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ENVIRONMENTAL PROJECT BRIEF FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE

ALONG WANDI – YUMBE – MOYO, ONDUPARAKA – ODRAMACHAKU – ABIRIA LINES

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LIST OF ACRONYMS

ERT	Energy for Rural Transformation
O/M	Operation and maintenance
NEMA	National Environment Management Authority
EIA	Environment Impact Assessment
ESMF	Environment Social Management Framework
MEMD	Ministry Energy and Mineral Development
MGLSD	Ministry of Gender Labour and Social Development
UNRA	Uganda National Roads Authority
REA	Rural Electrification Agency
ERA	Electricity Regulatory Authority
UETCL	Uganda Electricity Transmission Company Limited
UEDCL	Uganda Electricity Distribution Company Limited
LV	Low Voltage
KWh	Kilo watt hour
ERT	Energy for Rural Transformation
HC	Health Centre
TC	Trading Centre
IUCN	International Union for Conservation of Nature
NFA	National Forestry Authority
ESMP	Environmental and Social Management Plan
RoW	Right of Way
PPE	Personal Protective Equipment
AIDS	Acquired Immune Deficiency Syndrome
OSH	Occupational Safety and Heath
CFRs	Central Forest Reseves
NGOs	Non Government Organisations
CBOs	Community Based Organizations
PB	Project Brief
PAPs	Project Affected Persons
WB	World Bank
PID	Project Information Document
PIU	Project Implementation Unit
PCU	Project Coordination Unit
DMM	Depatment of Meuseums and Monuments
PCRs	Physical cultural resources
GHG	Green House Gases
OBA	Output Based Aid

TSS Total Suspended Solids

EXECUTIVE SUMMARY

Background

The Government of Uganda through the Ministry of Energy and Mineral Development has received funding under the World Bank to construct rural electrification projects in the rural areas of West Nile. The project areas include Arua, Yumbe, Nebbi, Koboko and Moyo Districts in Northern Uganda.

This is part of the grid extension plan by REA, targeting 22% rural electrification access, up from 7% stated in the Rural Electrification Strategic Plan, by 2022.

Increasing electricity access in the West Nile Region through construction of power lines and grid extension will have the following benefits:

- Improved delivery of social services, including health, education, telecommunication, and reduced costs of public administration
- Creation of employment during construction, and resulting from increased access to electricity, including development of agribusiness, hospitality and other industries in the region.
- Reduced carbon emissions, improved health and contributing to the national emission reduction targets and the reduced threat of climate change

The project outline

REA (REA) intends to construct up to 345.8 km of electrical power lines, in the districts of Arua, Yumbe, Koboko, Moyo, and Nebbi. The lines include:

i. **Wandi - Yumbe – Moyo Line** covering 304.3 km of medium voltage and 82 transformers, being fed from Arua- Koboko - Yumbe line at either Yumbe or Wandi;

ii. **Onduparaka – Odrmachaku – Abiria Line** covering 41.5 km of medium voltage and 16 transformers; being supplied from the Arua - Koboko - Yumbe line at Onduparaka.

Implementation of this project is supported by Credit from the World Bank/IDA for implementation of Phase III of the Energy for Rural Transformation Project (ERT III).

The construction of the electricity distribution lines will involve the following activities:

i. Erection of medium voltage line support structures, accessories and conductors
ii. Clearing of the right of way for medium voltage and low voltage lines
iii. Erection of the low voltage reticulation lines to bring supply points close to potential consumers
iv. Construction of temporary worker's camps and storage facilities for project materials during project implementation.

Requirement for Environmental Assessment

Development of Electrical Infrastructure is listed in the Third Schedule of the National Environment Act CAP 153 among projects for which environmental assessment is mandatory. The same requirement applies Electricity Act CAP 145 to power distribution projects. This project Brief is also in compliance with the World Bank Operational Policy 4.01 requiring environmental assessment (EA) of projects to ensure that they are environmentally sound and sustainable, and to improve decision making.

Undertaking an Environmental assessment and preparation of a Project Brief for the proposed development by REA is in line with national and lender requirements. This environmental impact assessment is a pre-requisite to the implementation of grid-extension lines under the ERT III project.

Objective of the Project Brief

This project Brief provides a description of the Grid extension project, presents baseline conditions in the project areas and results of stakeholder consultations and engagement, identifies project impacts and proposes mitigation measures.

Environmental assessment findings and recommendations

Sensitivities identified along the power line route include wetland systems, rivers and streams, protected areas including 4 plantation Central Forest Reserves, social infrastructure including roads, schools, health centres, settlements and businesses, including road side businesses in trading centres. Impacts on the sensitive sections of the line routes can be avoided through design given the span between the poles, and routing the line along the road reserves.

Electricity demand and load centres have also been highlighted, as well as the benefits of electrification. Stakeholder consultations and engagements have been carried out with Government Lead Agencies, and in all Districts and sub counties, and rural growth centres, and with project affected persons along the power line route.

Key impact issues arising include loss of vegetation along power line route including crops, private woodlots and trees; the need for sensitisation of affected communities on land acquisition, compensation, public safety and benefits from power line construction and operations; impacts on sensitive environments including wetlands, rivers, CFRs, wildlife and habitats; Workers occupational health, safety, welfare and behaviour; Gender issues, particularly benefits to women; environmental and social impacts management during construction and operations; and management of grievances during construction and operation. Mitigation measures hav been proposed for all these impacts.

An Environmental and social management plan has been proposed to be implemented by REA, as well as Supplemental environment and social management plans including Gievance Management Mechanism, public Consultation and Disclosure, Resettlement Framework for the ERT III Project, and Livelihood Restoration Plan. The ESMP is guided by the ERT III Environmental and Social Management Framework, and takes into account lessons learnt from ERT II implementation, including mechanisms for monitoring environmental and social compliance; Grievance management; Stakeholder engagement; and Costs for ESMP implementation.

The Contractor to be engaged by REA will have this ESMP integrated into their contract specifications, contractor environment and social action plans and provide for continual supervision of contractor for compliance with ESMP provisions. The contractor will specifically be required to have a Labour Force Management Plan and Code of Conduct for workers, and to implement a Chance Finds Procedure.

Changes may arise as details of the power line alignment, including actual locations of poles, transformmers, staging areas, accesss roads, and material source points or suppliers, or even of the contractor are finalised. Changes in some aspects of designs may as well occur, including routing of power powerlines away from forested areas. Such changes and additional risks will be addressed in monitoring reports and the relevant stakeholders updated.

REA will monitor compliance of the Contractor with the ESMP and regulatory requirements. REA or through a Supervising Consultant will follow up on environmental, social, health and safety aspects of the power line construction works, including handling of emergencies and grievances. For operations and maintainance, public safety aspects, power line protection measures and emergency preparedness will be emphasised.

The cost of ESMP implementation listed cover mainly monitoring, sensitisation, compensation, waste management, Grievance management, stakeholder engagement, security of materials and equipment, management of Labour and OHS issues, and additional studies (PCRs) estimated at USD 230, 400. Other costs will include capacity building of stakeholders to implement the ESMP estimated at USD 15,000 and the costs of environmental audit prior to line commissioning or handover estimated at USD. 30,000.

Table 0-1 presents a summary of environmental and social impacts and proposed mitigation measures.

Table 0-1: Summary of environmental and social impacts and proposed mitigation measures.

No	Impact issue	Location	Mitigation measures	Responsible entity
1	Clearance of vegetation and crops	Along the RoW Access roads to pole sites At pole sites Staging areas Gardens and woodlots	• Ensure that the RoW is restricted as much as possible to the road reserve; • Clearing of trees should be for only those that are more than 2m high within the RoW, and the tall trees and branches adjacent the power lines that are of safety concern; • Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations; • Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas; • The wetlands, rivers, streams and areas that have surface water should be protected from earth works and contamination, and poles sited away from wet sections of the lines where possible; • All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses; • Tree species listed in the IUCN Red list and seen during the surveys will be marked and avoided, wherever possible, by re-aligning the route; • Where losses of vegetation/crops are inevitable, compensation measures be instituted as per approved District Land Board rates and in line with the REA Resettlement Framework, and the Resettlement Action Plan that has been prepared alongside this Project Brief/Environmental Assessment.	District Environment Officers REA Supervising Consultant Contractor
2.	Sensitive habitats, ecosystems and wildlife	Wetlands and forested areas River banks	• At completion of clearance and installation works areas not needed for the distribution process will be restored; • NFA to be compensated for tree cleared outside the road reserves and within the CFRs; • The holes for poles in wetland areas shall be back filled using suitable gravel material in such quantities that will be just enough to stabilize the hole with no extra soil to silt the wetland;	District Environment Officers REA Supervising Consultant

No	Impact issue	Location	Mitigation measures	Responsible entity
			• Excess soils will be removed and utilized to restore disturbed sites or disposed at approved sites; • Ensure that the habitats are not disturbed by limiting the RoW within the road reserve; • Limit clearance for installation work and inspection to the necessary extent; • Remove as much vegetation as possible by hand held equipment and avoid the use of heavy machinery, especially in sloping areas and sensitive areas; • Avoid works in wet sections of the lines during the rainy season; • Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited; • Any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord should be relocated. The herptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away; • Construction workers to be sensitized no to cause harm to wildlife.	Contractor
3.	Potential bird kills from grid lines	Along the distribution line and in bird sensitive areas	• Conductors along wetlands and in protected areas will run horizontal not vertical to avoid potential collision with birds • Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters.	District Environment Officers REA
4.	Noise from construction and operation crew	Receptors in the vicinity of the proposed power transmission line routes e.g. Schools, health centres, trading centres, and residential areas.	• No night-time works will be undertaken; • Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centres; • Delivery vehicles will be prohibited from waiting near sites with their engines running; • Where appropriate, noise barriers /attenuation to be employed to ensure that the maximum noise level at 1 m distance from a single source will not	District Environment Officers REA Contractor

No	Impact issue	Location	Mitigation measures	Responsible entity
			exceed 85 dB(A); • If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and shop owners) will be informed of the timing and duration of the nuisance.	
5.	Traffic management	Along the roads in the project area.	• Employ traffic guides (flagmen) to control traffic; • Use of safety signage with labels such as "Men at Work" or "Work in Progress" or "trucks turning"; • Sensitise drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of up to 20 kph near construction sites •	REA Traffic Police Contractor
6.	Soil, water and ground water	Soils, surface waters and groundwater along distribution lines. Staging areas	• Siting of poles and transformers to avoid permanently and seasonally wet sections and water courses; • REA to ensure climate proofing of designs, to minimize impacts of extreme hydrology or climate change impacts; • The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion; • At the staging areas clearance of vegetation will be limited to only those areas where it is absolutely necessary; • If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fuelling tankers other than fuel storage on sites; • The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground; • No hazardous materials (e.g. fuel or lubricant	District Environment Officers REA Supervising Consultant Contractor

