ_{213.9nm} & detection limits 0.01, Al λ_{309.3nm} & detection limits 0.01 and Mn λ_{279.5nm} & detection limits 0.001.
- ❖ Chlorides were measured using Mohr's method with AgNO₃.



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DEPARTMENT OF CHEMISTRY

30/1/2025

SOIL ANALYSIS REPORT

LOCATION:36N0358416,UTM0211591,E1005

1.0 BACKGROUND

This is to certify that soil sample from the above source submitted has been analyzed with the following methods and the corresponding results were obtained

1.1 METHODS OF ANALYSIS

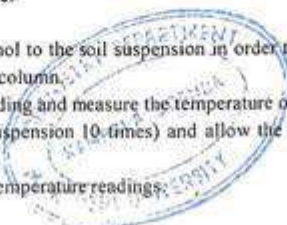
1.1.0 Soil Texture Determination by Hydrometer Method

Calgon (sodium hexametaphosphate) Solution, 10%

Dissolve 100 gm of calgon in 1 litre of distilled water. This solution should not be kept over one month, when too old it loses its dispersing efficiency because it will be converted to another compound.

Procedure

- a. Weight out 50 g of air dry < 2mm soil (100 gm in case of very sandy soil) into a 400 ml beaker.
- b. Saturate the soil with distilled water and add 10 ml of 10% Calgon solution. Allow to stand for 10 minutes
- c. Transfer the suspension to the dispersing cup and make to the mark in the cup with distilled water
- d. Mix the suspension for 2 minutes with an electric high speed stirrer. Use ordinary bottles if a cup is not available. Shake the suspension overnight if no stirrer is available.
- e. Transfer the suspension into a graduated cylinder and rinse remaining soil into the cylinder with distilled water. Insert the hydrometer into the suspension and add water to 1130 ml, then remove the hydrometer.
- f. Cover the cylinder with a tight-fitting rubber bung and mix the suspension by inverting the cylinder carefully ten (10) times. Note the time.
- g. Quickly add 2-3 drops of amyl alcohol to the soil suspension in order to remove froth and after 20 seconds place the hydrometer gently into the column.
- h. At 40seconds, take a hydrometer reading and measure the temperature of the suspension.
- i. Repeat step 6 (mixing of the soil suspension 10 times) and allow the cylinder to stand undisturbed for 2 hours.
- j. After 2hrs take the hydrometer and temperature readings.





- k. Make the necessary temperature corrections (Table 5.1). Temperature affects the hydrometer readings and, because the hydrometer has been calibrated at 68°F (20°C), either correction factors must be Applied or the determination conducted in a temperature controlled room kept at the correct temperature.

%Sand - After 40 seconds, the sand has settled and the hydrometer reading reflects the grams of silt + clay in 1 litre of the suspension. To calculate the amount sand present in 1 litre of the suspension, subtract this value from the original sample weight. For example, if the hydrometer reading after 40 seconds corrected for temperature is 18.0 g/litre, then silt + clay weigh 18.0 g in the 1 litre soil suspension. Therefore, the sand weighs 50.0 – 18.0 = 32.0 g in the 1 litre suspension (of the original 50.0 gm air-dry soil sample). The percentage sand is calculated by dividing the sand content (32 g) by the total (50 g) and multiplying by 100 as follows

% Clay. After 2 hours, the silt has settled. The hydrometer reading now reflects the clay content of the original suspension. For example, if hydrometer reading after the temperature correction is 4.7 g/litre, then the percentage of clay in the soil is:

%Silt. The silt content is calculated by subtracting the sum of the clay and sand contents from 100%

Soil texture. Once the sand, silt and clay distribution is measured, the soil may be assigned to a texture class based on the soil texture triangle.

1.1.1 Bulk Density Determination by the Soil Infill Method

If soil conditions are such that it shrinks and swells, the infill method may be employed:

- In a vessel approximately 10 cm x 10 cm x 10 cm, dry the soil at 105°C for 24 hr and weigh, (W).
- Fill the vessel with dry coarse sand from a known volume of sand. Make sure that the sand surface is level with the adjacent soil surface. Record the volume of sand remaining and hence calculate the volume used to fill the hole, V.

Bulk density (g/cm³) = Dry Weight of removed soil (g) / Volume of replacement sand (cm³)

1.1.2 Organic Matter Determination

Weigh 10 ± 0.1 g of well mixed air dry < 2 mm) manure or compost sample of a known moisture content in a dry porcelain or nickel crucible. Heat slowly in a furnace (raising the temperature setting in steps (100, 200 and 550°C). The final temperature setting of 550°C should be maintained for 8 hours.

Remove the crucible containing a grayish white ash. Cool in desiccators and weigh

The percentage ash and organic matter are calculated by the differences in weight of the crucibles before and after combustion as follows:

$$\% \text{ash} = [(W3 - W1) / (W2 - W1)] \times 100$$

$$\text{And } \% \text{ organic matter} = 100 - \% \text{ash}$$

Where W1 = the weight of the empty, dry crucible; W2 = the weight of the dry crucible containing manure; and W3 = the weight of the dry crucible containing manure following ignition. Note that the weight of the ash = W3 – W1.



1.1.3 Soil PH and Electroconductivity Determination

1. Add 50 ml deionised water to 20 ± 0.1 g soil.
2. Stir the mixture for 10 minutes; allow standing for 30 min, stirring again for 2 min.
3. Measure the pH of the soil suspension
4. Allow to settle for 1 hr then measure the conductivity of the supernatant liquid. For samples with an EC > 1.0 mS/cm consider saturated paste extract analysis.

5. The Electroconductivity measurement identifies soils which are potentially saline.
6. The Electroconductivity of the saturated paste extract is measured to determine the level of salinity.
7. Dissolve 0.7456 g of KCl in 1000 ml water: 1.412 mS/cm at 25°C
8. Dissolve 7.456 g of KCl in 1000 ml water: 12.900 mS/cm at 25°C.
9. Weigh about 300 ± 25 g soil into a plastic container.
10. Add water to the soil with stirring until it is nearly saturated.
11. Allow the mixture to stand covered for several hours to permit the soil to imbibe the water, and then add more water to achieve a uniformly saturated soil-water paste. At this point the soil paste glistens as it reflects light, flows slightly when the container is tipped, slides freely and cleanly off a spatula, and consolidates easily by tapping or jarring the container after a trench is formed in the paste with the slide of a spatula.
12. After mixing, allow the sample to stand (preferably overnight, but at least 4 hr), and then recheck the criteria for saturation. Free water should not collect on the soil surface, nor should the paste stiffen markedly or lose its glisten. If the paste is too wet, add additional dry soil to paste mixture.
13. Transfer to a Buchner filter funnel fitted with highly retentive filter paper. Apply vacuum, and collect the filtrate. If the initial filtrate is turbid, refilter.
14. Measure the conductivity of filtrate against that of the standards.

1.1.4 Digestion of samples for the determination of N-total (finally measured as NH_4), P, Na, K, Ca, Mg and Zn with H_2SO_4 , Se/salicylic acid and H_2O_2

This digestion procedure is for the determination of N-total (finally measured as NH_4), P, Na, K, Ca, Mg and Zn.

Principle

The large part of organic matter is oxidized by H_2O_2 at relatively low temperature. After decomposition of the excess H_2O_2 and evaporation of water, the digestion is completed by conc. H_2O_4 at approximately 300°C under the influence of Se as a catalyst.

Salicylic acid is used to form nitro-salicylic acid compounds in order to prevent loss of free nitrate.

Since CaSO_4 may be formed when cooling after completing the digestion it is necessary to wait 24 hours after the addition of water before Ca analysis. During this period the CaSO_4 will dissolve.

Apparatus

Heating block, for temperatures up to 300°C, with holes for tubes. Destruction tubes made of glass, acid rinsed and dried.

Reagents, all p.a. grade

- a) Conc. H_2O_4
- b) HP_2 30%
- c) Se powder
- d) Salicylic acid, powder



- e) Preparation of H_2O_4 -Se mixture
- f) Heat 250 mL of conc. H_2O_4 on a hot plate until fumes will appear ($\pm 300^\circ C$), add 0.88 g Se while mixing. Keep the temperature high. The originally dark coloured suspension turns via green-blue into a clear yellowish solution. Cool down.
- g) Digestion mixture
- h) Dissolve 7.2 g of salicylic acid in 100 ML H_2O_4 - Se mixture at room temperature. The colour will change from blue to yellow/greenish while mixing. This solution should not be stored for more than 48 hours.

Procedure

- i. Weight about 0.3 g with an accuracy of 0.001 g of the dried material and transfer quantitatively to the destruction tube (do not weigh less than 0.1 g)
- ii. Add 2.5 mL digestion mixture; swirl carefully until all the material is moistened. Prepare also 2 blanks and 2 reference samples
- iii. Allow standing for at least 2 hours, during these period nitro-salicylic acid compounds will be formed
- iv. Place the tube at $100^\circ C$ for at least 2 hours in an oven, during this period the nitrosalicylic compounds will be reduced
- v. Cool the tubes to room temperature and add successively three 1 mL aliquots of H_2O_2 mix carefully after each addition. The reaction is violent, wait until the reaction with H_2O_2 has ceased (± 10 sec) before adding the next portion.
- vi. Place the tube again in the preheated block and heat $330^\circ C$. In the beginning the rack with tubes should be lifted up from time to time to prevent loss of liquid during boiling. The digestion is considered complete when the digests have turned colourless or light yellow; this usually takes about 2 hours
- vii. The digest is diluted with about 15 mL of water, add about five pumice grains, boil (lower the rack with tubes a few cm in the heating block, be careful!) and after cooling made up to 50 mL in a volumetric flask. Mix well, let particles settle for 24 hours, before analysis
- viii. Dilute this digest 20 x prior to N and P analysis with the Tecator-Aquatec system. Calibrate this system with a standard serie of: 0.30 – 0.50 – 0.70 – 1.00 – 1.50 – 2.00 and 2.50 mg $P_{0,3}$ P/L, or

6.00 – 8.00 – 10.00 and 12.00 mgNH/ - NIL

Remarks:

- Before weighing, the material should contain a moisture content of 1-2%, so store the material in a dessicator after drying or dry again at $70^\circ C$ before weighing. If this is not done, the sample may contain up to 10% moisture. The use of conc. H_2SO_4 then causes a raise in temperature, which will result in a loss of nitrate.
- The sample is normally dried at $70^\circ C$ in a well-ventilated drying oven during 24 hours. The material is then finely ground, in order to obtain a homogeneous sample from which representative subsamples can simply be taken. As a rule of thumb, the milled material should pass 1 mm sieve when less than 1 gram is to be weighed out. Both drying and milling should be carried out with equipment that does not release elements for which the samples are to be analysed.
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- The analytical results are often referred to "oven-dry" material, which means dried at $105^\circ C$. For



Comparability, therefore, the moisture content should be determined by drying at 105°C and taking the difference with the 70°C dried sample. The drying at 105°C should be done, however, with a separate sample, since this operation may change its chemical composition.

1.1.5 The destruction of soil and sludge for the determination of Cd, Cr, Cu, Pb, Mn, Fe and Zn with atomic absorption technique

1.1.5.1 Apparatus

- Destruction-bloc with destruction tubes of borosilicate glass
- Nichiryo pipet model 3100 with removable tips

1.1.5.2 Reagents

All reagents with a low percentage of heavy metals

- Hydrochloride acid, 37% HCl
- Nitric acid, 65% HNO₃
- Hydrogen peroxide, 30% H₂O₂
- Pumice

1.1.5.3 Glassware

All rinsed with 1 + 1 HNO₃
Measuring cylinder, 500 mL
Measuring cylinder, 50 mL
Funnels with a diameter of 6 cm
1 L flask for the acid-mixture, see note
Volumetric flasks of 250 mL

1.1.5.4 Procedure

- Transfer not more than 1.250 g of a ground air-dried sample to the destruction tube, add 50 mL H₂O and three boiling chips
- Add 50 mL HCl/HNO₃ 3:1, mix and place a funnel on top of the destruction tube
- Heat the tube to 100°C and maintain for 1 hour
- Heat to 125°C and maintain for 15 minutes
- Heat to 150°C and maintain for 15 minutes
- Heat to 175°C and maintain for 15 minutes
- Heat to 200°C and add, if necessary (if no volume is left), 5 mL HNO₃
- Concentrate to about 5 mL
- Add, after cooling, 1 mL 30% H₂O₂ and destruct for 10 minutes. Repeat 1 x
- Add, after cooling, 3 mL 30% H₂O₂ and destruct again for 10 minutes
- Add 50 mL water and 25 mL HCl, mix and heat till boiling



- l) Cool and transfer the whole sample to a 250 mL volumetric flask, fill up to the mark, mix and let settle during 8t least 15 hours
- m) Measure the absorbance of the clear supernatant.

Note: 1.prepare a fresh acid-mixture and do not close the container

- Duration of procedure steps 1-7 at least 7 hours
- Determine two blanks
- Sludge samples will decompose almost completely

Amount of ions = $\frac{C \times D}{M}$ Where C = Concentration of sample solution
M = mass of sample in grams
D = dilution factor

Or Amount of ions = $\frac{C \times V_1}{V_2}$ Where C = Concentration of sample solution (mg/l)
V₁ = final volume (250)
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Or Percentage (%) = $\frac{\text{mg/l} \times \text{final volume (lt)}}{\text{Wt(g)}} \times 100$

- The concentration of Nitrites (NO₂), Nitrates (NO₃), Ammonia (NH₃), Phosphates (PO₄³⁻), Sulphates (SO₄²⁻), were then measured using the UV – visible Spectrophotometer test procedures (Shimadzu model 1601) / methods at various wavelengths Viz.: - NO₂ λ_{520nm}& detection limits 0.001, NO₃λ_{570nm}& detection limits 0.001, NH₃ λ_{640nm}& detection limits 0.01, and PO₄³⁻ λ_{640nm}& detection limits 0.01, SO₄²⁻λ_{520nm}& detection limits 0.01.
- ❖ The different metal ions were analysed using Shimadzu model 6200 Atomic absorption spectrometer (AAS); after digestion and taking the measurements at different wavelengths Viz:-
Na λ_{589nm}& detection limits 0.01, Ca λ_{422.7nm}& detection limits 0.01, Mg λ_{285.2nm}& detection limits 0.01, K λ_{766.5nm}& detection limits 0.01, Pb λ_{283.3nm}& detection limits 0.01, Fe λ_{248.3nm}& detection limits 0.01, Cu λ_{324.8nm}& detection limits 0.01, Zn λ_{213.9nm}& detection limits 0.01, Al λ_{309.3nm}& detection limits 0.01 and Mn λ_{279.5nm}& detection limits 0.001.
- ❖ Chlorides were measured using Mohr's method with AgNO₃.



2.0 ANALYSIS RESULTS

Upon the analysis the following mean – results were obtained

Parameter	Mean - Results
pH	6.83
Conductivity [$\mu\text{s}/\text{cm}$]	237
NO ₃ [mg/kg]	36.0
Ca [mg/kg]	20.0
Mn [mg/kg]	0.30
Cl [mg/kg]	0.39
Cu [mg/kg]	0.30
SO ₄ [mg/kg]	40.0
PO ₄ [mg/kg]	48.0
Fe [mg/kg]	1.20
Pb [mg/kg]	0.07
NH ₃ [mg/kg]	1.10
Mg [mg/kg]	18.0
Na [mg/kg]	13.0
K [mg/kg]	4.0
Cd [mg/kg]	0.00
Ni [mg/kg]	0.13
Zn [mg/kg]	0.01
Hg [mg/kg]	0.00
Oils & grease [%]	0.0
Bulk Density [g/cm^3]	1.01
Organic matter [%]	2.95
% Sand distribution in the soil	42.0
% Silt distribution in the soil	45.0
% Clay distribution in the soil	10.05
Soil texture class	Loam soil

REMARKS

The soil composition profile of the sample submitted for analysis was found to be loam soil and of simple structure.


ANALYST.....

RUHARARA BUDIGI





Annex 3: Water Test Results



NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY—Plot M11,old Portbell Rd,Bugolobi
 P.O. Box 7053, KAMPALA,Email,External_services@nWSC.co.ug

CERTIFICATE OF ANALYSIS


Client:National Forestry Authority
 Project:Proposed site for Canopy Walk in Budongo CFR,Masindi District
 Sample Description:L:Upstream of the stream,UTM36N0358447,0211609
 Sample Received Date:29/11/2024
 Sampled By:Client's Staff
 Sample Number:23/260/2024/C/B


Document No: NWSC/WQ/QF/42.4A
 Invoice No: 134/INV/2024/658-QUO

Parameters	Units	Test Result	National Standards for UnTreated water	Test Method
Alkalinity Total	mg/l	46.0	500	APHA-23208
Bact:Escherichia Coli IDEXX	CFU/100mL	4	0	Colilert-18/APHA-9222B
Bact:Total Coliforms IDEXX	CFU/100ml	20	10	Colilert-18/APHA-9222B
Bi-Carbonates	mg/l	113.0	500	APHA-23208
Calcium ; as Ca ²⁺	mg/l	10.50	150	APHA-311A
Carbondioxide	mg/l	0.0	0.0	APHA-513-92
Chlorides-Cl ⁻	mg/l	6.0	500	Hach8206
Colour(True)	TCU	180	50	Hach 8025
Electrical Conductivity (EC)	µs/cm	136	2500	APHA-2510
Fluoride :F ⁻	mg/l	0.19	1.5	Hach -8029
Hardness: Total	mg/l	34.0	600	APHA-2340C
Iron:Total	mg/l	0.321	0.3	APHA3111A
Magnesium : as Mg ²⁺	mg/l	5.60	100	APHA-3111A
Manganese	mg/l	0.0	0.1	APHA-8288
Nitrate-N	mg/l	6.0	45	Hach 8192
pH(Physical Chemical)	-	6.79	5.5–9.5	APHA-4500H 8
Sulphates:SO ₄ ²⁻	mg/l	6.0	400	Hach 8051
Total dissolved solids (TDS)	mg/l	125	1500	APHA-2540C
Total suspended solids (TSS)	mg/l	8	0.0	APHA-25400
Turbidity	NTU	15.20	25	Hach 8195

Remarks; The sample tested showed uncomplying physio-chemical & microbiology characteristics as provided for by the National Standards for untreated portable water.

AUTHORISED BY:; Manager,Central Laboratory Services.....
 APPROVED BY: Senior Manager-Water Quality Management.....





*** The NWSC certificate of analysis by no means constitutes a permit to any person undertaking to conduct business.Results are for the sample as received at the laboratory premises.



NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY—Plot M11,old Portbell Rd,Bugolobi
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CERTIFICATE OF ANALYSIS

Client:National Forestry Authority
Project:Proposed site for Canopy Walk in Budongo CFR,Masindi District
Sample Description:L:Down of the stream,UTM36N358623,0212786
Sample Received Date:29/11/2024
Sampled By:Client's Staff
Sample Number:23/261//2024/C/B

Document No: NWSC/WQ/QF/42.4A

Invoice No:134/INV/2024/659-QUO

Parameters	Units	Test Result	National Standards for UnTreated water	Test Method
Alkalinity Total	mg/l	44.0	500	APHA-23208
Bact:Escherichia Coli IDEXX	CFU/100mL	6	0	Colilert-18/APHA-9222B
Bact:Total Coliforms IDEXX	CFU/100ml	22	10	Colilert-18/APHA-9222B
Bi-Carbonates	mg/l	110.0	500	APHA-23208
Calcium ; as Ca ²⁺	mg/l	12.60	150	APHA-311A
Carbondioxide	mg/l	0.0	0.0	APHA-513-92
Chlorides-Cl ⁻	mg/l	5.0	500	Hach8206
Colour(True)	TCU	177	50	Hach 8025
Electrical Conductivity (EC)	µs/cm	134	2500	APHA-2510
Fluoride :F ⁻	mg/l	0.15	1.5	Hach -8029
Hardness: Total	mg/l	36.0	600	APHA-2340C
Iron:Total	mg/l	0.309	0.3	APHA3111A
Magnesium : as Mg ²⁺	mg/l	5.20	100	APHA-3111A
Manganese	mg/l	0.0	0.1	APHA-8288
Nitrate-N	mg/l	10.0	45	Hach 8192
pH(Physical Chemical)	-	6.82	5.5- 9.5	APHA-4500H 8
Sulphates:SO ₄ ²⁻	mg/l	9.0	400	Hach 8051
Total dissolved solids (TDS)	mg/l	128	1500	APHA-2540C
Total suspended solids (TSS)	mg/l	12	0.0	APHA-25400
Turbidity	NTU	16.80	25	Hach 8195

Remarks; The sample tested showed uncomplying physio-chemical & microbiology characteristics as provided for by the National Standards for untreated portable water.

AUTHORISED BY: Manager,Central Laboratory Services.....
APPROVED BY: Senior Manager-Water Quality Management



*** The NWSC certificate of analysis by no means constitutes a permit to any person undertaking to conduct business Results are for the sample as received at the laboratory premises.





Annex 4: Vegetation Checklist

Family	Species	Life form	IUCN status	MTWA2018
Acanthaceae	<i>Mendoncia gilgiana</i> (Lindau) Benoist	Climber	NE	NE
Acanthaceae	<i>Elytraria marginata</i> Vahl	Herb	NE	NE
Acanthaceae	<i>Hypoestes forskalii</i> (Vahl) R.Br.	Herb	NE	NE
Acanthaceae	<i>Justicia adscendens</i>	Herb	NE	NE
Acanthaceae	<i>Monothecium aristatum</i> (Nees) T.Anderson	Herb	NE	NE
Acanthaceae	<i>Phaulopsis imbricata</i> (Forssk.) Sweet	Herb	LC	NE
Acanthaceae	<i>Pseudanthemum subviscosum</i> (C.B.Clarke) Stapf	Herb	NE	NE
Acanthaceae	<i>Rhinacanthus virens</i> (Nees) Milne-Redh.	Herb	LC	NE
Acanthaceae	<i>Rungia grandis</i> T.Anderson	Herb	NE	NE
Acanthaceae	<i>Acanthus arboreus</i>	Shrub	NE	NE
Acanthaceae	<i>Brillantaisia owariensis</i> P.Beauv.	Shrub	LC	NE
Acanthaceae	<i>Justicia engleriana</i> Lindau	Shrub	NE	NE
Acanthaceae	<i>Justicia gendarussa</i> Burm.f.	Shrub	NE	NE
Acanthaceae	<i>Lankesteria elegans</i> C.B.Clarke	Shrub	NE	NE
Acanthaceae	<i>Mellera lobulata</i> S.Moore	Shrub	NE	NE
Acanthaceae	<i>Whitfieldia elongata</i> (P.Beauv.) De Wild. & T.Durand	Shrub	NE	NE
Acariaceae	<i>Lindackeria schweinfurthii</i> Gilg	Shrub	NE	NE
Amaranthaceae	<i>Achyranthes aspera</i>	Herb	NE	NE
Amaranthaceae	<i>Alternanthera sissilis</i> (L.) DC.	Herb	LC	NE
Amaranthaceae	<i>Cyanthula achyranthiodes</i> (Kunth) Moq.	Herb	NE	NE
Anacardiaceae	<i>Searsia natalensis</i> (Bernh. ex C.Krauss) F.A.Barkley	Shrub	LC	NE
Anacardiaceae	<i>Pseudospondias microcarpa</i> (A.Rich.) Engl.	Tree	LC	NE
Annonaceae	<i>Annickia chlorantha</i> (Oliv.) Setten & Maas	Tree	LC	NE
Annonaceae	<i>Monodora myristica</i>	Tree	NE	NE
Apiaceae	<i>Sanicula elata</i> Buch.-Ham. ex D.Don	Herb	NE	NE
Apocynaceae	<i>Cryptolepis nigrescens</i> (Wennberg) L.Joubert & Bruyns	Climber	NE	NE
Apocynaceae	<i>Leptadenia lanceolata</i> (Poir.) Goyder	Climber	NE	NE
Apocynaceae	<i>Mondia whitei</i> (Hook.f.) Skeels	Climber	NE	NE
Apocynaceae	<i>Alstonia boonei</i> De Wild.	Tree	LC	NE
Apocynaceae	<i>Funtumia africana</i>	Tree	NE	NE
Apocynaceae	<i>Tabernaemontana divaricata</i> (L.) R.Br. ex Roem. & Schult.	Tree	NE	NE
Apocynaceae	<i>Tabernaemontana odoratissima</i> (Stapf) Leeuwenb.	Tree	NE	NE
Arecaceae	<i>Phoenix reclinata</i> Jacq.	Tree	LC	NE
Asparagaceae	<i>Dracaena fragrans</i> (L.) Ker Gawl.	Herb	NE	NE
Asparagaceae	<i>Sansevieria dawei</i> Stapf	Herb	NE	NE
Aspleniaceae	<i>Asplenium sp</i>	Herb		
Asteraceae	<i>Adenostemma mauritanum</i> DC.	Herb	LC	NE
Asteraceae	<i>Ageratum conyzoides</i> L.	Herb	LC	NE
Asteraceae	<i>Crassocephalum crepidioides</i> (Benth.) S.Moore	Herb	NE	NE
Asteraceae	<i>Dyschoriste radicans</i> Nees	Herb	NE	NE