No	Impact issue	Location	Mitigation measures	Responsible entity
			drums) will be stockpiled on site; • All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line; • Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works; • Location of staging areas on steep gradients should be avoided to prevent increased erosion; • All vehicles and equipment to be serviced in designated areas, preferably at garages in urban centres along the lines.	
7.	Theft and Vandalism	Material, equipment, conductors along the distribution line Staging areas	• Sensitization of the community through radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure; • REA to work closely with local leaders, including the District Security Committee (involving the RDC, DISO, GISO, Uganda Police) and Local Councils, to address security and safety at the sites and the storage camps; • Workers to be employed on site should be vetted or obtain reference letters by their respective village LC1 chairpersons; • Contractor to engage a reputable security firm to provide security at sites, storage site, camp, staging areas, and during materials transportation; The security firms will be screened and references sought, including from the Uganda Police • All workers should be provided with identification cards to be used to access the construction sites.	REA Contractor
8	Pollution from transformer oil spillages	Transformer sites along distribution lines	• All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage; • The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation; • Damage to native grasses and low shrubs	District Environment Officers REA Contractor

No	Impact issue	Location	Mitigation measures	Responsible entity
			vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species; • Oil spill kits to be provided for during repair and maintainace of transformers; • Waste creosote or transformer oil to be handled by licenced companies in line with requirements of the National Enviroment (Waste Management) Regulations.	
9	Occupational safety and health	Staging areas along the distribution line routes	• The contractor should have in place a Health and Safety Policy and Action Plan, addressing workers occupational health and safety issues, workers welfare and working conditions in line with the Occupational Health and Safety Act of 2006, and the REA EHS Policy; • The Contractor should have HSE induction for all workers, and undertake daily tool box meetings prior to works; • Provision of PPEs (gloves, safety boots, coveralls and goggles), as well as continuous awareness on the need for use of PPEs and enforcement of usage; • Provision of First Aid Kits on site for the safety of the workers; • Ensure good housekeeping practices on site (have all equipment, materials, containers well stacked or stored) to avoid trips and falls on site; • For all chemicals used on site and in storage, Material Safety Data Sheets should be provided; • The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground; • During maintenance, switch off and fully deactivate the main power; • Use personal monitors in vulnerable areas to detect EMF; • All workers on sites whould be well trained on their tasks; • The Contractor to use poles that have been well seasoned and dried and not having dripping	District Environment Officers Health Officers REA Contractor

No	Impact issue	Location	Mitigation measures	Responsible entity
			creosote; • The poles should not be placed in water-logged areas and neither should they come in contact with public drinking water sources; • Disposal of off-cuts of poles should not be by burning but be collected and handed to a licensed hazardous waste management agent; • Wash work clothes stained with creosote separately from other household clothing; • Workers should regularly be taken through safety drills and emergency preparedness training allowing for quick and efficient responses to accidents that could result in human injury or damage to the environment; • Fence off equipment storage areas and storage sites to discourage idlers to the sites; • Keep all equipment and machinery in good working order to limit excessive fumes and noise; • The contractor to put in place a traffic management plan, and guidelines for drivers to avoid accidents; • Provide adequate sanitary facilities for workers at the construction camps and work sites.	
10	Labour issues	Workers, women and children, the host communities in the project area.	• Contractor to have in place a Labour force Management Plan, in line with the Labour Act and OHS Act. Labour Force Mangement Plan to address issues of workers welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, and a grievance management mechanism. In preparing a Labour Force Management Plan, the Contractor should take into account the World Bank Guidelines on managing the risks of adverse impacts on communities from temporary project induced labor influx All workers to have contracts; • Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement.	REA Contractor

No	Impact issue	Location	Mitigation measures	Responsible entity
11	Disruption of road side businesses.	Community road side businesses such as kiosks, shops, furniture/welding workshops, gardens and woodlots All Urban centres or rural growth centres where the line traverses.	• Adequate notification should be given to affected persons, especially road side vendors in urban centres, to enable them adjust their work with minimum interference; • Ensure that houses and structures are not impacted by passing the line through the Road Reserve; • In the event permanent structures or houses are affected, REA to compensate affected persons at markets rates approved by the CGV • Sensitize communities on dangers of electricity during construction works and maintenance; • Poles to be located away from buildings, graves or sites of cultural significance; • Contractor to ensure timely completion of works where roadside vendors are involved, including excavation, installation of poles and stringing.	REA Contractor Community Development Officers
12	Solid waste management	At the staging areas	• Avoid or minimize the generation of waste materials, as far as practicable; • Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and • Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner; • Use only waste handlers licenced by NEMA to dispose off hazardous waste. • Provide adequate sanitary facilities for workers especially at staging areas; • Provide labelled waste bins at work sites for segregation of waste into biodegradable, non-biodegradable and hazardous streams, and dispose appropriately; • Decommission the equipment storage after the project is commissioned; • Work sites, especially temporary material storage at the pole sites (sand, aggregate, cement) and concrete mixing areas to be cleaned up after works. Only required materials to be delivered	REA District Environment Officers Contractor

No	Impact issue	Location	Mitigation measures	Responsible entity
			and areas of works restricted to at most 16m²; • REA will adhere to its procurement guidelines ensuring that all their transformers conform to latest editions of appropriate EC specifications and/or other recognized International Standards.	
13	Community and workers' health including HIV/AIDS	Staging areas for workers and all Urban centres or rural growth centres where the line traverses.	• Contractor to have in place an HIV/AIDS Prevention and Management Policy, and to ensure on workers are sensitized; • Contractor to liase with District Authorities (Directorate of Medical Services) and other HIV/AIDS institutions for related services, including provision of condoms, sensitization, conselling; • Sensitize community and schools about construction hazards as well as HIV/AIDS; • Provide workers with condoms • Communities will be encouraged to report cases of illicit sexual behavior by contractor workers to REA and local authorities; • All workers to have access to medical care.	REA District Health Officers Sub County health inpectors and community development officers.
14	Potential risks due to damage to power lines	At the transformers and along the distribution lines.	• Ensure adequate protection measures for the lines and compliance of contractor with REA design guidelines; • Coordinating with switch control units to ensure power supply is turned off before start of line maintenance; • The public shall be protected against hazards of tree trimming along the roads by placing warning signs & signals; • Where there is danger that the tree may strike and damage property, the trimmers should employ block and tackle system to control the direction of fall; • All tree trimmings and branches should be cleared off the road by the crew; • Sensitize communities about the dangers of exposed high voltage live wires; • Provide prominent warning signs at all installations to warn the intending intruders from touching the lines or fixtures; • Sensitize Communities to report a sagging wire or	REA Traffic Police Contractor

No	Impact issue	Location	Mitigation measures	Responsible entity
			one that has fallen to the ground; • Maintenance personnel should be vigilant during maintenance routines; • Surge arrestors installed at each end of the power line; • Cable sizing done with a big factor of redundancy so as to operate within rating; • Watch and Monitor construction activities at cable sites; • Ensure use of conductor with larger cross sectional area which has energy loss reduction capability by design. • Routine maintenance of the RoW to be undertaken by the concessionaire, including clearance of trees within the RoW and tall trees adjacent the lines.	
15	Exposure to electromagnetic waves	Along RoW	• Sensitisation of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation •	REA ,operator
16	Physico-Cultural Resources	Along the RoW	• At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly about sites of cultural importance along the RoW; • Where cultural resources are encountered, compensation will be provided including support for relocation where applicable in a culturally acceptable manner; • Excavation of sites of known archaeological importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards; • In the event of any chance finds of significance by the contractor, following the discovery of possible PCRs; • The Contractor will be required to stop works and contact REA/MEMD to inform the Department of Museums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access; • DMM will then undertake investigations, and	REA Contractor Local leaders

No	Impact issue	Location	Mitigation measures	Responsible entity
			works will only resume once authorization is provided.	
17	Grievance Management	In all affected villages, subcounties and Dsitricts along the RoW	• Set up grievance management committees at Village, Subcounty and District Levels • Inform affected communities on the functioning of the Grievance management committee • Develp and implement a Public Consultation and Disclosure Plan	REA Contractor District Local Governments

1. INTRODUCTION

1.1 Overview and background

In 2001, Uganda undertook energy sector reforms aimed at improving performance and the reforms involved the unbundling of vertically integrated government utility Uganda Electricity Board (UEB) into three separate segments for generation, transmission and distribution. The major aim of these reforms was to improve quality of service, improve connectivity, improve reliability, reduce losses, attract private capital investment into the sector and thus enhance overall sector efficiency.

Rural electrification is one of the main pillars of the power sector reform strategy and program in the Ministry of Energy and Mineral Development (MEMD). Much of Uganda's rural population remains isolated and has not yet received or seen the benefits of liberalization of the economy. This is partly due to inadequate physical infrastructure and therefore, lack of integration with national, regional, and international markets. In order to achieve rural transformation in the country, it is necessary to develop those sectors that will add value where it is needed.

Government of Uganda through the Ministry of Energy and Mineral Development has received funding under the World Bank to construct rural electrification projects in the rural areas of West Nile. The project area is located in Arua, Yumbe, Nebbi, Koboko and Moyo Districts in Northern Uganda.

1.2 Brief project outline

REA (REA) intends to construct up to 345.8 km of electrical power lines, in the districts of Arua, Yumbe, Koboko, Moyo, and Nebbi. The lines include:

iii. **Wandi - Yumbe – Moyo Line** covering 304.3 km of medium voltage and 82 transformers, being fed from Arua- Koboko - Yumbe line at either Yumbe or Wandi;

iv. **Onduparaka – Odrmachaku – Abiria Line** covering 41.5 km of medium voltage and 16 transformers; being supplied from the Arua - Koboko - Yumbe line at Onduparaka.

Implementation of this project is supported by Credit from the World Bank/IDA for implementation of Phase III of the Energy for Rural Transformation Project (ERT III). This is part of the grid extension plan by REA, targeting 22% rural electrification access, up from the current 5% by 2022.

The construction of the electricity distribution lines will involve the following activities:

v. Erection of medium voltage line support structures, accessories and conductors
vi. Clearing of the right of way for medium voltage and low voltage lines

vii. Erection of the low voltage reticulation lines to bring supply points close to potential consumers
viii. Construction of temporary worker's camps and storage facilities for project materials during project implementation.

1.3 Requirement for a Project Brief

Development of Electrical Infrastructure is listed in the Third Schedule of the National Environment Act CAP 153 among projects for which environmental assessment is mandatory. The Electricity Act CAP 145 under Section 29(2) (f) and Section 33(1) (g) require that any entity desirous of securing a license to establish a project for which a licence is required under this Act (in this case a distribution licence) provides reports of studies undertaken to assess impact of the project on electricity supply, socioeconomics, cultural heritage, environment, natural resources and wildlife.

In addition, the Electricity Act CAP 145 under sections 67 to 71 also requires a distributor of electricity to address issues related to land use, land acquisition, compensation, and to minimize impacts on land and the environment.

The World Bank Operational Policy 4.01 requires environmental assessment (EA) of projects proposed for Bank financing to be undertaken to help ensure that they are environmentally sound and sustainable, and to improve decision making.