Family	Species	Life form	IUCN status	MTWA2018
Asteraceae	<i>Erigeron floribundus</i> (Kunth) Sch.Bip.	Herb	NE	NE
Asteraceae	<i>Lipotriche scandens</i> (Schumach. & Thonn.) Orchard	Herb	NE	NE
Asteraceae	<i>Gymnanthemum amygalina</i> (Delile) Sch.Bip.	Shrub	NE	NE
Asteraceae	<i>Struchium sparganophorum</i> (L.) Kuntze	Shrub	LC	NE
Balanophoraceae	<i>Thonningia sanguinea</i> Vahl	Herb	NE	NE
Balsaminaceae	<i>Impatiens niarniamensis</i> Gilg	Herb	NE	NE
Begoniaceae	<i>Begonia eminii</i> Warb.	Herb	NE	NE
Bignoniaceae	<i>Markhamia lutea</i> (Benth.) K.Schum.	Tree	LC	NE
Boraginaceae	<i>Cordia africana</i>	Tree	LC	NE
Burseraceae	<i>Commiphora africana</i> (A.Rich.) Engl.	Tree	LC	NE
Campanulaceae	<i>Lobelia bequaertii</i> De Wild.	Herb	NE	NE
Cannabaceae	<i>Celtis africana</i> Burm.f.	Tree	LC	NE
Cannabaceae	<i>Celtis durandii</i>	Tree	NE	NE
Cannabaceae	<i>Celtis mildbraedii</i> Engl.	Tree	LC	NE
Cannabaceae	<i>Celtis zenkeri</i> Engl.	Tree	LC	NE
Cannabaceae	<i>Trema orientale</i> (L.) Blume	Tree	LC	NE
Capparaceae	<i>Capparis fascicularis</i>	Climber	NA	NE
Commelinaceae	<i>Aneilema beniniense</i> (P.Beauv.) Kunth	Herb	NE	NE
Commelinaceae	<i>Aneilema sp</i>	Herb		
Commelinaceae	<i>Commelina benghalensis</i> L.	Herb	LC	NE
Commelinaceae	<i>Commelina capitata</i> Benth.	Herb	NE	NE
Commelinaceae	<i>Palisota schweinfurthii</i>	Herb	NE	NE
Commelinaceae	<i>Pollia condensata</i> C.B.Clarke	Herb	NE	NE
Commelinaceae	<i>Pollia mannii</i> C.B.Clarke	Herb	NE	NE
Commelinaceae	<i>Stanfieldiella imperforata</i> (C.B.Clarke) Brenan	Herb	NE	NE
Convolvulaceae	<i>Ipomoea cairica</i> (L.) Sweet	Climber	LC	NE
Convolvulaceae	<i>Lepistemon owariensis</i> (P.Beauv.) Hallier f.	Climber	NE	NE
Cucurbitaceae	<i>Kedrostis heterophylla</i> Zimm.	Climber	LC	NE
Cucurbitaceae	<i>Leganaria siceraria</i> (Molina) Standl.	Climber	NE	NE
Cucurbitaceae	<i>Momordica foetida</i> Schumach.	Climber	NE	NE
Dichapetalaceae	<i>Tapura fischeri</i>	Tree	NE	NE
Dilleniaceae	<i>Tetracera potatoria</i>	Shrub	NE	NE
Dioscoreaceae	<i>Dioscorea bulbifera</i> L.	Climber	NE	NE
Ebenaceae	<i>Diospyros abyssinica</i> (Hiern) F.White	Tree	LC	NE
Euphorbiaceae	<i>Tragia brevipes</i> Pax	Climber	NE	NE
Euphorbiaceae	<i>Acalypha neptunica</i>	Shrub	NE	NE
Euphorbiaceae	<i>Acalypha ornata</i>	Shrub	NE	NE
Euphorbiaceae	<i>Acalypha petiolaris</i> Hochst.	Shrub	NE	NE
Euphorbiaceae	<i>Alchornea laxiflora</i> (Benth.) Pax & K.Hoffm.	Shrub	LC	NE
Euphorbiaceae	<i>Erythrococca bongensis</i> Pax	Shrub	LC	NE
Euphorbiaceae	<i>Alchornea cordifolia</i> (Engl. & K.Krause) Danser	Tree	LC	NE
Euphorbiaceae	<i>Argomuelleria macrophylla</i> Pax	Tree	LC	NE



Family	Species	Life form	IUCN status	MTWA2018
Euphorbiaceae	<i>Macaranga schweinfurthii</i>	Tree	NE	NE
Fabaceae	<i>Abrus canescens</i> Welw. ex Baker	Climber	NE	NE
Fabaceae	<i>Chamaecrista kirkii</i> (Oliv.) Standl.	Shrub	LC	NE
Fabaceae	<i>Crotalaria brevidens</i> Benth.	Shrub	NE	NE
Fabaceae	<i>Albizia grandibracteata</i>	Tree	NE	NE
Fabaceae	<i>Cynometra alexandri</i> C.H.Wright	Tree	LC	NE
Flacourtiaceae	<i>Flacourtia indica</i>	Shrub	NE	NE
Flacourtiaceae	<i>Dovyalis macrocalyx</i>	Shrub	NE	NE
Lamiaceae	<i>Leucas hirta</i> (B.Heyne ex Roth) Spreng.	Herb	NE	NE
Lamiaceae	<i>Achyrospermum parviflorum</i> S.Moore	Shrub	NE	NE
malvaceae	<i>Urena lobata</i> L.	Herb	LC	NE
malvaceae	<i>Grewia mollis</i> Juss.	Shrub	NE	NE
malvaceae	<i>Grewia similis</i> K.Schum.	Shrub	NE	NE
malvaceae	<i>Hibiscus calyphyllus</i> Cav.	Shrub	LC	NE
Malvaceae	<i>Leptonychia mildbraedii</i> Engl.	Shrub	NT	NE
Malvaceae	<i>Leptonychia semlikensis</i> Engl.	Shrub	VU	NE
Marantaceae	<i>Marantochloa purpurea</i>	Herb	NE	NE
Melastomataceae	<i>Melastoma malabathricum</i> L.	Herb	NE	NE
Melastomataceae	<i>Warneckea jasminoides</i> (Gilg) Jacq.-Fél.	Shrub	LC	NE
Meliaceae	<i>Khaya anthotheca</i> (Welw.) C.DC.	Tree	VU	EN
Menispermaceae	<i>Chasmanthera dependens</i>	Climber	NE	NE
Moraceae	<i>Antiaris toxicaria</i> (J.F.Gmel.) Lesch.	Shrub	LC	NE
Moraceae	<i>Dorstenia kameruniana</i> Engl.	Shrub	NE	NE
Moraceae	<i>Ficus asperifolia</i>	Shrub	NE	NE
Moraceae	<i>Ficus saussureana</i> DC.	Tree	LC	NE
Moraceae	<i>Ficus vallischaude</i>	Tree	NE	NE
Ochnaceae	<i>Ochna bracteosa</i> Robyns & Lawalrée	Shrub	NE	NE
Oleaceae	<i>Jasminum abyssinica</i>	Climber	NE	NE
Onagraceae	<i>Ludwigia abyssinica</i> A.Rich.	Herb	LC	NE
Orchidaceae	<i>Vanilla imperialis</i> Kraenzl.	Herb	NE	NE
Phyllanthaceae	<i>Flueggea virosa</i> (Roxb. ex Willd.) Royle	Shrub	LC	NE
Phyllanthaceae	<i>Margaritaria discoidea</i> (Baill.) G.L.Webster	Tree	NE	NE
Poaceae	<i>Digitaria longiflora</i> (Retz.) Pers.	Grass	NE	NE
Poaceae	<i>Leersia hexandra</i> Sw.	Grass	LC	NE
Poaceae	<i>Megathyrsus maximus</i> (Jacq.) B.K.Simon & S.W.L.Jacobs	Grass	NE	NE
Poaceae	<i>Olyra latifolia</i>	Grass	NE	NE
Poaceae	<i>Oplismenus hirtellus</i> (L.) P.Beauv.	Grass	NE	NE
Poaceae	<i>Panicum trichocladum</i> C.Rchb. ex Kunth	Grass	NE	NE
Poaceae	<i>Setaria homonyma</i> (Steud.) Chiov.	Grass	NE	NE
Polypodiaceae	<i>Drynaria rigidula</i> (Sw.) Bedd.	Herb	NE	NE
Pteridaceae	<i>Pellaea viridis</i>	Fern	NE	NE



Family	Species	Life form	IUCN status	MTWA2018
Rhamnaceae	<i>Scutia myrtina</i> (Burm.f.) Kurz	Shrub	NE	NE
Rhamnaceae	<i>Lasiodiscus mildbraedii</i>	Tree	NE	NE
Rubiaceae	<i>Geophila repens</i> (L.) I.M.Johnst.	Herb	NE	NE
Rubiaceae	<i>Bertiera aethiopica</i> Hiern	Shrub	NE	NE
Rubiaceae	<i>Coffea canephora</i>	Shrub	NE	NE
Rubiaceae	<i>Cremaspora triflora</i> (Thonn.) K.Schum.	Shrub	LC	NE
Rubiaceae	<i>Massularia acuminata</i> (G.Don) Bullock ex Hoyle	Shrub	LC	NE
Rubiaceae	<i>Oxyanthus speciosus</i> DC.	Shrub	LC	NE
Rubiaceae	<i>Pavetta subcana</i> Hiern	Shrub	NE	NE
Rubiaceae	<i>Psychotria ceratoloba</i> (K.Schum.) O.Lachenaud	Shrub	NE	NE
Rubiaceae	<i>Psychotria punctata</i> Vatke	Shrub	NE	NE
Rubiaceae	<i>Rutidea orientalis</i> Bridson	Shrub	NE	NE
Rubiaceae	<i>Rutidea smithii</i> Hiern	Shrub	LC	NE
Rubiaceae	<i>Rytigynia bagshawei</i> (S.Moore) Robyns	Tree	LC	NE
Salicaceae	<i>Oncoba spinosa</i> Forssk.	Shrub	LC	NE
Sapindaceae	<i>Paullinia pinnata</i> L.	Climber	NE	NE
Sapindaceae	<i>Allophylus ferrugineus</i> Taub.	Shrub	NE	NE
Sapindaceae	<i>Allophylus africanus</i> P.Beauv.	Tree	NE	NE
Sapotaceae	<i>Aningeria altissima</i>	Tree	NE	NE
Sapotaceae	<i>Chrysophyllum albidum</i>	Tree	NE	VU
Sapotaceae	<i>Chrysophyllum perpulchrum</i>	Tree	NE	VU
Sapotaceae	<i>Gambeya beguei</i> (Aubrév. & Pellegr.) Aubrév. & Pellegr.	Tree	NE	NE
Sapotaceae	<i>Gambeya gorungosana</i> (Engl.) Liben	Tree	NE	NE
Solanaceae	<i>Solanum nigrum</i> L.	Herb	NE	NE
Sterculiaceae	<i>Cola gigantea</i> A.Chev.	Shrub	LC	NE
Sterculiaceae	<i>Cola gigantea</i>	Tree	NA	NE
Thymeleaceae	<i>Peddiea africana</i> Harv.	Shrub	LC	NE
Thymeleaceae	<i>Peddiea fischeri</i> Engl.	Shrub	LC	NE
Violaceae	<i>Rinorea beniensis</i> Engl.	Tree	VU	NE
Violaceae	<i>Rinorea tshingandaensis</i> Taton	Tree	VU	NE
Vitaceae	<i>Cissus quadrangularis</i> L.	Climber	NE	NE
Zingiberaceae	<i>Afromomum angustifolium</i> (Sonn.) K.Schum.	Herb	NE	NE
Zingiberaceae	<i>Renealmia congolana</i>	Herb	NE	NE
zygophyllaceae	<i>Balanites wilsoniana</i> Dawe & Sprague	Tree	LC	NE



Annex 5: Wildlife Checklists

Full list of mammals recorded in the surveys in the Kaniyo-Pabidi proposed project area

Order	Species	Conservation concern (IUCN/Uganda)
	Blue Duiker <i>Cephalophus monticola</i>	LC/LC
	Bush Duiker <i>Sylvicapra grimmia</i>	LC/LC
	Bush Pig <i>Potamochoerus porcus</i>	LC/LC
	Bushbuck <i>Tragelaphus scriptus</i>	LC/LC
	Forest Duiker <i>Cephalophus rufilatus</i>	LC/LC
Artiodactyla	Giant Forest Hog <i>Hylochoerus meinertzhageni</i>	LC/EN
	Leopard <i>Panthera pardus</i>	NT/VU
	<i>Coleura afra</i>	LC/LC
	<i>Neoromicia capensis</i>	LC/LC
	<i>Nycteris argae</i>	LC/LC
	<i>Nycteris hispida</i>	LC/LC
	<i>Nycticeinops schlieffenii</i>	LC/LC
	<i>Rhinolophus alcyone</i>	LC/LC
	<i>Epomophorus labiatus</i>	LC/LC
	<i>Epomops franqueti</i>	LC/LC
	<i>Mimetilus moloneyi</i>	LC/LC
Carnivora	<i>Scotophilus dingani</i>	LC/LC
Insectivora	<i>Crocidura olivieri</i>	LC/LC
	Chimpanzee <i>Pan troglodytes</i>	EN/EN
	L'Hoest's monkey <i>Cercopithecus lhoesti</i>	LC/LC
	Olive Baboon <i>Papio anubis</i>	LC/LC
Primates	Red-tailed Monkey <i>Cercopithecus ascanius</i>	LC/LC
	African Giant Squirrel <i>Protexerus stangeri</i>	LC/LC
	Alexander's Dwarf (Bush) Squirrel <i>Paraxerus alexandri</i>	LC/LC
	Boehm's Squirrel <i>Paraxerus boehmi</i>	LC/LC
Rodentia	Crested Porcupine <i>Hystrix cristata</i>	LC/LC



Annex 6: Birds checklist

FAMILY	SPECIES NAME	Habitat Descripti on CODE	Total Nos. PCs Results	TSCs Results of Scores
ACCIPITRIDAE	CROWNED EAGLE <i>Stephanoaetus coronatus</i>	R-VU,FF	0	4
ACCIPITRIDAE	MARTIAL EAGLE <i>Polemaetus bellicosus</i>	R-VU	2	2
PHASIANIDAE	HELMETED GUINEAFOWL <i>Numida meleagris</i>	G	26	0
RALLIDAE	BUFF-SPOTTED FLUFFTAIL <i>Sarothrura elegans</i>	FF	6	4
COLUMBIDAE	TAMBOURINE DOVE <i>Turtur tympanistria</i>	F	17	5
COLUMBIDAE	AFEP PIGEON <i>Columba unicincta</i>	FF	5	6
CUCULIDAE	DUSKY LONG-TAILED CUCKOO <i>Cercococcyx mechowi</i>	FF	3	6
CUCULIDAE	AFRICAN EMERALD CUCKOO <i>Chrysococcyx cupreus</i> 389	F	9	6
CUCULIDAE	BAR-TAILED TROGON <i>Apaloderma vittatum</i>	FF	2	1
ALCEDINIDAE	WHITE-BELLIED KINGFISHER <i>Corythornis leucogaster</i>	FF,W	2	6
MEROPIDAE	WHITE-THROATED BEE-EATER <i>Merops albicollis</i>	A,f,Ae	60	6
BUCEROTIDAE	BLACK-AND-WHITE-CASQUED HORNBILL <i>Bycanistes subcylindricus</i>	F	8	6
CAPITONIDAE	MOUSTACHED GREEN TINKERBIRD <i>Pogoniulus leucomystax</i>	R-RR,FF	7	0
CAPITONIDAE	RED-RUMPED TINKERBIRD <i>Pogoniulus atroflavus</i>	FF	3	0
CAPITONIDAE	YELLOW-THROATED TINKERBIRD <i>Pogoniulus subsulphureus</i>	FF	1	0
CAPITONIDAE	YELLOW-SPOTTED BARBET <i>Buccanodon duchaillui</i>	FF	15	0
CAPITONIDAE	YELLOW-BILLED BARBET <i>Trachyphonus purpuratus</i>	FF	1	0
PYCNONOTIDAE	LITTLE GREENBUL <i>Andropadus virens</i>	F	31	6
PYCNONOTIDAE	LITTLE GREY GREENBUL <i>Andropadus gracilis</i>	R-NT,FF	0	3
PYCNONOTIDAE	SLENDER-BILLED GREENBUL <i>Andropadus gracilirostris</i>	FF	0	1
PYCNONOTIDAE	WHITE-THROATED GREENBUL <i>Phyllastrephus albigularis</i>	FF	3	6
PYCNONOTIDAE	YELLOW-STREAKED GREENBUL <i>Phyllastrephus flavostriatus</i>	FF	20	6
TURDIDAE	FOREST ROBIN <i>Stiphornis erythrothorax</i>	FF	0	2
TURDIDAE	RUFIOUS FLYCATCHER-THRUSH <i>Stizorhina fraseri</i>	FF	8	1
TURDIDAE	AFRICAN THRUSH <i>Turdus pelios</i>	f	0	5
SYLVIIDAE	SHORT-TAILED WARBLER <i>Hemitesia neumanni</i>	FF	0	2
SYLVIIDAE	EVERGREEN-FOREST WARBLER <i>Bradypterus lopezi</i>	FF	0	1
SYLVIIDAE	WHITE-BROWED CROMBEC <i>Sylvietta leucophrys</i>	FF	2	0
SYLVIIDAE	GREEN HYLIA <i>Hylia prasina</i>	F	12	0
MUSCICAPIDAE	SOOTY FLYCATCHER <i>Muscicapa infuscata</i>	FF	1	0
MONARCHIDAE	BLUE-HEADED CRESTED FLYCATCHER <i>Trochocercus nitens</i>	FF	2	0
MONARCHIDAE	RED-BELLIED PARADISE FLYCATCHER <i>Terpsiphone rufiventer</i>	F	3	0
NECTARINIIDAE	LITTLE GREEN SUNBIRD <i>Anthreptes seimundi</i>	FF	0	0
NECTARINIIDAE	GREY-HEADED SUNBIRD <i>Deleornis fraseri</i>	FF	0	4
NECTARINIIDAE	OLIVE SUNBIRD <i>Cyanomitra obscura</i>	FF	2	5



MALACONOTID AE	WESTERN BLACK-HEADED ORIOLE <i>Oriolus brachyrhynchus</i>	F	0	5
STURNIDAE	CHESTNUT-WINGED STARLING <i>Onychognathus fulgidus</i>	FF	0	1
PLOCEIDAE	YELLOW-MANTLED WEAVER <i>Ploceus tricolor</i>	FF	0	1
PLOCEIDAE	RED-HEADED MALIMBE <i>Malimbicus rubricollis</i>	FF	0	2



Annex 7: Herpes Checklist

Scientific Name	IUCN Global Red List status	Regional/ National Red List status	Presence in project area	Presence in Area of Influence	Tier	Critical Habitat Triggered?
<i>Arthroleptis adolfifriederici</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Arthroleptis poecilonotus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Arthroleptis poecilonotus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Arthroleptis schubotzi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Arthroleptis stenodactylus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Leptopelis bocagii</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Leptopelis christyi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Leptopelis kivuensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Leptopelis oryi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Sclerophrys gutturalis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Sclerophrys maculatus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Sclerophrys pusilla</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hoplobatrachus occipitalis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hemisis marmoratus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Afrivalus laevis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Afrivalus osorioi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No



<i>Afrivalus quadrivittatus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius acuticeps</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius balfouri</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius cinnamomeoventris</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius kivuensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius langi</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius lateralis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Hyperolius viridiflavus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Kassina senegalensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Phlyctimatis verrucosus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Phrynobatrachus auritus</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Phrynobatrachus natalensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Xenopus laevis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Xenopus muelleri</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Ptychadena anchietae</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Ptychadena cf. mascareniensis</i>	Least Concern	Data Deficient	Form Literature review	Form Literature review	2	No
<i>Ptychadena chrysogaster</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Ptychadena porosissima</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No



<i>Ptychadena tellini</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Ameitia nutti</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No
<i>Amietia angolensis</i>	Least Concern	Least Concern	Form Literature review	Form Literature review	2	No



Annex 8: Minutes of the stakeholder meetings and discussion

Appendix 8(a) Opinions from the National Forestry Authority meeting in the Boardroom (27th of Jan, 2025)

No	Entity engaged	No. of person engaged	Major Opinions and Answers	
			Question/Concern from SSC	Answer/ Responses from NFA
1	National Forest Authority	08	<p>*R1: We engaged UWA last year in December and a number of concerns were raised that needed your indulgence,</p> <p>R2: the concession NFA undertook with the Great Lakes Safaris, and the other is for how long.</p> <p>*Q1:how you plan to mitigate the potential conflicts of benefits sharing with UWA as a result of this project?</p> <p>R3: We visited the site, and compiled the scoping report and are now ready for field which we will be undertaking through next week to finish with the exercise.</p>	<p>R1: As the National Forestry Authority (NFA), we play a dual role; as a developer and stakeholder in the Kiniyo-Pabidi Budongo Central Forest Reserve Canopy Walkway Ecosystem project.</p> <p>R2: NFA is responsible for procuring the consultant for this Environmental and Social Impact Assessment (ESIA) assignment. SSC emerged as the winning consultant for this project.</p> <p>R3: This ESIA exercise is under time constraints, with only three months allocated for completion. We are now one month into this timeframe.</p> <p>R4: Iam pleased to report that the consultant has already submitted the scoping report, which was approved by the National Environment Management Authority (NEMA) on 30th December 2024.</p> <p>R5: Consultations with various stakeholders are outlined as crucial in the Terms of Reference (TORs) for completing the ESIA activities.</p> <p>R6: SSC has informed us that they still require specific information from NFA to enhance and finalize their report.</p>
2			NFA Q1: When do we see these concerns from UWA?	
3			SSC Q1. Who is responsible for revenue collection for this project? Q2: How do you intend to ensure the safety of the tourists on the canopy, and the animals during the site construction given the fragile nature of this ecosystem?	<p>NFA responded by Appreciated the quick consultant team for the quick reconnaissance</p> <p>Highlighted the legal mandate of NFA vs the mandate of UWA and quoted Chapter 7 of SFR, Q1 Response</p> <p>Requested the team to get the updated forest management plans, refer to it, and get further clarification Q2 response</p> <p>The updated plan has made an effort, e.g subsection 13 of the Act, to assess and mitigate</p>