Undertaking an Environmental and social impact assessment, and preparation of a Project Brief for the proposed development by REA is in line with national and lender requirements. A project Brief has been prepred considering that the project impacts are readiliy identified and can be avoided or mitigated. This Project Brief is a pre-requisite to the implementation of grid-extension lines under the ERT III project. This Project Brief (PB) is based on project description provided by REA, and the findings of the detailed surveys and stakeholder consultations conducted by the study team.

1.4 Purpose of the Project brief

Section 19 (1) of the National Environment Act, Cap 153 requires developers of projects that may, or are likely to have impacts on the environment to submit a project brief to NEMA (the Authority) in the prescribed form and giving the prescribed information.

The purpose of this project brief therefore, is to provide necessary information on the proposed activity to guide the Authority and the Lead Agencies in decision making and ensure that the project is implemented in an environmentally sound manner consistent with environmental regulations. This project brief also proposes mitigation measures to potential impacts that have been identified which are likely to accrue from the implementation of the rural erectrification projects in West Nile.

1.5 Objectives of the project brief

The study objectives are:

a) To establish the baseline environmental and social conditions in the project area relevant to the project
b) To obtain the views, concerns and suggestions of the relevant key stakeholders (including potentially affected persons) regarding the environmental and social impacts of the project
c) To identify the potential environmental and social impacts, and make recommendation for their mitigation or enhancement, and monitoring
d) To prepare an environmental and social management plan for the project, indicating potential impacts, sources, management options, monitoring indicators, effects and monitoring agencies and budget

1.6 Developer and contact details

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1.7 Structure of the project brief

Table 1-1: Structure of the project brief

Chapter 1	Introduction to the project and the report
Chapter 2	Outline description of the Project
Chapter 3	Provides baseline environmental and social conditions in project area
Chapter 4	Review of National Policy, Legal, Regulatory and institutional framework, and the World Bank Safeguard Policies
Chapter 5	Environmental and Social Impact Assessment Methodology
Chapter 6	Stakeholder consultations and engagement
Chapter 7	Project alternatives
Chapter 8	Impacts Assessment and Mitigation
Chapter 9	Environmental and Social Management and Monitoring Plan
Chapter 10	Conclusion and recommendations
	References
	Appendices

2 PROJECT DESCRIPTION

2.1 General overview of power transmission

The electric power transmission system is often referred to as a grid. Redundant paths and lines are provided so that power can be routed from any generation facility to any customer area through a variety of routes, based on the economics of the transmission path and the cost of power. The redundant paths and lines also allow power flow to be rerouted during planned maintenance and outages due to weather or accidents.

2.2 Project location

The districts of Arua, Yumbe, Koboko, Nebbi and Moyo, are the beneficiaries of the rural erectrification projects in West Nile and the power distribution routes include;

Wandi - Yumbe – Moyo Line covering 304.3 km of medium voltage and 82 transformers, being fed from Arua- Koboko - Yumbe line at either Yumbe or Wandi;

Onduparaka – Odramachaku – Abiria Line covering 41.5 km of medium voltage and 16 transformers; being supplied from the **Arua - Koboko - Yumbe line** at Onduparaka.

This is part of the grid extension plan by REA, targeting 22% rural electrification access, up from the current 5% by 2022. The project will involve installation and operation of grid-extension lines of approximately 345.8 km under the ERT III project.

Figures 2.1, 2.2, 2.3 and 2.4 show the proposed power lines and landuse in the districts of Arua, Yumbe, Moyo and Koboko.

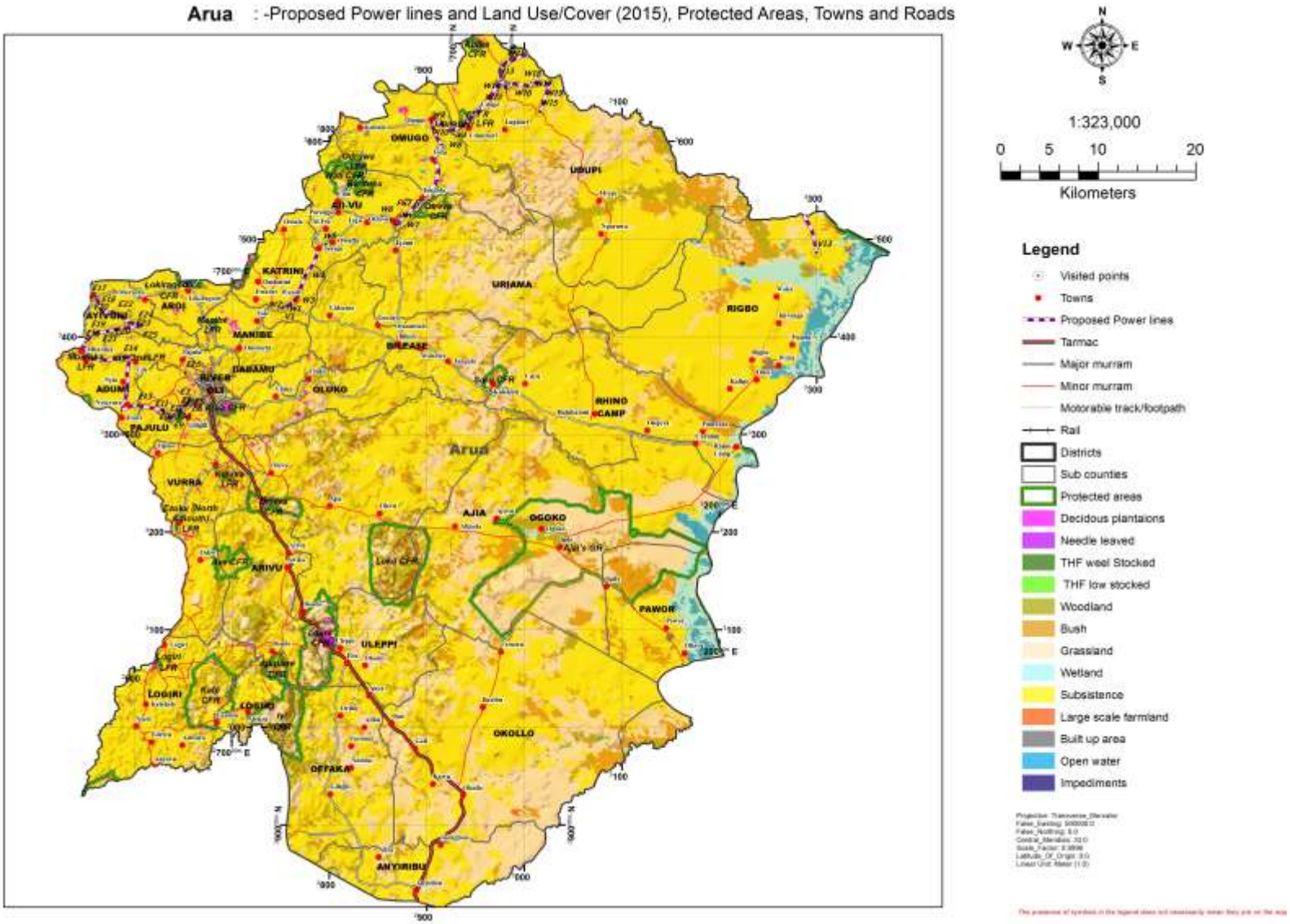

Figure 2-1: Proposed Power lines and land use in Arua District

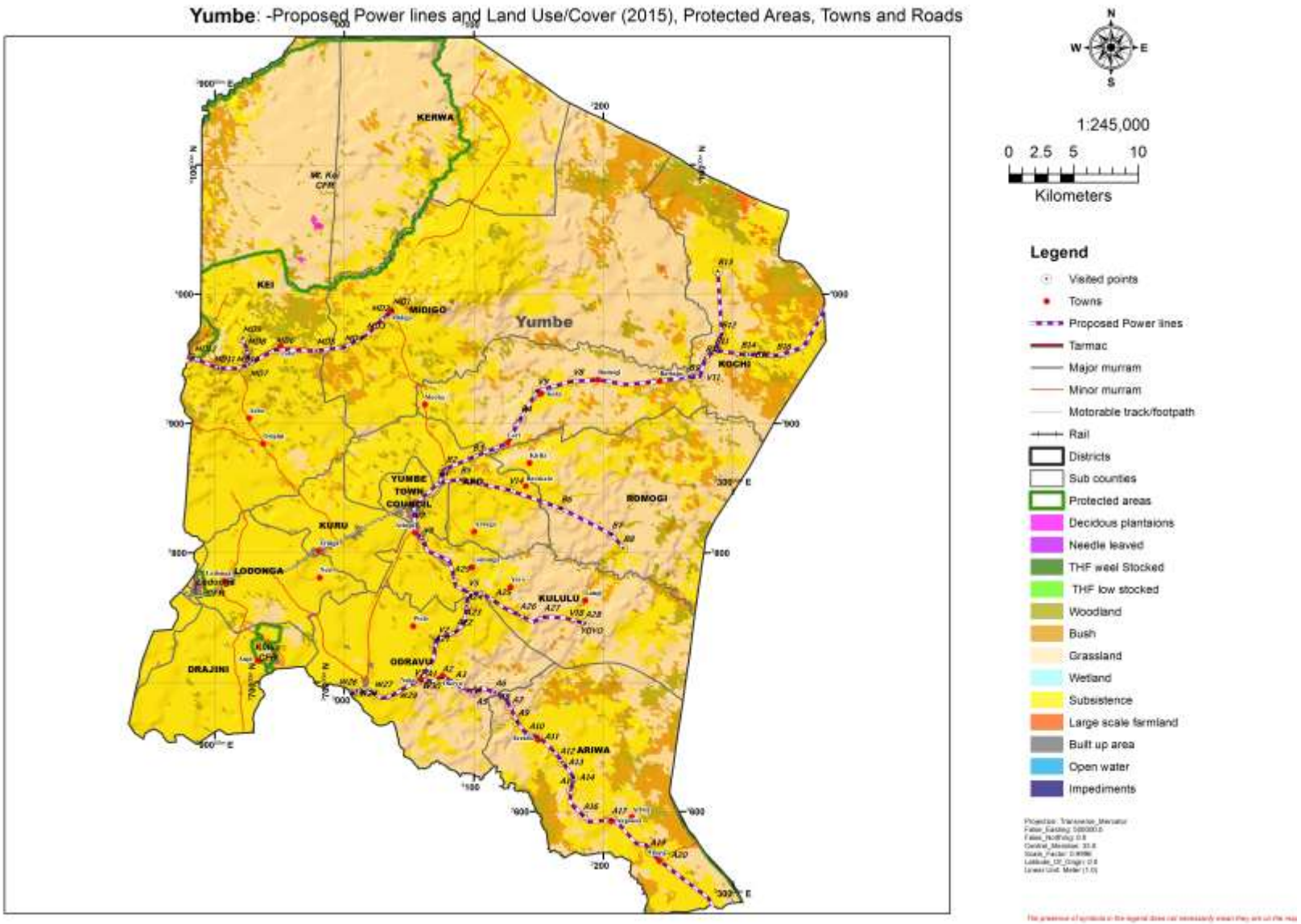

Figure 2-2: Proposed Power lines and land use in Yumbe District

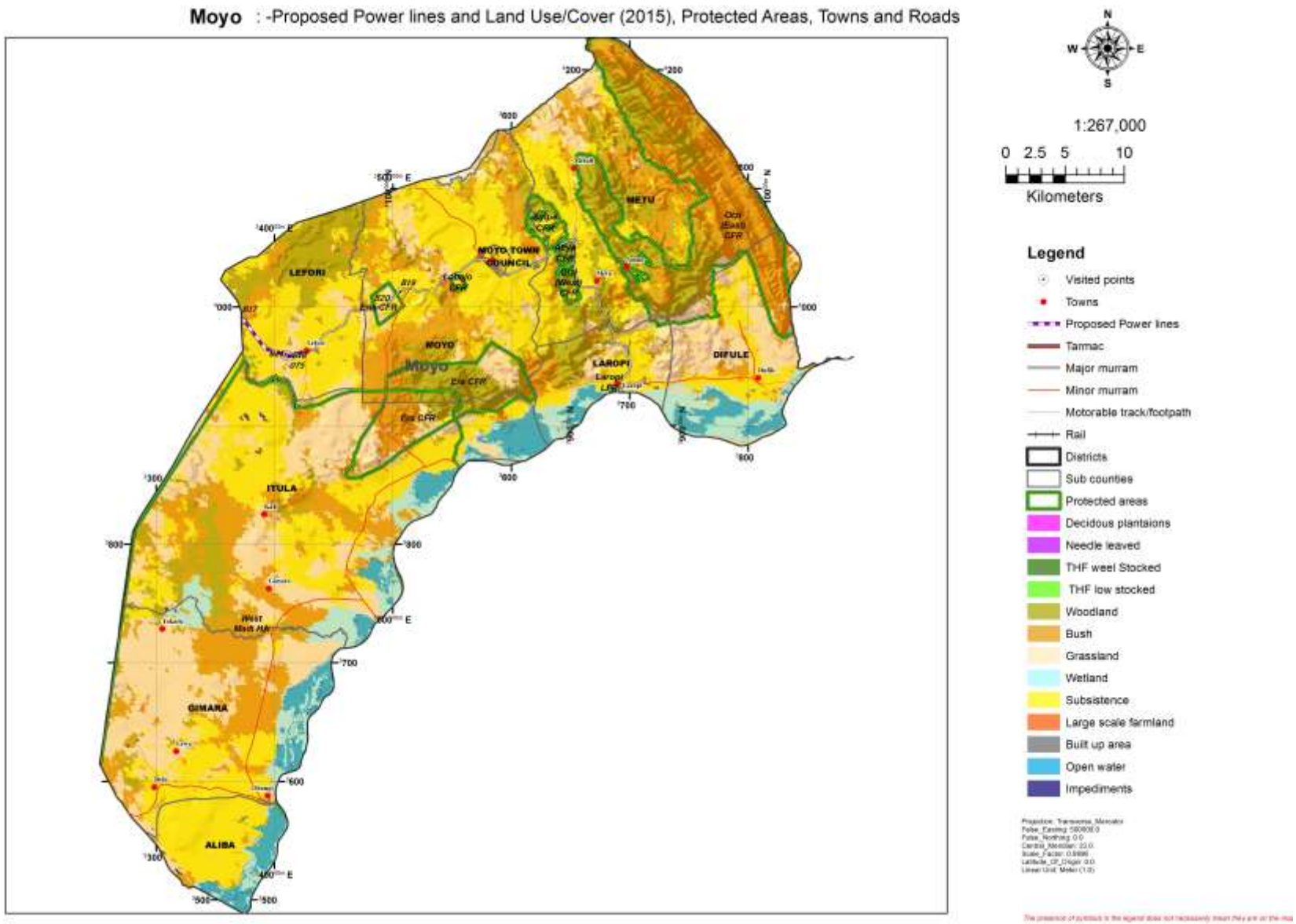

Figure 2-3: Proposed Power lines and land use in Moyo District

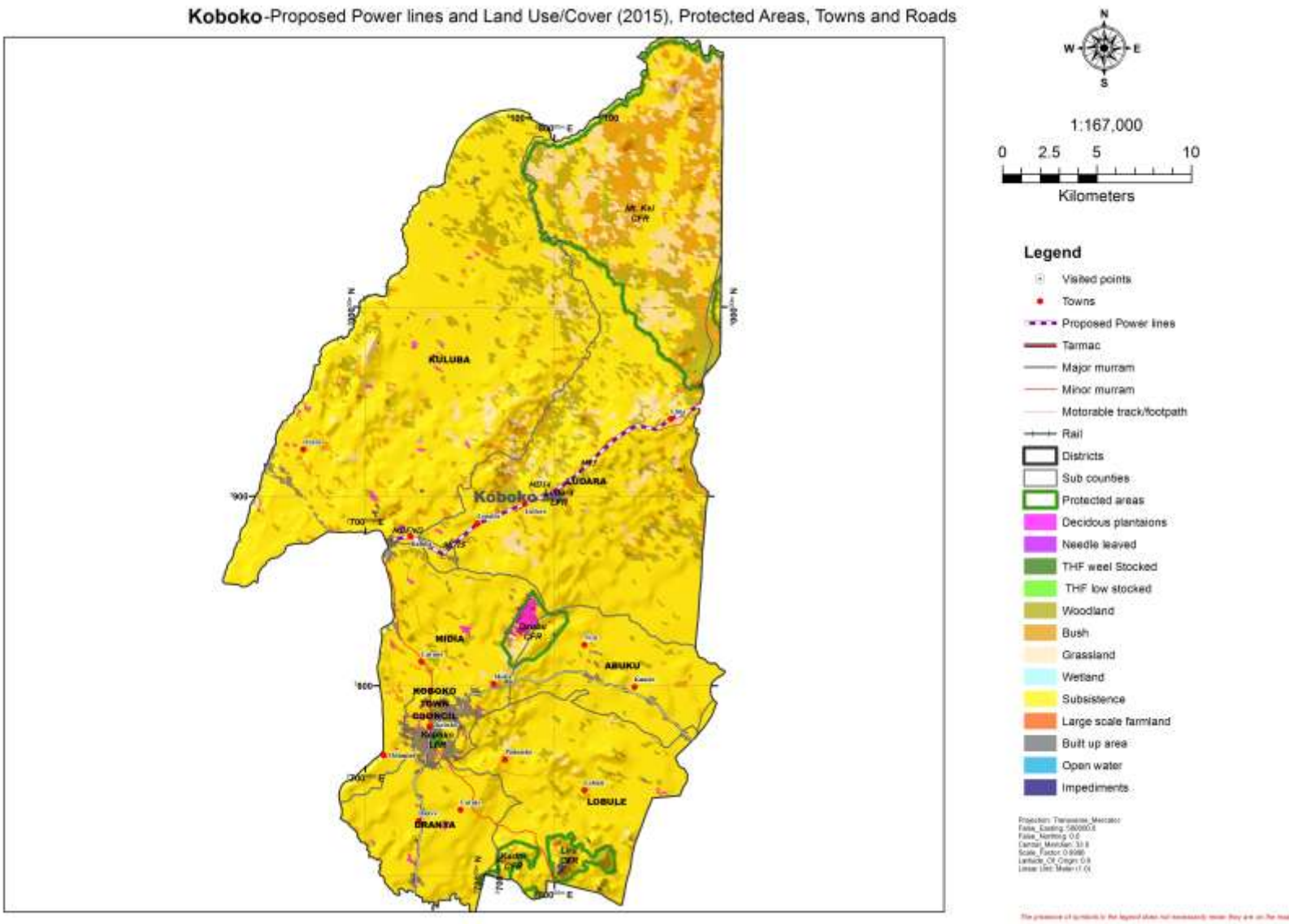

Figure 2.4: Proposed Power lines and land use in Koboko District

2.3 Target of ERT III project

The broad-based Energy for Rural Transformation (ERT) project phase III specifically targets rural households who have still not connected 18 months or more after their area has been electrified under earlier projects including the ERT II. The ERT III like the ERT I and II projects addresses the issue of low access to electricity in rural areas by making connection accessible and affordable.

It is expected that with OBA subsidy more customers in the West Nile Region along the poposed lines will be connected as the up-front payment of connection costs will be dealt with, however the average consumption rate and growth will be lower since some of the customers brought on board will be in the low consumption category.

2.4 Project objective

The ERT III project is aimed at increasing access to energy in rural areas of Uganda that is expected to facilitate improvement in the productivity of enterprises and the quality of life of the households. The main project development objective is to increase rural access to electricity. The other objectives will be to increase the use of renewable energy and promote energy efficiency. These objectives will be achieved by shifting the focus to rapid growth in investments so as to reach the Government's long-term targets for rural electrification and renewable energy development while consolidating the outcomes of ERT I and II activities.

2.5 ERT III project areas

ERT III will be implemented in the areas which are summarized on regional basis under Table 2-1 below.

Table 2-1: Proposed Regional Areas for ERT III Extension

No.	Region	Extent (Km)
1.	West Nile	345.8
2.	Eastern	307.00
3.	Central	303.7
4.	Southern	125.00
5.	South Western	80.00
6.	Rwenzori Region	54.00
7.	Central North	214.00
8.	Mid-Western	176.7
9.	North Western	221.5
	Total (Kms)	**1,828**

(Source: Draft ERT III Project Summary, REA 2013)

2.6 Project components and activities

Under ERT III activities will be dedicated to general rural energy infrastructure including grid systems expansion and intensification and on-grid connections amongst others. The REA project in West Nile encompasses the following components:

2.6.1 Design Stage

The design stage will involve detailed surveys to locate the center lines of the power distribution lines. Topographic information will be required.

The power line route is expected to mainly follow the road reserves. However in some cases, mature trees, hilly areas, wetlands and water courses, structures, as well as forest reserves will be avoided. In undertaking these activities the district authorities and local leaders will be informed, and the local communities where the line traverses sensitised.

The centre lines of the power line route will be pegged out, as well as the pole locations, taking into account environmental and social sensitivities along the route. Soil investigations will as well be undertaken to guide required reinforcements especially at pole locations.

2.6.2 Construction Stage

2.6.3 Materials and Specifications for construction

The 33 kV distribution lines will be constructed using 12m high wooden poles, which are mostly creosote treated, with average spacing of 100m. The foundation for the wooden poles will consist of 0.35m diameter and 2.0m depth. In wetland areas, the pole foundations will be compacted using gravel material ferried as a backfill. Steel wire (7/4.00) stay sets will be installed at angels, T-off and terminal structures and anchored by a stay block buried 2.0m depth. The stay blocks will consist of a 1m long creosote treated woodblock or 0.3m x 0.3m x 0.3m concrete block. H-type section poles erected 2m from each other will be installed every 1.5km together with four stay sets installed along the line corridor. At heavy angles, the stay wire will be installed at 45° angles from the pole.