No	Entity engaged	No. of person engaged	Major Opinions and Answers	
			Question/Concern from SSC	Answer/ Responses from NFA
			<p>Q3: How about the concession agreement with the Great Lakes Safaris, how will those issues be reconciled when this project takes effect? C1: UWA needs more details about the project from NFA, like the designs, materials that will be used for constructing the canopy walk, etc.</p>	<p>From this exercise I have learnt that we need to review the license with Great Lakes Safaris, but the review and update of licenses can be addressed on how to manage the process. Response to Q3. We need a forest bases infrastructure insurance policy for the canopy walk If UWA has no information about the project they should write to NFA.</p>
4			<p>Q4. In the establishment of NFA there is no component of tourism promotion, yet UWA does, can this project be handed over to UWA to manage it? SSC Concerns; C1: NFA has been rationalized, will his project be kept under NFA or it will be taken on by MoWE? Q1: How will materials be assembled for the construction of the canopy walk? Q2: Will they do welding on the site? This was asked to help explain the risks to the ecosystems around</p>	<p>NFA is using Cap 160 and its mandate has not changed, NFA will share the necessary documents, including the FMP, inventory reports, the ESIA report for the Great Lakes Safaris, the updated maps, and the forest bio-diversity reports for Budongo CFR. Institutions of governments should not be fighting on partnerships and arrangements of that nature read cap 160 of the National Forest Planting, section 51 on the functions of NFA NFA is trying to expand, there already exists an eco-lodge, trails, and accessibility, we will avail you the designs For the access rights on the gate you will be allowed for as long as you have clearances, we have people working in the forest, do they pay all the time they are entering? They won't stop you</p>
5			<p>SSC, Q1: Does NFA have a community forest collaboration with the surrounding communities? Q2: What community support activities has NFA done in the area? Q3: How long is the NFA concession agreement with Great Lakes Safaris? Q4: Issues of assembling the construction materials on the site, have you considered the risks this poses to these ecosystems? Q5: Are there any programs running in this area that you would wish the team to pay attention to?</p>	<p>NFA; We have signed CCA agreements with communities around CFRs for different activities Q1 and Q2, responses Great Safaris license is valid and will be revised accordingly NFA responded to Q3, that the should consultant find out from Great Lake Safaris during consultation. No answer was given to Q4 NFA, there is going to be an ecotourism site in Busingiro. Response to Q5</p>
7			<p>Q1: Will the report require risk assessments and the assessment of the cumulative impacts?</p>	<p>The consultant should stick to the Terms of Reference approved by NEMA.</p>



No	Entity engaged	No. of person engaged	Major Opinions and Answers	
			Question/Concern from SSC	Answer/ Responses from NFA
			Concern: This would require us to conduct a comprehensive ESIA. We need clarity on this Are there any projects that are planned to be put in this area as a result of this project? We have heard of something like a research tower, where will it be established? What are your plans concerning the concession agreement with Great Safaris?	The Concern has been responded to under section Q5
			NFA Q1: How much do you intend to do on the inventory of trees on this project, like the age of trees, will they be able to hold the canopy for the safety and the other sustainable elements?	
Date		Participant position		
14 th Jan 2025		Environment management and Research Coordinator Planning Planning officer Team Member (SSCL) 02 Ecologist Cartographer CMS		

**R= means response provided while Q = means a question raised respectively*



Appendix 8 (b): Opinions from the Uganda Wildlife Authority Kampala Head Office Meeting in Library (20th of Jan, 2025)

Min	Entity engaged	Raised Concerns	Responses
1	Uganda Wildlife Authority Kampala	<p>The consultant should clearly define the roles of NFA and UWA during the consultation process to prevent conflicts during project implementation.</p> <p>Question: Q1: What is the nature, size, and length of the canopy walk? Q2: What materials are you going to use in construction? Q1: Do you have the Project maps? Q2: We would like to understand Scoping details? Q3: what methodology will you employ during the implementation? Q1: Have you benchmarked for similar canopy projects</p> <p>Safety measures for tourists and the facility.</p> <p>UWA emphasized: The importance of referencing updated legal frameworks. The inclusion of a comprehensive list of animal species in the report. Roles of various stakeholders, including MoWE, UWA, and NFA. UWA raised concerns about: Revenue management, particularly UWA's mandate to generate tourism revenue. UWA clarified that workers are issued access permits under specific terms and conditions as part of conservation efforts.</p>	<p>The consultant is actively engaging with key stakeholders and the public to gather concerns, diverse views, issues, proposals and recommendations in line with mitigation measures where possible and ensure that all issues related to the project are addressed accordingly.</p> <p>The details of the project design, including materials and selected hanging trees, are included in the project report, which will be shared with The consultant noted that project maps were developed by a separate consultant. However, the methodology employed by the consultant team has been shared.</p> <p>Reference was made on Nyungwe Canopy Walk in Rwanda and Nyunguyawe as benchmarks, highlighting that the concept is still under exploration for viability and sustainability. explained that safety measures will be addressed by a Health and Safety Expert, who will provide recommendations to ensure the safety of both tourists and wildlife.</p> <p>A detailed list of animal species will be produced following baseline surveys. The consultant is limited to the ESIA for the canopy walk and confirmed ongoing coordination with stakeholders to address these concerns. Further consultations with NFA will be conducted for clarification on revenue management and access.</p>



Min	Entity engaged	Raised Concerns	Responses
		Regarding access rights for the consultant team to collect data over a 3–4-day period without charges.	Advice was given to the consultant team to formally write to the ED-UWA, providing vehicle registration details, team member names, and the duration required for data collection.
No of UWA staff engaged: 5 Date: 19 th Dec 2024		Position; 1. Monitoring and Research, 2. Senior Environment, 3. Senior Biodiversity, 4. EIA Warden, 5. Intern Student,	



Appendix 8 (c) opinions from the Consultative Meetings held with Ministry of Tourism, Wildlife and Antiquities

Insitution	Issues Raised	Mitigation Measures
Ministry of Tourism, Wildlife and Antiquities		
Department of Museusms and Monuments (Research, Sites and Monuments and Natural History)	<ul style="list-style-type: none"> Conduct archaeological survey in the proposed project area and document any archaeological and heritage resources that may be affected. Since the proposed project area is forest connected to a national park, it is quite sensitive to conduct any archaeological excavation or ground disturbing tests. The study team should rely more on archaeological survey and consultations. 	<ul style="list-style-type: none"> Archaeological survey was conducted in the project area and the results of the survey explained in the section of results 4.3 of the ESIS. Only a single small test pits excavation was conducted in the project area. Extensive archaeological survey was majorly conducted.
Masindi District Local Government	<ul style="list-style-type: none"> The study team should ascertain the heritage potential of the project area much as it is located within a gazetted area. 	<ul style="list-style-type: none"> The proposed project is located within a gazetted national forest, close to Murchsion national park. There will be no need to displace the community around the project area. The project instead, should involve the community to preserve some of the already known cultural sites outside the project area.
Uganda Wildlife Authority (UWA) Field Station	<ul style="list-style-type: none"> Informed the study team on the existence of remains of past human activities in the Murchison Falls National park based on the previous archaeological research in the Chobi sector. There was need for the team to survey the project area and ascertain the presence of archaeological resources in the proposed project area. 	<ul style="list-style-type: none"> Archaeological survey was in the proposed project area and the results area recorded in the section of results 4.3 of the ESIS.
Community around the Project Area	<ul style="list-style-type: none"> The community around the project area did not have specific concern on the project since it is in the gazetted area, however, they asked the team to document any cultural heritage in the proposed project area that may boost archaeo-tourism/cultural tourism potential of the area. 	<ul style="list-style-type: none"> The proposed project should advocate for the preservation of natural sites and plants of traditional interest especially those that are still used by the local community.
Date of engagement: 31st January 2025	Number of Participants:02	Position



Appendix 8 (d): Minutes of the opinions from the Ministry of Ministry of Water and Environmental meeting in Wetland office (27th of Jan, 2025)

No	Stakeholder	Opinion and Answer	
		Question (Questioner)	Answers (Respondent)
1	Ministry of water and Environment	SSC remarks' Acknowledged the good reception by the ministry and mentioned that the ministry's views will be vital for this project	MWE remarks: He welcomed members and introduced the SCC team working on behalf of NFA about the tree canopy walk in Kaniyo Pabidi. He stated that the SSC team was there to consult the ministry's views about the proposed establishment of the tree canopy walk in Kaniyo-Pabidi
2		MWEQ: Where is the canopy walk located? Q2: What is the size, accessibility, auxiliary components if they are there? Q3: What is the nature of the landscape is it a wetland or dry area?	SSC Responded that; <ul style="list-style-type: none"> • The canopy walk is cyclic with different corners (refer to overlay), in total its 464 meters to complete. • Located within a dry area • No wetland however when it rains, some places become boggy • Accessibility: 6 kms from Kachumbanyombo gate to Budongo café and from the café to the canopy walk is 1 km • No auxiliary components at the moment • The area was selected because it's of interest such as (Mahogany and Cynometra)
		MWE Q1. What mode of stakeholder's engagements did you use in the field?	SSC Responded that; we used <ul style="list-style-type: none"> • Stakeholder meetings • Focused group discussions • Guiding tool such as questionnaires
		MWE Q1: How is the project going to handle the social concerns such as gender based violence, HIV?	<ul style="list-style-type: none"> • SSC, responded that, much of the work during construction and after will be done by the local people and the impact of HIV will be minimal or not. • The project will have aggrievance redress mechanism both at the project site and in the community to handle any grievances.
		MWE Q1.Are there any other animals other than Chimps? Q2. Won't noise affect these animals?	<ul style="list-style-type: none"> • Yes, there are other animals like porcupines, Leopard, Dyke, monkeys to mention • The noise from tourists coming to do the canopy walk, SCC will recommend the acceptable noise standards for the wildlife reserve.



		MWE You mentioned that there are seasonal streams, in the area, Q1: Are there cases of flooding?	<ul style="list-style-type: none"> The seasonal stream is just small and there are no cases of flooding
		Deo About operating management, is it going to be under UWA or NFA?	<ul style="list-style-type: none"> It will be managed by NFA
		MWE Part of sustainability and safety for measurements for the tourists	<ul style="list-style-type: none"> SSC will provide adequate measures about the safety of the tourists About sustainability, still SSC will guide the client (NFA) on that, the good thing the project is self-sustaining since it will be making money through earnings from tourists.
		MWE, He emphasized that ministry's concern should be taken seriously especially on issues of mitigation and ensuring that the forest is preserved Recommendation: Ensure that NFA is not going to change the land use.	<ul style="list-style-type: none"> SSC, we take note of the concern and we advise NFA to come out strongly on the proposed project to avoid future land use change
No. of staff engaged: 8 Date: 27 th January 2025		Position: Commissioner wetland, Senior Forest officer wetland officer (2) Forest officer (2) Sociologist Gender officer Monitoring officer	



Appendix 8 (e) Minutes of the meeting the Ministry of Gender labour and Social Development in OSH office (28th of Jan, 2025)

No	Stakeholder	Major Opinion and Answer	
		Question/Concern (Questioner)	Answer (Respondent)
1	Department of Occupational Health and Safety (DOSHS) in the Ministry of Gender, Labour and Social Development (MoGLSD)	SSC, remarks; He acknowledged the good reception by the ministry and mentioned that the ministry's views will be vital for this project	OSH, welcomed members and introduced the SCC team working on behalf of NFA about the tree canopy walk in Kaniyo Pabidi. He stated that the SSC team was there to consult the ministry's views about the proposed establishment of the tree canopy walk in Kaniyo-Pabidi
2		OSH, Q1 Q1. Where is it located? Q2., what is the size of accessibility, auxiliary components if they are there?	SSC:Response <ul style="list-style-type: none"> • The canopy walk is cyclic with different corners (refer to overlay), in total its 464 meters to complete. • Located within a dry stream, no wetland however when it rains, some places become boggy • Accessibility: 6 kms from Kachumbanyobo gate to Budongo café and from the café to the canopy walk is 1 km • No auxiliary components at the moment • The area was selected because it's the one that has those trees (mahogany and metro) <p>Answer accepted</p>
		SSC, Q1. what should be expected by the ministry during the implementation phase?	OSH, responded that there a number of issues we expect the developer to address or put into consideration; <ol style="list-style-type: none"> 1. Carry out aerosol (air, noise dust etc) monitoring before, during and after construction of the proposed project 2. Contractor should employ a health and safety expert on site for the entire proposed project 3. Workers should have contracts and insurance during construction 4. Occupational safety and health policy should be taught to all workers and pinned at work station at the proposed project 5. HIV and Aids sensitization, child labour and sexual harassment should be sensitized to workers 6. Safety of workers through (PPE) personal protective equipment, tool box talks and others especially works at height