For the Low Voltage (LV) at selected centers, the pole height will be 9m with average span of 50m. The foundation for the LV pole consists of 0.2m diameter and 1.6 m depth. Steel wire (7/2.64) stay sets will be installed at angles, T-off and terminal structures and anchored by a stay block buried 1.6m depth. The stay block will consist of 1m long creosote treated woodblock or 0.3m x 0.3m x 0.3m concrete block. Some aterials such as wooden poles will be obtained locally.

2.6.4 Route alignment and Pole installation

A 10m corridor will be cleared of vegetation for the entire route. Vegetation along the corridor will be cleared and any other tall trees within falling distance of the line will also be cut. Pole locations will be staked and the line profile drawings prepared. Holes to receive wooden poles will be dug to depths between 1.5-2m. Most of the excavation works will be done manually. Pneumatic hammers

will only be used where hard rock will be encountered. However, in waterlogged areas and at small river crossings, bucket excavators will be used.

2.6.5 Pole Framing, Erection and Installation of Stay wires

Wooden poles will be drilled and hardware installed and the erection of poles will be done manually. The poles will be plumbed using ropes attached to their tops and insulator support steelworks fixed. Steel wire stay sets will be installed at angles, T-off and terminal structures will be anchored by a stay block. Conductor configurations using either line post insulators or suspension insulators will be installed. The distribution system will be energized at 33 kV, and is designed as a three wire, grounded wire system, with earth return. The single-phase distribution system will use single wire earth return (SWER) design and construction, tapping one phase off the main line. The poles will be treated wood, imported or sourced from local treatment plants, and of the eucalyptus variety. The poles usually will be 10m tall for tangent structures, with 9m above ground and 1.5m below, and an average of 100 to 120 meters apart on the line segments where "Rabbit"conductor is employed and 100 to 105 meters apart for those line segments where "Dog" conductor is employed. 12m poles will be used where slight angles are required in line construction while 14m poles will be used at vertical corners. 9m poles will be used for all secondary lift poles. 2.4m galvanized steel cross-arms with cross-arm braces and polymer pin-type insulators will be used on tangent structures.

2.6.6 Conductor stringing

The majority of the lines will be built with 100mm^2 Aluminum Conductor Steel Reinforced (ACSR) conductors, with a rated current carrying capacity of 300 amps. Some smaller lines and minor taps will be with 50mm^2 conductor, with a rated capacity of 200 amps. Stringing will be done using conventional methods and thereafter, between support structures, the wires will be pulled and tensioned on the guyed structures using pull lifts.

2.6.7 Transformers installation

In addition to gas detection, oil temperature, winding temperature, pressure release and oil level relay devices, transformers shall be equipped with current differential protection and restricted earth fault on two or more windings where applicable as main protection. As back-up protection, transformers shall have non-directional over-current protection and restricted earth fault on all windings.

2.6.8 Service drops

The residential service drops will be between 15 and 30m in length with a maximum length of 40 meters, and will mostly be of 16mm^2 copper duplex. All kWh meters will be socket-based type to help prevent meter tampering. Service drops to larger, industrial type customers will use larger conductors, such as 50mm^2 or 25mm^2, as needed, but will always be of covered multiplex type conductors.

2.6.9 Line hardware

The framing of the structures and the specification of the actual hardware (bolts, insulators, etc.) will follow the REA specifications. These specifications have proven to be not only adequate but the economic use of materials for rural electric systems in all cases in which they have been employed.

Moreover, these same structures have been used in rural electric cooperatives in the United States for more than 65 years with remarkable durability and have proven to be safe both for consumers as well as utility personnel assigned to construct and maintain them.

2.6.10 Post Construction Clean up

After completion of construction works, batching areas, stockpile sites and the temporary camps or material storage sites will be restored. The use of cement will be negligible, with mail local earth material used.

2.6.11 Operation and Maintenance

The operation of the 33kV lines will be fully automated. The system will be equipped with several devices such as auto reclosers to turn off power when a fault occurs on the line like in a rainy storm, tree branches falling on the line or whenever a certain pole collapses. The auto reclosers therefore, protect the line from damage and make it safer to the users. The transformers will also be equipped with surge arresters and fused isolators to protect them from voltage surges that may occur during lightning of switching in the system.

Maintenance of the line will be done routinely every year or as deemed necessary by the system operator. The activities will include line clearance along the Right of Way; repair damaged structures, conductors and cracked or broken insulators. The maintenance will also include selective tree trimming depending on their growth rate and weeding around poles for a radius of 1 meter to protect them from bush fires. Where invasive species ae encountered, their removal and destruction to avoid proliferation will be considered. The use of herbicides will be avoided.

Emergency maintenance will also be carried out including technical breakdown done whenever there is a fault on the line or after severe wind/rain storm. This will be done to replace damaged poles and to determine if conductors, insulators or poles have been damaged.

2.6.12 Decommissioning

It is anticipated that the distribution line facilities will be continuously maintained and repaired, and will be operated for a number of years. Because of their long useable life the circumstances under which, they might be decommissioned are not likely to be foreseen at this stage as such, a general decommissioning approach is considered in this Project Brief.

The process of decommissioning will involve the deconstruction of distribution lines in a reverse order from their construction, using similar equipment and techniques. The conductors and shield wires will then be lowered to the ground, and all cables would be spooled and removed from the right-of-way for salvage. The poles will then be dismantled and removed from the right-of-way for salvage. It is further proposed that, the contractor undertakes to decommission the site by:

a) Relocating all un-used equipment to their central stores outside the site preferably to other sites where the contractor could be doing similar projects;
b) Any equipment that has gone into waste should be treated as waste and disposed of in appropriate through best acceptable international practices;
c) Demolishing any additional structures that could have been constructed/installed by the contractor. The site should be leveled and any additional structures may be left onsite after securing a written request to do so from the landlord;
d) Dispose of all the generated waste in accordance with the waste management plan and waste management regulations;
e) Clean up the site; and
f) Handover the site to the Landlord and demobilize/withdraw all personnel that had been posted to the yard including the security personnel. Handover acknowledgement should be written/ documented.

2.7 Distribution line and network capacity

The line lengths for West Nile Service Territory project were determined and a summary of the Medium Voltage and the Low Voltage line lengths to be installed is provided in Table 2-2 below:

Table 2-2: Summary of the MV and LV line lengths

Line	MV(km)	3 phase LV route length (m)	1-phase LV route length (m)	Transformers (Nos)
Wandi- Yumbe- Moyo Line	304.30	52,003	84,131	82
Onduparaka-Odramachaku-Abiria Line	41.50	9,785	21,325	16
Project Summary	**345.80**	**61,788**	**105,436**	**98**

2.8 Project justification

Load centers

One hundred and fifty nine load centers were identified along the project line and in each of the identified load centers, the potential number of consumers per category was established as shown in in Appendix 8. Overall it was established that there was potential electricity demand in the project area with the following being the main uses: lighting, radio, ironing, television, fridges, welding by artisans and mechanics, and for the business community agro-processing featured very highly.

2.9 Line diagrams for the distribution network

Single line drawings for the proposed distribution network are presented in the figures 2.5 and 2.6.