No	Stakeholder	Major Opinion and Answer	
		Question/Concern (Questioner)	Answer (Respondent)
			7. The proposed nature based canopy walk should be registered with the ministry of gender in order to acquire a work place certificate 8. Working hours according to the labor laws should be respected 9. Rest rooms should be constructed for workers separated male and female Statutory equipment that are going to support the proposed project should be examined, inspected and certified by the ministry of gender
		SSC Concern: Are there concerns or issues that should be implemented during the project operation?	OSH Responded that; 1. The safety of tourist should be key while using this proposed facility 2. Every tourist, operators and customers using this place should be insured 3. Waste management should be key while using this place through sensitization of all people using that place 4. Security for tourists from animal attacks while using the facility 5. Avoid mass tourism which might scare away wild life
	No of Participants: 1 Date: 28th January 2025		Position OSH Officer



Appendix 8 (f): Minutes of the meeting with Masindi District Local Government in the Council Chamber on (20th of Jan, 2025)

No	Major opinion and Answer		
	Question (Questioner)	Answer (Respondent)	Reaction of questioner
1	SSC Q1. We want to know your opinion on the development of Nature Based canopy walk in Kaniyo Pabidi Central Forest?	No response was given to Q1 We welcome the development in Kaniyo Pabidi forest. MDLG responded with the question, Q1. Is it going to be the first kind of tourism product in the area?	NFA Reacted that, Yes in Budongo Central Forest Reserve. Accepted the answer
2	MDLG, Concern C1: NFA does not share revenues even when this new development is going to be a new tourism product in the district. C2: The district is interested in the expansion of its revenue base through tourism.	NFA, responded, that regarding revenue sharing, NFA does not have structures like the Uganda Wildlife Authority. However, NFA has been giving back to the communities through Community Forest management (CFM),	MDLG reacted that royalties should be given back to where the natural resource is being exploited.
3	MDLG Concern; The host district is also not allowed to access Budongo Forest. They have to pay the gate entrance fees yet the district is a stakeholder. Q1: Have you harmonized the gate entry fees with the Uganda National Wildlife Authority?	NFA, responded that anybody going to Kaniyo Pabidi is not supposed to pay any park entrance fees unless the communication is not received. We have NFA staff at the gate whom you should contact in case you are going to Kaniyo Pabidi also he is up and down due to understaffing. NFA shall deploy a staff at Kichumbanyobo gate to handle the people going to Budongo Central Forest.	Answer accepted
4	MDLG Q1. What is the scope of work for the ESIA in Kaniyo Pabidi?	SSC, Responded that the scope and Terms of reference were already shared with the client and late submitted to NEMA. We also got the approval at the end of December 2024. However, we shall share the approved Terms of Reference for your understanding the scope of work for the Nature Based Canopy walk in Kaniyo Pabidi Forest.	Answer accepted
5	SSC, How can local Communities be supported to benefit from tourism?	MDLGi, responded that communities should be involved and put at the centre of every development in Budongo ecological forest. As the district, we shall help the community to form women groups, and Kasenyi group. The groups will be trained by the district in financial literacy and making crafts.	Answer accepted.



Major opinion and Answer			
No	Question (Questioner)	Answer (Respondent)	Reaction of questioner
		MDLG, responded that NFA should develop roadside markets for the local communities sell their agricultural commodities and locally made goods such as hand crafts, Also, the local community should not focus on tourism only but rather have product diversification. NFA should put in place mechanisms for benefiting the Domestic tourism.	
6	MDLG, Concern; The oil road ie Kasinja-Paraa road destroyed the tree canopy. Q1. What is the status of the canopy now?	NFA. responded that no further destruction was undertaken. However, we also do not want the canopy to close the road as it might cause accidents.	Answer Accepted.
7	MDLG Q1. How can local tour guides be supported to meet the qualifications or standards set in place?	SSC, responded that, NFA can apply for a site guide and train the guides from the local community, and after attaining the minimum requirements, assess, approve them, and give them license to work as guide. This is intended to support the local community guides who may not meet the requirements by the ministry.	Answer accepted.
No. Participants:17		Position: Deputy Chief Administrative Officer Principal Assistant Chief Administration Officer District Communication Officer Acting District Production Officer Private Assistant Acting Medical Officer Principal Communication Officer Tourism Officer Chief Finance Officer District Planner Acting Community Development Officer Clerk to Council Principal Commercial Officer District Commercial Officer Secretary District service commission Acting District Production Officer Senior Environment Officer	



Appendix 8 (g): Minutes of the discussion with the office of Kasenyi Community Tourism Association at KCTA on (21st Jan 2025)

No	Major Opinion and Answer	
	Question (Questioner)	Answer (Respondent)
1	SSC, Remarks He thanked the chairperson Kasenyi Community Tourism Group for sparing time for the engagement.	The chairperson of the KCTA thanked SSC and the developer for reaching out to seek their views and appreciated the project that will stimulate tourism in Uganda.
2	SSC, Q1: Is KCTA registered. Q2: what is the criteria of joining the association?	KCTA Chairperson responded that; Yes, the group is registered with the district local government. We have 40 members 18 females and 22 males Pay membership of 10,000 and 5,000 below 18years
	Q3: which tourist activities is the group involved in	Members are involved in craft making, apiary, trail cutters, traditional dances and games.
	Q4: Do you think the group has benefited from tourism/ Budongo CFR?	Some Group members are being trained by Budongo Café, tourists provide market to crafts and honey. UWA supported group in establishing apiary project The group requested UWA for a buffer zone to have the apiary
	Q5: How do you collaborate with the community in grievance handling or management?	We have a committee that liaises with other stakeholders like UWA in handling animal-community conflict The group has been receiving support from UWA
	Q6: Do you think that the proposed canopy will have an impact on the group/community	Definitely, it will increase on the number of tourists thus providing a market to apiary products, and crafts. Negatively the communities may be restricted from accessing the forest
	Q7: Are you given access to Budongo CFR	Women are given opportunities to collect firewood twice a week; Wednesday and Friday Herbal collection is also accepted and done by the women



Appendix 8(h); Minutes of the meeting with Kasenyi communities on 20th January 2025.

No	Stakeholder consulted	Major Opinion and Answer	
		Concerns	Response by Consultant / Community
1.	Kasenyi Local Community.	<ul style="list-style-type: none"> The chairperson thanked SSC and the client NFA for engaging the communities to have their views towards the new product that is being introduced and noted that it will bring in more tourists Communities are faced with issues of wildlife-people conflict and most community members failed to attend the meeting since they are guarding their gardens and domestic animals. UWA should put in place the electric fence to hinder wild animals from invading communities. The contractors should engage the communities for job opportunities 	<ul style="list-style-type: none"> The consultant thanked the local leadership and the community for appreciating the invitation and requested them to freely share their views and concerns regarding the construction of the canopy walk Noted that all views have been captured and will be shared with responsible agencies (UWA) Casual labor will be provided by the community members
2.		<ul style="list-style-type: none"> Appreciated the consultant for engaging the communities and noted communities are always supportive of the activities in the Central Forest Reserve. She noted that the construction of the Canopy walk will be done in Paniyo- Pabidi in Budongo CFR Introduced the consultant Strategic Sustainable Consults (SSC) that was hired by NFA to carry out ESIA studies for the proposed project. Noted that NFA is mandated to protect and conserve the natural environment and called upon all community members to conserve the environment through tree planting. Requested all members present to raise their concerns and propose mitigation measures for proper project implementation. 	<ul style="list-style-type: none"> Appreciated the presence of the client and noted that some of the issues as raised by the communities can be well addressed by the client for the better understanding of the project and implementation. Additionally, it was highlighted that communities should be continuously engaged by NFA to ensure that the communities can as well promote the product once it has been constructed.
3.		<ul style="list-style-type: none"> Noted that Sustainable Strategic Consults Ltd was contracted by NFA to undertake the Environmental Social Impact Assessment for the proposed canopy walk in Kaniyo Padibi Community stakeholder meeting is part of the process to identify environmental and social issues 	<ul style="list-style-type: none"> Yes, the government allowed all community members once in April 2024 to visit and those who were interested went there. Of Course, the construction of the canopy will bring in more tourists and as community members we would like to visit and have that experience.



	<p>associated with the project and how they can be well mitigated.</p> <ul style="list-style-type: none"> • Have you ever visited Budongo CFR? • Do you as communities think that the construction of the natural based canopy walk will bring in more tourists? • Have you ever benefited from any tourist activity? • Do you have any suggestions concerning the construction of the canopy? • Have you ever been employed by any agency to do any works within Budongo? 	<ul style="list-style-type: none"> • Yes, as a group from Kasenyi we are usually called upon to do traditional dance and games for tourists which in turn bring in money. • As communities we should be engaged to do casual jobs. • Most of the youth from neighboring villages including Kasenyi village are empowered, trained and employed by Budongo Café. • UWA has revenue sharing where by surrounding communities/ groups are supported.
4	<ul style="list-style-type: none"> • Appreciated NFA for the proposed project and noted that it will increase on income due to the increase of tourists. • There are land-related conflicts that should be resolved. • Are there mitigation measures to prevent animals from invading the community? • The demarcations were made without participation from landowners and the affected communities, we fear land grabbing. • Wished to know about project sustainability? • How will the community be involved in planning and implementation? • There is need for the project designs to be shared with the community. • Are there some cooperate social responsibility to the community from the project? • What are the mitigation measures on safety of the project? • Are there monitoring and evaluation for the project? • Are there community feedback mechanisms from the government? • Noted that some time back the government promised to offer some land to communities to do conservation activities for communities like apiary but the promise was never fulfilled. 	<ul style="list-style-type: none"> • The construction will involve support from local communities during construction through job opportunities. • NFA will continue to conduct continuous engagements with communities. • Designs will be shared with communities during community engagements • The monitoring and Evaluation will be continuous done in-accordance with NEMA conditions of the ESIA certificate. • Environmental and social audits will be done according to the NEMA certificate conditions. • Issues to do with animal encroaching communities, urged communities to ensure that they inform UWA through their chairpersons. • Safety management plan will be developed and implemented by the client.
5	<p>As community members we need jobs</p> <hr/> <p>Appreciated the proposed project and the meeting</p>	<ul style="list-style-type: none"> • Full mobilization of labor will be made by the contractor at construction phase • Communities should work hand in hand with UWA to chase animals from the communities.