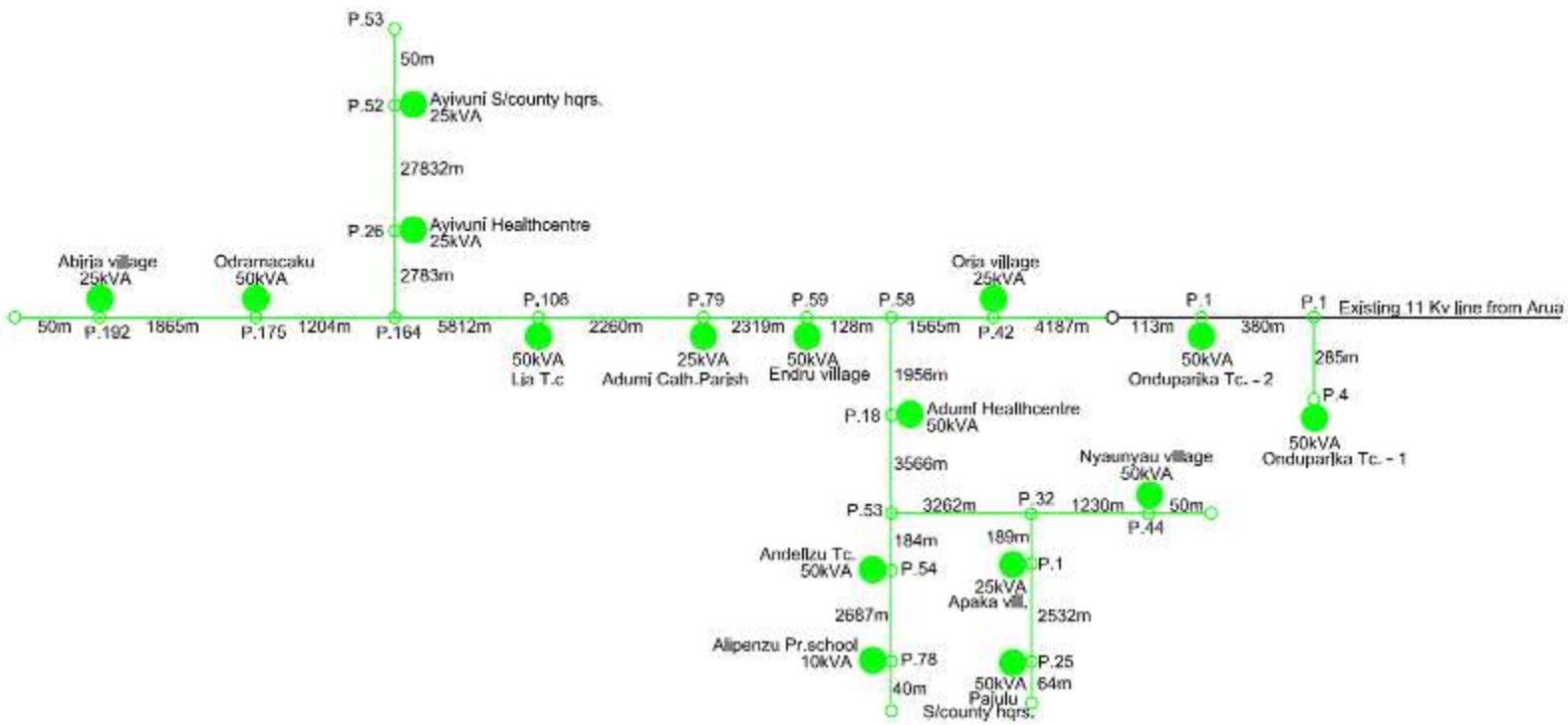

Figure 2-5: Onduparaka – Odramachaku – Abiria Line

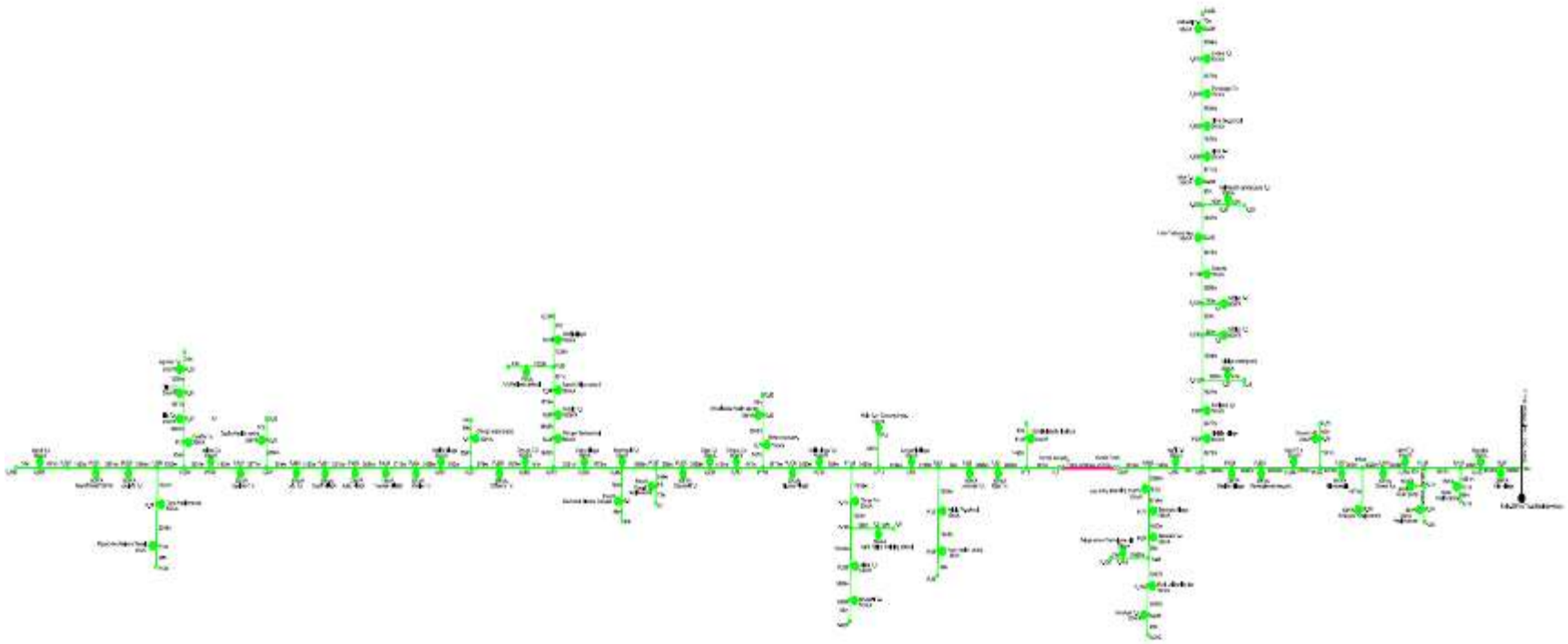

Figure 2-5: Wandi- Yumbe- Moyo Line

2.10 Description of the distribution line routes

2.10.1 Onduparaka – Odramachaku – Abiria Line

This line covers a total distance of 41.5 km and will be of medium voltage with 16 transformers. It will start from an existing 11Kv line that runs from Arua and will then stretch along the road for a distance of 6.2 Km up to Olia village where it will branch to Alipenzu primary school for a distance of 2.2Km. Along this stretch there will be two other T-offs that will stop at Nyaunyau village and Pajulu Sub County headquarters located around UTM coordinates 36 N 0263317 N0331851.

From Olia village the line will stretch for a distance of 10.5 Km to Lia trading centre located around coordinates 36N 0255108 0337829 where there will be another T-off that will stop at Aiivuni Health Centre II and Ayivuni Sub County headquarters located at coordinates 36N0260551 0341578. Along this particular route there is a residential area and gardens of food crops such as cassava, maize and ground nuts. There is also Kawa stream associated with a seasonal wetland in Mbaraka village around coordinates 36N0258047 0341058 followed by Fwe primary school around coordinates 36N0260054 0341629 and a bushy area up to Ayivuni Subcounty headquarters. Figure 2-6 below shows the main features along this T-off.

Residential houses and gardens of food crops

Kawa stream and the the associated wetland

Figure 2-6: Features along the T-off to Ayivuni Sub County headquarters

From Lia trading centre the line will stretch for a distance of 3.1Km through Odramachaku trading Centre located around coordinates 36N 0255512 0344183 to Abilia village. Along this route there are eucalyptus woodlots and a telecommunication mast operated by Eaton towers on the right hand side of the road to Odramachaku trading Centre.

Eucalyptus woodlot after Lia TC

Mast for Eaton Towers along the route

Figure 2-7: Features around Lia Town

2.10.2 Wandi- Yumbe- Moyo Line

This 33Kv line will start from Wandi trading centre in Arua district with T-offs that provide supply to load centers that include Ogua, Agurwa, Ogofia, Omugo Water Pump Station, Oboji, Okuabni, Yoyo, Locongo and Umbechi.

Along this route there are trading centres, rivers, forest reserves, schools and health centres. From Wandi Trading Centre the line will traverse Oninia primary school located around coordinates 36N0276505 0344067 and eucalyptus woodlots around coordinates 36N 0277256 0346018.

Eucalyptus woodlot along the route

Oninia primary school

Figure 2-8: Features after the Wandi Town

The line will also traverse Owaffa primary school located around UTM coordinates 36N0278372 0347677. The line will then traverse some thick vegetation in Baria village that covers a distance of

about 400m and then to Leju trading centre located around coordinates 36N0285764 0352472. The line will cross another eucalyptus woodlot and a garden of tobacco located around coordinates 36N0287787 0352738 in Jilla village. The line will then go through Goup trading centre after which it will cross Inawa river located around coordinates 36N0291469 0359941. From this point, the line will follow the road to Yumbe and traverse Omugo Sub County headquarters, Omugo water supply pump and Omugo trading Centre which are some of the load centres along the power transmission line route.

The power transmission line will then cross Oru river around coordinates 36N0292717 0361472 in Azapi village, then through Otumbari trading centre. After this point the line will cross Ivetre seasonal river, Otumbari trading centre where Otumbari forest reserve is located and Ozurugo River located around coordinates 36N0294415 0363894 in Ebia village.

River Oru

Otumbari Central Forest Reserve

Figure 2-9: Sensitive environments along Wandi – Yumbe – Moyo line

After crossing Ozuru River, the line will traverse Okpotanic trading centre where it will have a T-off at around coordinates 36N0297525 0366485 to Lugbari primary school in Upper Oja village. The line will then have another T-Off to supply Abiribani trading centre and other residential areas in Amia village.

River Ora is also along this route around coordinates 36N0300360 0369334 in Luluwere village with dense thickets on either side of the bridge which separates Arua and Yumbe districts. From this point the line will traverse Odravu trading centre, River Racha (at ccordinates 36N0306849 0372118), Kuninga trading centre and Odravuprimary school.

There will be a T-off from Noko trading center to Okubani trading centre in Ariwa Sub County. Along this T-off there is a residential area and an extensive woodland in Odranga village which is privately owned and it strecthes for a distance of about 4Km. From that stretch, the line will supply Okuyo trading centre, Ombechi trading centre, Kalunga trading centre, and Okubani trading centre where this T-off will stop.

Okuyo trading centre

Extensive woodland in Odranga village

Figure 2-10: Features around Okuyo trading centre

From Noko trading centre the line will pass through Wolo trading centre then cross Jure River at around coordinates 36N0308569 0374254 , Lmonga trading centre, Yoyo trading centre up to Geya primary school in Ujji village where this stretch will stop.

There will be another line from Yumbe traversing Kerila trading centre with T-offs that will supply power to Barakala and Iyete trading centres. The line will also cross River Kochi in Nabbala village at around coordinates 36N 0326505 0393904 and then to Kochi trading centre where a T-off to Goboro trading centre will be tapped.

From Kochi trading centre, the power transmission line will follow Yumbe-Moyo road, cross Yii stream at 36N 0341193 0396174, Nyawa River in Gboro-Gboro-chu village, then Lefori trading centre and finally cross a fotest reserve located around coordinates 36N0349879 0401020 IN Eria village where the line to Moyo will stop.

Barakara trading Centre

Kochi River

Kochi trading Centre

Lefori trading Centre

Figure 2-12: Possible load centres along Wandi – Yumbe – Moyo line

2.10.3 Yumbe/Midigo - Koboko Line

This line will start from an existing 33Kv line in Olaba trading Centre, Koboko district to supply the trading centres along Yumbe -Koboko road and will stop in Midigo trading Centre, Yumbe district. The line will traverse Umbechi, Alendure Ujipaku and Lima trading centres all located in Ludara Sub County. Along this route there is Mt Kei Central Forest Reserve located around UTM coordinates 36N 0288281 0395399 in Lile village, Kei Sub county, Yumbe district. From this point the line will cross Urunga primary school up to Lube trading centre where there will be a T-off that will cross Tulu river at 36N 0292425 0395929.

From Lobe trading centre, the line will traverse several residential areas including Oyakwa trading Centre up to Midigo trading Centre in Yumbe district where it will stop.

Mt Kei Forest Reserve

Lima Trading Centre

Figure 2-13: Features along Yumbe – Midigo line

3 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

3.1 Ecology and Biodiversity

The uncountable goods and services that we obtain from natural ecosystems is a strong justification for the conservation of biological diversity. However, infrastructural developments, industrialization as well as generation and distribution of electricity are significant drivers of change of quantity and quality of this diversity (Tisdel, 2005). Conservation of environment and biological resources is frequently required so as to maximize human welfare and to avoid adverse outcomes due to their loss. The decrease in biodiversity particularly natural habitats and vegetation cover leads to reduction in ecosystem functioning and services which is in turn accompanied by loss of goods and services (Dobson *et al.* 2006).

As part of baseline studies, the environmental assessment team undertook biological surveys along the proposed power distribution line route, and focused on the ecologically fragile areas traversed by the power line route, including wetlands, forest reserves, sensitive ecology and other protected areas. For all the taxonomic groups surveyed a literature review was conducted to compile all available secondary data that can be accessed. The Biological environment surveys covered five broad taxa (Plants, mammals, birds, invertebrates, Herpertiles – (Reptiles & Amphibians)). These taxa were covered considering they are easy to study, assess and record and a good amount of information on the conservation status can be easily found.
The biological stuidies thus aimed at:

i. Collection of baseline data on the flora and fauna of the area, providing a species occurrence list, spatial occurrence and an indication of relative abundance of different species in the different taxa
ii. Identification and description of sensitive habitats and species, including conservation status as per IUCN listing and national protection status
iii. Identification and description of all species including those of commercial importance, as well as invasive species
iv. Indicator species for future monitoring, and frequency of monitoring
v. For birds, to list any migratory species and any concerns related to the line that could be a barrier to migration.