	<p>Noted that they needed support from the government to restrict wild animals from destroying their crops and eating their domestic animals</p> <ul style="list-style-type: none"> I stay near the park but wild animals have destroyed all crops, Baboons eat domestic animals like hens We spend most of the productive time in guarding crops UWA promised electric wires 	<ul style="list-style-type: none"> Measures will be put in place to restrict animals from accessing community
6	<ul style="list-style-type: none"> Some organizations come engage the communities but when they go they do not return. Requested the consultant to ensure that the canopy walk is constructed. Can NFA have free canopy walk day for communities 	<ul style="list-style-type: none"> Canopy walk is a government project that will be fully constructed with support from world bank Arrangements will be done by NFA to ensure that access is given to the communities to experience the canopy walk.
7	<ul style="list-style-type: none"> I work near the park and some officials put demarcations in their land without consent 	<ul style="list-style-type: none"> Local leadership should work with NFA to ensure that boundaries are put in exact areas to avoid conflicts.
<p>No. of Participants: 62 Male: 34 Females: 28 Date:20th January 2025</p>		<p>Position: Community Leadership Association Community members.</p>



Appendix 8 (i): Minutes of the meeting with Kigaragara Local community at Kigaragara Trading Center on (20st January 2025)

No	Major opinion and Answer		
	Question (Questioner)	Answer (Respondent)	Reaction of questioner
1	An elder and resident Kigaragara asked; 1.How will the community benefit from the proposed project	NFA responded to the community members opportunities for the communities will be available during and after the construction of the proposed project however through the chairperson's recommendation jobs will be given	Accepted the answer
2	women's leader in the community Kagaragra 1. The ladies in the community collect fire wood every weekend, won't the proposed project limit the community from pick the fire wood?	NFA Responded saying that the proposed project will not stop any member from picking fire wood and that will continue however they should fall the regulations of NFA as usual	Accepted the answer
3	Trader in the community Kigaragara 1. What is the plan of this proposed project? 2. Shall the community be allowed to host the tourist while the numbers increase?	SSC, responded by giving the community a picture on how the proposed project is going to be located, constructed, and how it may operate NFA Responded to the next question saying that hosting of tourists will be accepted but after training of the communities on how to host	Accepted the answer
4	CommunityLeader 1. Can the proposed project in the forest reserve also give back to the community like a borehole, school, etc.?	SSC responded to the community members that through the chairperson and other local leaders can write to National forest authority(NFA) requesting such additional facilities however he reminded them that it's not on the plan of the proposed project	Accepted the answer
5	Environmental community member Kigaragara was happy about the proposed project however 1.Suggest that the proposed project should also help the community on how to stop animals from attacking their homes and farms	SSC responded by requesting (NFA) national forest authority to address this issue. NFA)also responded to this matter by saying they are aware of it and it will be addressed	
6	Community leader asks that this proposed project won't it limit traditional medicine heavers from the forest? And wont the constructor face issues of safety since the proposed project is up in the trees	NFA responded by saying traditional medicine harvest will continue because the proposed project is covering a small area in the forest which cannot stop other activities SSC, on the aspect of safety he said that contractor will have all gears of keeping safety during construction	NFA, Safety will be key while the construction is ongoing
7	Resident Kigaragara	NFA responded that he will consult further on the requests made by community member and will provide response	NFA informed the days for the access of the forest by community is enough



	Asked NFA allow the local community to have a tourism market day in a month and also increase in the days of accessing the forest reserve		
8	Community leader suggested that NFA, UWA and community should work together and scare away the primates that eat their animals and crops	(SSC)&(NFA) Teams seconded the suggestion of the chairperson Kigaragara and this matter will be communicated top management to figure out a solution	
No of community participants: 18		Position: Local council I leadership Community members Community based organization leaders	



Annex 9: List of Consulted Stakeholders

Appendix 9 (a) Consultation Lists for Uganda Wildlife Authority

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION UGANDA WILDLIFE AUTHORITY - KAMPALA

No	Name	Institution	Designation	Contact	Signature
1	LORNAH NABUKWASI	UWA	MONITORING & RESEARCH OFFICER	0784890913 lornah.nabukwasi@wildlife.go.ug	
2	JIMMY BALUKU	UWA	VEILION	balukujimmy2018@gmail.com 0787915561	
3	DOREEN NINJUMA	U.W.A.	S.E Tourism	doreen.ninjuma@wildlife.go.ug 070243482	
4	DR. BWIRE TADEO. K	UWA	SM/SDO	0782122622	
5	Florence Kyalimpa	UWA	warden EIA	florence.kyalimpa@wildlife.go.ug 0782954625	
6	Kansiime Phionah	SSC	Sociologist	pkansiime@gmail.com 0783739261	
7	TAYESWA JAMES	SSC	Sociologist	0779870067	
8	Godfrey Tumuhairwe	SSC	Sociologist	0703658912	
9	Raymond Kababaka	SSC	Team Leader	0782909816	

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Appendix 9 (b): Consultation lists for National Forestry Authority



ATTENDANCE LIST

ESIA CONSULTATIVE MEETING BETWEEN NFA AND STRATEGIC SUSTAINABLE CONSULTS

SUBJECT: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CANOPY WALK AT KANIYO PABIDI, BUDONGO CFR, UNDER IFPA-CD PROJECT

DATE: 14/01/2024

No	Name	Gender	Position/Institution	Contacts	Signature
1	Shallon Challenge	F	Environment Mgt & Research Officer	0774265866	<i>[Signature]</i>
2	Les. Immanuel	M	Coordinator Planning / IFPA-CD	0782561941	<i>[Signature]</i>
3	BWANIKI BANYI	M	Contract Officer (C.O)	078372887	<i>[Signature]</i>
4	RICHARD BAVAKURE	M	TEAM MEMBER, (SSCL)	0792090677	<i>[Signature]</i>
5	TAMEBUA JAMES	M	TEAM MEMBER (SSCL)	0774127042	<i>[Signature]</i>
6	Geoffrey Jumuhamo	M	Sociologist	0783668912	<i>[Signature]</i>
7	Douglas Katozaka	M	Team Leader	0782909816	<i>[Signature]</i>
8	Stephen Sengwaka	M	Ecologist	075618562	<i>[Signature]</i>
9	Ronald Mugoobwa	M	Planning officer - NFA	0775121179	<i>[Signature]</i>
10	maria Kalema	M	Social person S-S consult.	0771402585	<i>[Signature]</i>
11	Jolin Mwaesigwa	M	NFA / CME	0783622773	<i>[Signature]</i>
12	Kensime Phumah	F	Sociologist - S.S.C.	078573926	<i>[Signature]</i>



Appendix 9 (c): Consultation Lists for Masindi District Local Government

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION Masindi District Local Government Council Chambers

No	Name	Institution	Designation	Contact	Signature
1	<u>Joseph Sunday</u>	<u>MASINDI - B2G</u>	<u>AG. SPO</u>	<u>0761804086</u>	<u>[Signature]</u>
2	<u>Sunday Joseph</u>	<u>MASINDI ALG</u>	<u>AG. SOW</u>	<u>0774-417296</u>	<u>[Signature]</u>
3	<u>MASINDI-B-AGRICULTURE</u>	<u>do</u>	<u>MP Planner</u>	<u>0772450508</u>	<u>[Signature]</u>
4	<u>Kisembo Fred</u>	<u>MALIC</u>	<u>Deputy Council</u>	<u>0782332051</u>	<u>[Signature]</u>
5	<u>BACUMA DAM</u>	<u>MALIC</u>	<u>CFO</u>	<u>0772884213</u>	<u>[Signature]</u>
6	<u>Kinyi Rita A</u>	<u>MALIC Tourism office</u>	<u>Tourism off</u>	<u>0771011666</u>	<u>[Signature]</u>
7	<u>Ngumire Wilber</u>	<u>NESLA</u>	<u>CEO</u>	<u>0772380866</u>	<u>[Signature]</u>
8	<u>Opiyo Cyrus</u>	<u>MALIC</u>	<u>MP</u>	<u>0782407520</u>	<u>[Signature]</u>
9					

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION MASINDI DISTRICT LOCAL GOVERNMENT Council Chamber

No	Name	Institution	Designation	Contact	Signature
1	Natsambwa Samson	Masindi DLG	DCMO	0734697908	
2	Kyamigis K Mwas	MALG	PAECO	0772595242	
3	ATITHIRA BRIAN	MDLG	DCO	0794510955	
4	Bchemwa Godfrey	MALG	DCDO	0772311355	
5	DR SEBUKUZA FRED	MDLG	ASDPO	0772747766	
6	Okise Patrick	MALG	PA	0772853825	
7	Dr Mubungu Roger	Masindi Hosp Masindi	Agm	0782223254	
8	Kalyegira Isaac Moses	MASINDI DLG	PCO	0772681985	
9	Nyandera Angela	MASINDI DLG	Secretary DSC	0772899341	

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Appendix 9 (d) Consultation Lists for Kasenyi Local Community

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION KASENYI VILLAGE - MASINDI DISTRICT

No	Name	Institution	Designation	Contact	Signature
1	ARTHUR BONIFACE	KASENYI	Member	-	Arthur
2	Peter Katurakeho	Kasenyi	member	0779022996	
3	Muhumwa Alex Bahinder	Kasenyi	member	0782442826	
4	ATERALE MILDRED	Kasenyi	member	0761986805	ATE
5	Iyume Kyokiffe	Kasenyi	member	077746066	
6	Twekambe G. Muhereza	Kasenyi	member	0789574905	
7	Musike Azizi	Kasenyi	member	0788-702645	
8	Godfrey Bamunro	Kasenyi	member	0779974774	
9	AYO FRANCIS	KASENYI	member	0766796803	

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION KASENYI VILLAGE - MASINDI DISTRICT

No	Name	Institution	Designation	Contact	Signature
1	ATHUBE BONIFACE	KASENYI	Member	-	ATHUBE
2	Pelen Katurukho	Kasenyi	member	0799022996	
3	Muhumyza Alex Bahider	Kasenyi	member	0782442826	
4	ATEBALE MILDRED	Kasenyi	member	0761986895	ATEBALE
5	Tugume Kyokiffe	Kasenyi	member	0779466666	
6	Twekambe G. Muhereza	Kasenyi	member	0789574905	
7	Mugisha Azizi	Kasenyi	member	0788-902645	
8	Gedfner Bamunno	Kasenyi	member	0779974734	
9	AYO FRANCIS	KASENYI	member	0766796883	

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION KASEMI VILLAGE - MARSABIT DISTRICT

No	Name	Institution / Village	Designation	Contact	Signature
1	Kwabong Samuel	Kasenyi	Community member	0778414408	
2	Baikaire Benedicto	Kasenyi	community member	0703833152	
3	RWOHMITO PATRICK	Kasenyi	Community member	0775663706	
4	Jelous Ayilyomu-Ruth	Kasenyi	member community	-	
5	Talemwa Dorcus	Kasenyi	member	0776268436	
6	KABASINGUZI GRACE	Kasenyi	member	0763509941	
7	Muntuku harrieb	Kasenyi	member	-	
8	Baguma Magaret	Kasenyi	member	0785228009	
9	Aruhura JULET	Kasenyi	member	0786033195	

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION MASINDI DISTRICT - KASENYI VILLAGE

No	Name	Institution	Designation	Contact	Signature
1	JANET NABALI	KASENYI	member	078480028	J.N
2	Nyakile Juditha	KASENYI	member	0778310117	JL
3	Kuribira Grace	KASENYI	member	0783475159	KA
4	Nyakato J.	KIGARAGATA	member	0789654657	LJ
5	Kabalisa SCOVIA	KASENYI	Member	0786016006	KA
6	Nyakasisiki Kedon	KASENYI	Member	0779024708	KA
7	KABASINI GRACE	KASENYI	Member	0765384491	grace
8	SUNDAY SADIQ	KASENYI	member	0782841022	SA
9	KATUSABE MWAJUMA	KASENYI	member	0789052661	Katusabe

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION KASENI VILLAGE - KIASUNDI DISTRICT

No	Name	Institution	Designation	Contact	Signature
1	Namuga Harriet	Kasenyi	member	0783886812	Namuga
2	Ahabwa Gorrek	Kasenyi	member	0788750423	
3	Kyansima Robinah	Kasenyi	member	0782037103	Kyansima
4	MBABAZI CHRISTINE	KASENYI	member	0774478252	mbabazi
5	Salyani TEKEREZA	KASenyi	member	0764112967	
6	KUGONZA CHRISTOPHER	Kasenyi Community Tourism Group	CLP KACOT	076134293	
7	OVOTO BATHOLOMEW	Kasenyi	Q/Person KCI Kasenyi	0788205029	
8	Ayomirouth Agnes	Kasenyi	member	0775722539	
9	BINEGA JOHN	Kasenyi	member	0772832750	B-J

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION KASENYI - MASUDI DISTRICT

No	Name	Institution	Designation	Contact	Signature
1	ONYERA ALICE	Kasenyi	Member	0788019594	<i>aw</i>
2	LUCY ADIRU	Kasenyi	Member	—	
3	KAMAZA PRONIA	Kasenyi	member	0776952524	<i>PRONIA</i>
4	NYANDERA EVALYNE	Kasenyi	member	0783242037	<i>Evalyner</i>
5	SARIDA BAIFA	Kasenyi	member	0778307241	<i>S</i>
6	GABOIRE MARY	Kasenyi	member	0773032987	<i>MARY</i>
7	MURUNGI JOY	Kasenyi	member	0773495824	<i>mj</i>
8	KIIZA JOSEPH	Kasenyi	Member	0778668342	<i>Joseph</i>
9	MWESIGWA NABDITH	Kasenyi	Member	0777461700	<i>NABDITH</i>