A total of 26 plots were surveyed for Onduparaka-Odramachaku-Abiria line of which seven were within rivers or streams. Another 82 plots were surveyed for Wandi-Yumbe-Moyo line out of which 14 were within rivers, streams or swamps and three within forest reserves. Along the Midigo-Ludara T-Kei line 15 plots were surveyed and one of these was in a stream and one in a forest reserve.
The biological survey report is presented in Appendix 1.

3.1.1 General vegetation description

Arua

The natural vegetation of Arua District used to be characterized of open lands with equatorial type of savanna grasslands, with small pockets of natural forests on hills, especially along the northern parts of the district.

The original vegetation of Arua district was composed of mixed woody savanna, which has greatly been reduced by subsistence farming that currently occupies about 80% of the total land area.
Forests are an important part of the vegetation of Arua District. This is again divided into low and high altitude forests. But in Arua district the predominant type is the high altitude forests. The former are mainly found along valleys.

The Savanna by far is the predominant vegetation in the district. The vegetation is *Butyrosparmum – hyparrhemia* savanna. It is characterized by such trees *as Isobulinia doka, Danieh cliveer* and *Afzeha africana.*

In the central parts of Arua, the vegetation consists mainly of *butyropernum-Hyparrhenia Savana with dry hyparrhemia grass savanna.* Post-cultivation communities of *Imperata-Panicum-Hyparrhenia and Hyparrhenia-Peridium* are found on the lower ground. Palm savanna is found to the northeast. Also present are dry *combretum-Acacia-Heteropogan* and *Butyrospermum-Hyparrhenia savana.*

Yumbe

Yumbe district vegetation is divided into;
Forests; this type is again divided into low and high altitude forests. But in Yumbe, the predominant type is the high altitude forest. The former is mainly found along valleys. The high altitude forests are found on hilly places where climatic conditions are favorable for their development. It consists of natural forest on Mt. Kei in the northeastern part of the district. Associated grass species found in the forests are *Hyparrhenia rufa, Panicum maximum* and Klipspriner (on Mt. Kei only). Further information is needed on the vegetation.

Savannah; this is by far the predominant vegetation in the district. The vegetation is *Butyrospermum-Hyparrhenia* Savannah, the nearest relative in Uganda to the Miambo woodland of Tanzania. It is characterized by such trees as *Isoberlinia doka, Daniehcliveri* and *Afzelia africana.*

In the central parts of the district, the vegetation mainly consists of *Butyrospermum-Hyparrhenia* Savannah with dry Hyparrhenia grass Savannah and also Palm Savannah. Also present are dry *Combretum acaccia-Heteropogon* and *Butyrospermum-Hyparrhenia* Savannah.

Koboko

The predominant vegetation in Koboko District is savannah woodland with bushy forest cover found in the northern part of the District in the sub counties of Kuluba and Ludara and at the sides

of Liru Mountains in Lobule. Midia Sub-county is generally flat and covered with bush shrubs. The bushy forests in the northern part of the District mainly comprise of natural trees with few forests comprising of planted trees. The hills in the east have fertile soils around them that has led to people migrating to settle along the hill foots and slopes.

Moyo

The total forest cover of Moyo district is 1,304.7 Km^2 (130,470 ha), comprised of woodlands (54%), bush lands (3%) and grasslands (43%). The district has 28,365Ha of Central Forest Reserve, 20.0Ha of Local Forest Reserve and about 100.0Ha of Private Forests and 156,933Ha of community/public land forests. 55% of the forests have been lost undoubtedly, because the forests are the only sources of all building materials (98% of the dwelling units are not permanent houses) and 99% of the households depend on wood fuel for their domestic energy needs.

Although the hills in the sub-counties of Metu and Itula are covered by forests, the major vegetation cover in the district is savannah woodland with isolated thorn shrubs found near streams and rivers. Otze Central Forest Reserve in Metu has rich bio-diversity with high potential for eco-tourism.

3.1.2 Results of the flora assessment

A flora assessment was undertaken by the ESIA Biodiversity team along the proposed distribution line with the following objectives:

i) To characterize the vegetation types in the project area and identify key habitats
ii) assess the current status of the vegetation and key habitats
iii) provide a preliminary indication of habitats and species that are likely to be affected by the project

The assessment was conducted along major roads since it is through the road reserves that the proposed electricity distribution lines will pass. Vegetation, flora and key habitats were assessed within established rectangular survey plots of 50x100 m area established at irregular intervals along each section of the road where the transmission line is proposed to pass. At each survey plot careful observation of the vegetation and dominant plant species present was done.

Habitat or ecosystem sensitivity was assessed on account of presence of taxa that are IUCN Red listed as Critically Endangered (CR), Endangered (EN) or Vulnerable (VU); endemic and near-endemic taxa; as well as rare taxa (MUIENR, 1998; WCS, 2016).

3.1.2.1 Onduparaka-Odramachaku-Abiria line

Vegetation along this line was categorized as Plantation (mainly of *Eucalyptus* sp, and *Tectona grandis*), Riverine or streamline vegetation, Open grasslands and Fallows. The line traverses through four rivers Ega, Kawa, Olika and Seva and three streams Esia, Krukrue and another which had no name according to the inhabitants.

- The floral communities on the rivers and streams were dominated by *Echinochloa pyramidalis*, *Cyperus dives*, *Leersia hexandra*, *Kyllinga bulbosa*, *Fimbristylis* sp, *Mimosa pigra* and *Setaria sphacelata* wetlands. The banks for majority streams were either under cultivation with food crops or plantations (mainly *Pinus* sp)
- Grass lands were dominated by *Sporobolus pyramidalis, Setaria sphacelata and Eragrostis* sp.
- Thickets were dominated by *Chromolaena odorata, Lantana camara, Hyptis suaveolens* and *Imperata cylindrica*. Along this line majority bush lands, thickets and bushed thickets were in fallows. Only two riverine bush lands were encountered one on river Ega and the other on river Esia.

Sensitive habitats and species

From a conservation point of view, the habitats along the Onduparaka-Odramachaku-Abiria line are of low ecological sensitivity. Most of the natural habitats were of Grassland vegetation type with few large trees that may be affected by the transmission line.

Two globally threatened species were recorded, i.e. *Tamarindus indica* and *Vitellaria paradoxa,* both of which are assessed as Vulnerable by IUCN are some of the common species along the Onduparaka-Odramachaku-Abiria line.

Eucalyptus sp Plantation on either side of the road in Pajule

Fallow dominated by *Chromolaena odorata*, *Imperata cylindrica* and *Lantana camara*

Riverine bush land on river Ega dominated by *Echinochloa pyramidalis* and *Cyperus dives*

Open grassland dominated by *Setaria sphacelata* and *Sporobolus pyramidalis*

Figure 3-1: Vegetation types along Panduru-Lia-Adumi transmission line

3.1.2.2 Wandi-Yumbe-Moyo line

The vegetation along Wandi-Yumbe-Moyo line was categorized as Woodlands, Open grass lands, thickets (dense and light), plantations, fallows, and riverine and stream line vegetation types (Figure 3-2). A summary of the vegetation is provided in Table 3-1 and a detailed flora report in appendix 1. In general the vegetation is described as:

- Woodlands were dominated by *Acacia sieberiana, Acacia hockii, Philenoptera laxiflora, Combretum adenogonium, Grewia mollis, Bridelia scleroneura, Balanites aegyptiaca, Tamarindus indica, Grewia trichocarpa, Piliostigma thonningii* and *Terminalia glaucescens*.
- Thickets were dominated by *Maytenus senegalensis, Harrisonia abyssinica, Flueggea virosa, Acacia senegal, Tylosema fassoglensis, Acacia hockii, Bridelia scleroneura* and *Chromolaena odorata*.

Woodlands and thickets dominate sections of the Wandi-Yumbe-Moyo line from Noko to Ariwa, Barakala to Lyete and Locongo, Kochi to Gobolo and Kochi to Eria Central Forest Reserve.

- Open grasslands were dominated by *Setaria sphacelata, Sporobolus pyramidalis, Imperata cylindrica, Hypertheria dissoluta, Eragrostis sp and Cynodon dactylon*.
- Riverine and streamline vegetation types were dominated by *Echinochloa pyramidalis, Cyperus dives, Hyperthelia dissoluta, Phragmitis mauritianum, Mimosa pigra* and *Cynodon dactylon*.
- Fallows were dominated by *Chromolaena odorata, Lantana camara, Imperata cylindrica, Hyptis suaveolens*, *Acalypha* sp. and *Solanum incanum*.
- Plantations were dominated by *Eucalyptus* sp. and *Tectona grandis*.

Sensitive habitats and species

This line traverses natural vegetation types of Bushland, Thicket and Woodland as well as the Eria Central Forest Reserve. This reserve is presently dominated by *Tectona* and *Grevillea* and *Eucalyptus* plantations. The natural habitats are predominantly *Combretum-Terminalia Acacia* woodland. These natural and exotic plantation habitats have large trees that may be affected by the transmission line. An estimated 1 km length of sections with large trees were observed. Of these, c.400 m are under *Eucalyptus*, *Grevillea*, *Tectona* while another c.600 m are under natural woodland of *Combretum-Terminalia-Vitellaria-Acacia*. Two globally threatened species were recorded on this line, i.e. *Tamarindus indica* and *Vitellaria paradoxa,* both of which are assessed as Vulnerable by IUCN. These species are some of the common species along the Wandi-Yumbe-Moyo transmission line.

Woodland dominated by *Combretum* spp, *Terminalia glaucescens* and *Acacia hockii*

Thickets dominated by *Acacia Spp*, *Harrisonia abyssinica* and *Grewia mollis*

River Inawa dominated by *Phragmites mauritianum, Mimosa pigra* and *Cyperus dives* at 36N 0291469 0359941

Mixed thick vegetation in Aiivu Sub-county

Figure 3-2: Vegetation types along Wandi-Yumbe-Moyo line

3.1.2.3 Midigo-Ludara, T-Kei line

Vegetation along Midigo-Ludara T-Kei line was categorized as open grassland, plantations, fallows and woodlands which dominate the largest section of this line (Figure 3.3).

- Open grasslands were dominated by *Imperata cylindrica*, *Pennisetum polystachion* and *Setaria sphacelata*.
- Plantations were dominated by *Eucalyptus sp* and *Tectonia grandis*.
- Fallows were dominated by *Panicum maximum, Echinochloa colona, Sorghum arundinacium*, *Chromolaena odorata*, *Lantana camara* and *Hyptis suaveolens*.
- Woodlands were dominated by *Acacia hockii*, *Bridelia scleroneura, Combretum adenogonium, Kigelia Africana, Piliostigma thonningii, Borassus aethiopum, Vitellaria paradoxa* and *Azadiranchta indica.*

Sensitive habitats and species

This line traverses natural vegetation types dominated by woodland and marginally affects the Mt. Kei Central Forest Reserve to the south. This reserve is presently dominated by *Tectona* and *Eucalyptus* plantations. The natural habitats are predominantly *Combretum-Vitellaria* woodland. The length that may be traversed by the transmission line is estimated at 200 m and this is mainly under trees of *Tectoca* and *Eucalyptus*. Another c.500 m is under natural woodland of *Combretum, Vitellari*, *Acacia* and *Albizia*. Just like along the earlier lines, two globally threatened species were recorded, i.e. *Tamarindus indica* and *Vitellaria paradoxa,* both of which are assessed as Vulnerable by IUCN. These species are some of the dominant species along the Midigo-Ludara T-Kei line.