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC
ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION KASENJI VILLAGE

No	Name	Institution	Designation	Contact	Signature
1	Knezi Dri fani	Kasenji	member	0777385864	
2	Ofico Supriano	Kasenji	MEMBER	0781314524	
3	odho GEOFREY	KASANJI	MEMBER	0789029834	
4	Stella Kipnanyi	Kasangi	member	-	
5	Tina K Augustine	Kasenji	MEMBER	-	
6	Bosere Ronald	Kasenji	member	077629489	
7	Okecho Colson	Kasenji	member	0788803665	
8	Francis Byimukama	Kasenji	Member	0782-267273	
9	Amundo Lawrence	Kasenji	member	07825DE683	

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION KASENGI - VILLAGE

No	Name	Institution	Designation	Contact	Signature
1	MUTHUMUZA ANTON	Kasongi	member	0764567312	
2	KIWA ONKOSAE	Kasongi	Member	0783110301	
3	KASSIME PHIONAH	SSC	Sociologist	0783739261	
4	MUMUKAMA GODFRAY	SSC	Sociologist	8703658913	
5	RICHARD BAVAKURE	SSC	ENVIRONMENTAL SPECIALIST	0782090677	
6	Maire Kalom	SSC	sociologist	077140345	
7	Daphine Birungi	SSC	Tourism Expert	0705602690	
8	TABU JUSTUS	HFA - Bubungu sector	sector Manager	0789568090	
9	Cheptsek Recho	NFA	ESIA-tourism Supervisor	0785336205	
	RITA NYANGOMA	Kasongi	member	0774034039	

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Appendix 9 (e): Consultation Lists for Kigaragara Local Community

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION _____

No	Name	Institution	Designation	Contact	Signature
1	OKWONGA ALFRED	Sec/leg	KIGARAGARA	0769080534	
2	BERUETH ANNET	D. f c	KIGARAGARA	0786554485	
3	MACEZI TUSTO	Kigaragara village		0772961268	
4	OKUMU JOHN BAPTIST (B)	"	"	0760591020	
5	Ciwana - Ruzo	-	-	-	
6	BUTELE LINDU	"	"	"	
7	Wandera John	-	-	-	
8	WILEU GEBRGE				
9	Abigata Annet	Kigaragara		0789223280	Annet

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMNET (ESIA) STAKEHOLDER & PUBLIC
ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION _____

No	Name	Institution	Designation	Contact	Signature
1	Kibwoto John Peter	None	(Gangang V.	072309628	
2					
3					
4					
5					
6					
7					
8					
9					

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION Kigangany

No	Name	Institution	Designation	Contact	Signature
1	Karlemu Mowine	SSE	Soa 7109.27	0771402386	
2	Cheptock Reho	NFA-Burungu	Ecotourism Supervisor	0785336205	Chirwa
3	Ozumu Geoffrey	Kigangara		0789510460	
4	Klakitto Agnes	Kigangara		-	NSA
5	Grace Akimago	Kigangara	publicity	0763400694	A:V?
6	AZABO FRANCIS	''			
7	BIRUNGI IRANI	Kigangara	Women Counsellor Deputy Speaker Labanga Subc	07873044 15	
8	Amuzigo Joyce	Kigangara		0775933903	Amuzigo
9	Bakanyanga Joseph	''	Elida	--	

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Appendix 9 (f): Consultation Lists for Ministry of Tourism Wildlife and Antiquities

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION Wildlife Conservation Department Bandraam - MTWA

No	Name	Institution	Designation	Contact	Signature
1	Baluxie Toward	MTWA	SWO-L	0789604561	[Signature]
2	Michael Muli	MTWA	WO-M	0789604561	[Signature]
3	Maria Kilon	WFC	Analyst SSC	077143528	[Signature]
4	Antonia Mwangi	SSC	Tourism Expert	078976696	[Signature]
5	TARICWA JAMES	SSC	Sociologist	0799872667	[Signature]
6					
7					
8					
9					

I (I/We) and (we/our) have understood the objectives of consultation and have read the information provided. I understand that my participation is voluntary. I understand that the consultation is part of the assessment and is being carried out.



Appendix 9 (g): Consultation Lists for Ministry of Water and Environment

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION Ministry W & E

No	Name	Institution	Designation	Contact	Signature
1	Maria Kalema	SS-C	Sociologist	0771402345	
2	Mutari Emmanuel	MWE	Wetland Officer	0773393487	
3	Kambedha Irene	MWE	Sen. Forest Officer	0776381444	
4	Nakagiba Sarah	MWE	Sociologist	0702003962	
5	Kabaahu Deo	MWE/WMD	PWD/Am	0782-729140	
6	Namanya Ronald	MWE/WMD	W.O/ME	0786904269	
7	Ayakaka Perry	MWE/FSSD	Forest Officer	0776145215	
8	Asadhu Srobyoto	MWE/WMD	Senior wetlands officer	077283618	
9	Bongomin Benjamin	MWE/WMD	Wetland Officer/Trn	077359184	

I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Appendix 9 (h): Consultation Lists for Uganda Tourist Board (UTB)

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION Lugogo / UTB Office

No	Name	Institution	Designation	Contact	Signature
1	Simon Laita	Uganda Tourist Board	Product Development Institution Officer	0782195219	
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I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Appendix 9 (i): Consultation Lists for Ministry of Labour Gender Social Development

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION Ministry of Gender

No	Name	Institution	Designation	Contact	Signature
1	Bakimulla Dalgou	ESHD - MGLSD	PH(C)	bakidalgou@gmail.com 0703796957	
2	Mounia Kalema	ESRD 0703796957	Social log/zt	07714023 55	
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I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Appendix 9 (j) Consultation Lists for Exclusive Sustainable Tourism Operators Association (ESTOA)

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION ESTOA engagement reg. Exclusive Sustainable Tourism Operators

No	Name	Institution	Designation	Contact	Signature
1	Benedict PITALA	ESTOA	EXECUTIVE BOARD MEMBER	072219904 0952 616021	
2	Kelena Mwiru	JSC	Secretary	0771402551	
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I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Appendix 9 (k): Consultation List for Uganda Safari Guides Association

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION USAGA meeting regard safari guide Association

No	Name	Institution	Designation	Contact	Signature
1	TUMWESIGYE Jimmy Kamukama	USAGA	Tour Guide	0782787920	
2	Mulasa Frank Wabwaba	USAGA	Gen Sec	072266115	
3	Harbuli Byambanga	USAGA	Chairman	077912939	
4	Kalena Muniu	VSC	Co-ordinator	077140285	
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I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Appendix 9 (I): Consultation List for Budongo Forest - Cafe

PROPOSED KANIYO PABIDI CANOPY WALK ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STAKEHOLDER & PUBLIC ENGAGEMENT CONSULTATION REGISTRATION

PLACE/VENUE/LOCATION BUDONGO FOREST

No	Name	Institution	Designation	Contact	Signature
1	Eric Samson Okuli	CFFA Budongo	Manager	0759243845	
2	KUGONZA CHRISTOPHER	Kasanyi Community Tourism Group	Chairperson	0761341293	
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I sign and register upon understanding the provided information and have had the opportunity to contribute. I understand that my participation is voluntary. I understand that the contribution is part of decision making and I hereby consent.



Annex 10: Letters of No Objection from Local Council Leadership
Appendix 10 (a): No Objection Letter for Kigaragara LCI

KIGARAGARA VILLAGE,
KASENYI PARISH
LABONGO S/COUNTY
BUSHI COUNTY
MASINDI DISTRICT
20/01/2025

THE EXECUTIVE DIRECTOR
NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY
P.O. BOX 22255 KAMPALA - UGANDA

Dear Sir/Madam

RE: NO OBJECTION FOR PROPOSED TREE BEST CANOPY
WALK IN KASENYI PARISH, BUSHI COUNTY;

On behalf of the Community of Kigaragara L.C.I,
we greatly welcome the project and look forward
for employment opportunities, development, increase
in tourists. However, we highlight the concerns
that might come with the project during and
after which may be noise pollution, safety of people
who are going to construct the proposed project.

So we welcome the project however the contractor
should take the concerns above with mitigation measures

We wholly thank all your cooperation and
all the considerations are gratefully appreciated.

Chairperson L.C.I
Eperabon Emoru

LCI CHAIRPERSON
KIGARAGARA VILLAGE
KASENYI PARISH
LABONGO SUBCOUNTY
MASINDI DISTRICT
Date: 20/01/25

0779116961



Appendix 10 (a): No Objection Letter for Kasenyi LCI



KASENYI LCI OFFICE
KASENYI PARISH
LABONGO SUBCOUNTY
MASINDI DISTRICT
20-01-2025

RE: NO OBJECTION TO THE ESTABLISHMENT OF NATURE
BASED CANOPY IN KANIYO PABIDI FOREST RESERVE

On behalf of the Community and Leadership of Kasenyi Village, I would like to confirm their position that we have no objection to the construction of the Nature Based Canopy in Kaniyo Pabidi

as the Community we have made our opinions which we through the developer and the authority we take up during the proper implementation. in Summary,

- The Community of Kasenyi expect job during construction and after.
- N.F.A together with UWA support the Community in chasing away baboons
- Communities should be given some one day in a year to visit the nature based canopy freely as benefits
- Support our Community in terms of tourism such that they can benefit from the project.
- Based on these recommendations and other raised in the meeting we have no objection to the proposed project in Kaniyo Pabidi forest reserve.

Thanks you.

Yours in Service
Oroyo Batholomey
Chairperson LCI Kasenyi
1256-7882000





Annex 11: Photographs of the stakeholder meetings

Appendix 11(a): Consultation photographs for Ministries, Departments and Agencies



NFA



NFA



Uganda Wildlife Authority



Ministry of Water and Environment

Appendix 11 (b): Consultation photographs for Local Government



Appendix 11 (c): Consultation photograph for the Local Community Tourism Association



Appendix 11 (d) Consultation photographs for the Local Community



Kasenyi Local Community



Kigaragara local community



Annex 12: Visitor Numbers and Revenue Collections at Kaniyo Pabidi – Budongo Central Forest Reserve

Appendix 12 (a): Quarter 1(July- September 2024) summary of tourist records at Kaniyo Pabidi ecotourism site with tourist activities

(QUARTER 1)	JULY- SEPTEMBER (2024)	TOTAL GENDER		(JULY- SEPTEMBER (2024)	(JULY- SEPTEMBER (2024)
ACTIVITIES & ACCOM	TOTAL NO OF PAX	MAL E	FEMAL E	TOTAL REVENUE- USD	NFA % - USD
CHIMP TRACKING	1,472	670	802	178,605.00	89,252.50
HABITUATION	3	2	1	670.00	335.00
FILMING	0	0	0	-	-
FOREST WALK	82	21	61	1,376.84	688.42
BIRDING	19	13	6	990.00	495.00
ACCOMMODATION	0	0	0	-	-
TOTAL	1,576	706	870	181,641.84	90,770.92

Appendix 12 (b): Quarter 2(October- December2024) Summary of Tourist Records at Kaniyo Pabidi Ecotourism Site Showing Forest Activities

(QUARTER 1)	JULY- SEPTEMBER (2024)	TOTAL GENDER		(JULY- SEPTEMBER (2024)	(JULY- SEPTEMBER (2024)
ACTIVITIES & ACCOM	TOTAL NO OF PAX	MAL E	Bv FEMAL E	TOTAL REVENUE- USD	NFA % - USD
CHIMP TRACKING	776	354	422	88,445.00	44,222.50
HABITUATION	0	0	0	-	-
FILMING	0	0	0	-	-
FOREST WALK	52	28	24	1,430.00	715.00
BIRDING	6	2	4	320.00	160.00
ACCOMMODATION	0	0	0	-	-
TOTAL	834	384	450	90,195.00	45,097.50

Note: A total of \$ 45,097.50 (ugx 166,570,138.45 ONLY) to be paid to NFA for quarter two using the respective foreign exchange rates for quarter 2, 2024.