Section of Mt Kei Forest Reserve dominated by *Tectona grandis*

Section of Mt Kei forest reserve dominated by *Eucalyptus* sp.

Figure 3-3: Vegetation types along the Midigo-Ludara-Kei line

Over all for the whole proposed line, from a commercial point of view, the exotic *Eucalyptus, Tectona* plantations will have to be cut for passage of the transmission line and this will attract compensation for the owners.

There are many rivers, streams, woodlands and bushed thickets that form natural habitats particularly for Onduparaka-Odramachaku-Abiria and Wandi-Yumbe-Moyo transmission lines. Three Central Forest Reserves including Otrevu, Utumbari and Eria located on Wandi-Yumbe-Moyo transmission line and one (Mt Kei Central Forest reserve) on Midigo-Ludara T-off Kei transmission line exist as plantations of *Eucalyptus sp* and *Tectona grandis*, these together with other sensitive habitats are worth avoiding or protecting during installation, where possible.

3.1.3 Fauna

Fauna in West Nile

The region has Mt Kei forest conservation area which used to be known as Mt.Kei White Rhino sanctuary, but has been redesigned (the Mt. Kei wildlife sanctuary). The White Rhinos have become extinct from this sanctuary. The area once supported a significant population of white rhinos, elephants and buffalo. Derby eland were also seen in small numbers. Today, all these species are extinct in the area. However, the area still supports a small population of Klipspringer (on Mt. Kei), reed bucks, bush pigs, baboons etc (Yumbe District Local Government, 2014).

A survey of Mt. Kei indicated the importance of this protected area for the conservation of trees and shrubs, particularly of species associated with Butyrospermum savannas, a rare species that has not been found in any other forest in Uganda.

Other wildlife species found especially in wetland areas, forests, along river banks include among others Sitatunga, water buck hippopotamus and birds, are hunted for their meat, skins, horns or feathers; while other animals produce resources that are gathered e.g. honey from bees, eggs and feathers from birds.

Results of the fauna assessment

3.1.3.1 Herpetiles

Herpetofauna consists of Amphibians and Reptiles. Amphibians are a class of vertebrates, comprising of frogs, toads, caecilians, newts and salamanders (Young, 1981). Reptiles are a class of vertebrates, comprising of turtles and tortoises, lizards, chameleons, skinks including limb-less skinks, geckoes, crocodiles, monitors and all types of serpents commonly known as snakes (Foster, 1994; Young, 1981).

Ecologically, amphibians are predators, acting as primary and secondary carnivores. Their prey consists mostly of insects, some of which are pests of crops or disease vectors. Amphibians are therefore important ecological components of both wetlands and dry land. Among vertebrates they are distinctive in many ways. A thin, moist, highly permeable skin; jellied, unshelled eggs; possession of aquatic and terrestrial life histories; restricted home range; and limited dispersal abilities of many species make amphibians effective bio-monitors. For biological assessments, they are especially promising because of their capability of linking wetlands with surrounding landscapes (upland habitats) (U.S. EPA. 2002).

The overall objective of the assessment was to conduct a study on the herpetofauna (amphibians and reptiles) in the project areas where the proposed distribution lines will pass. It also involved evaluating the potential impacts of erecting the proposed distribution networks on the herpetofauna.

The study was conducted in 89 sampling sites established along the three proposed distribution transmission lines and these included 19 sites on Onduparaka-Odramachaku-Abirira line, 57 sites on Wandi-Yumbe-Moyo distribution line, and 13 sites on Midigo-Ludara-T-off Kei distribution line.
To maximize results the sampling sites were chosen and located in different habitats. The habitats include seasonal wetlands, Rivers, ponds along the roads, savanna/woodlands and Forest Reserves.
Four sampling methods were employed, namely; 1) visual encounter surveys (VES), 2) dip-netting, 3) acoustic /call Surveys, as well as 4) local consultations and literature review.

Amphibians

Four amphibian species were recorded during the study areas (Table 3.2). Three of the species recorded are wetland specialists namely; Common reed frog, Eastern groove crowned bullfrog, and the Draft puddle frog (Figure 3-4). No forest specialists were encountered.

Table 3-1: Amphibian Fauna Encountered in the Project Area

Family Name	Common Name	Scientific Name	IUCN Conservation Status	Total Number of Individuals Encountered
Hyperoliidae	Common Reed Frog	*Hyperolius viridiflavus viridiflavus*	Least Concern (LC)	1
Ranidae	Mascarene Rocket Frog	*Ptychadena mascareniensis*	Least Concern (LC)	43
	Eastern Groove - Crowned bullfrog	*Hoplobatrachus occipitalis*	Least Concern (LC)	16
	Draft Puddle Frog	Phrynobatrachus mababiensis	Least Concern (LC)	4

Common Reed Frog encountered in the project area

Crowned Bull Frog encountered at one of the rivers

Figure 3-4: Some of the amphibians encountered

Reptiles

Four reptilian species were recorded present in the study area (Table 3-2, Figure 3-5). Of special interest is the Nile Monitor recorded along Wandi-Yumbe-Moyo distribution line. The species is of social economic importance in most parts of the Country.

Table 3-2: Reptilian Fauna Encountered in the Project Area

Family Name	Common Name	Scientific Name	IUCN Conservation Status	Total Number of Individuals Encountered
Scincidae	Speckle-lipped skink	*Mabuya maculilabris*	Least Concern (LC)	23
Scincidae	Rainbow Skink	Mabuya margaritifer	Least Concern (LC)	36
Agamidae	Red-headed agama	*Agama agama*	Least Concern (LC)	55
Varanidae	Nile Monitor	*Varanus niloticus*	Widespread and common; Listed under CITES	1

Red Headed Agama basking; it is a common sight in the project area

Rainbow Skink basking; it is a common sight in the project area

Figure 3-5: Some of the reptiles encountered in the project area

No species of conservation concern under IUCN Red List Category were recorded. Among the reptiles recorded, the Nile Monitor *Varanus niloticus* is listed under CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora but it, remains common and widely distributed in Uganda and other countries. No species of conservation concern were encountered or recorded.

3.1.3.2 Butterflies

A survey of butterflies along the proposed line was taken in order to;

i. Assess the diversity of butterflies
ii. Provide recommendations with regard to impacts likely to emanate from the installation activities of the electricity transmission systems.

Butterflies were studied within established rectangular survey plots of 50x100m area at irregular intervals along each section of the road where the transmission line is proposed to pass. Sampling was done by walking through the survey plots at a slow and even pace of (~1km/h) for 10 minutes. Each Butterfly seen within a virtual 5 m observation cube projected ahead of the observer was counted and representative species collected (Pellet, 2007). Butterflies were identified and recorded from the field and those that couldn't be easily identified were carried in paper envelopes to Makerere University Museum for identification.

Species richness

A total of 28 butterfly species from 89 individuals encountered were recorded for all the transmission lines (full list in the biodiversity report, Appendix 1).

All species of butterflies that were encountered were assigned to ecotypes. The criterion used to distribute butterflies into ecotypes was obtained from Davenport et al (1996) and Kronstad (2009). In this criterion species were given letters ("F"), ("f"), ("O"), ("W"), ("M"), ("S") and ("U") according to whether they are forest specialists, forest edge, open habitat, wide spread, migratory, swamp specialist and butterflies of unknown habitat preference respectively. The red list category was indicated for each species. The categories were obtained from most recent IUCN red lists' data and WCS (2016) list of threatened species in Uganda.

Six ecological types (Table 3-3) were represented in the data set that was dominated by butterflies that prefer open habitats, followed by the wide spread species and then migratory while swamp and forest specialist had the least number of species.

Table 3-3: Number of species and percentage composition of each ecotype of butterflies along the proposed line

Ecotype	No of species	Percentage composition
S	1	3.5
O	8	28.6
W	7	25
M	6	21
F	4	14.3
F	2	7.6

Key S-Swamp, O-Open Habitat, W-Wide spread, M-Migratory, f-Forest edge and F-Forest specialist

The type of vegetation of the project area attracts very few butterfly species. Three species are labelled least concern but their survival depends on conservation of suitable habitats. It could as well be true that many of the species that are not yet assessed for inclusion on the IUCN red list are endangered and thus in need of conservation. This demands precautions for protection of this little biodiversity within the area.

3.1.3.3 Birds

Bird surveys were carried out along the proposed route to document bird species present in the area in the context of conservation importance, identify potential adverse impacts to the species and their habitats and propose mitigation and monitoring strategies.

The birds were surveyed through line transect counts. This involved moving along a predetermined route and recording birds on either side of the observer. Most terrestrial ecosystems were heavily degraded, and thus areas of focus included the interface between wet (riparian and marsh areas) and the dry terrestrial systems.

Overall the survey across all sections of the proposed project area 70 species were recorded (see Appendix 1 for a full list in the biodiversity report). Of these 36 were recorded along the Odramachaku – Onduparaka – Abiria (O-O- A) line, 57 along the Midigo – Ludara – T off Kei (M-L-T) line and 70 along the Wandi – Yumbe – Moyo (W-Y-M) line (Table 4.1, Appendix III). Seven of the species were Afro tropical migrants, with *Milvus migrans* having at least some Palearctic populations.

Table 3-4: Summary of species recorded across different habitat specializations, migratory and conservation status along the different sections of the project area.

Line		O-O-A	W-Y-M	M-L-T
Habitat Specialization	FF - Forest specialist	0	1	3
	F - Forest generalist	2	9	4
	f - Forest Visitor	14	18	16
	W - Wetland specialist	0	6	2
	w - Wetland associate	9	10	6
	G - Grassland specialist	6	11	6
	Ae - Aerial feeder	1	2	2
Migratory status	P - Palearctic migrant	0	0	0
	p - Species with at least some Palearctic populations	1	1	0
	A – Afro tropical Migrant	4	7	3
Conservation status	LC - Least Concern			
	EN - Endangered			

Key: (O – O – A - Onduparaka – Odramachaku – Abiria, W – Y – M- Wande – Yumbe – Moyo and M – L – T - Midigo – Ludara – T off Kei).

Table 3-5: Migratory species, their conservation status and project area sections of encounter

Atlas No.	Species	Conservation status	Migratory Status	O-O-A	W-Y-M	M-L-T
30	AFRICAN OPEN-BILLED STORK *Anastomus lamelligerus*	LC	A	x	x	
75	BLACK KITE *Milvus migrans*	LC	p,A	x	x	
309	RED-CHESTED CUCKOO *Cuculus solitarius*	LC	A		x	x
373	GREY-HEADED KINGFISHER *Halcyon leucocephala*	LC	A	x	x	
375	WOODLAND KINGFISHER *Halcyon senegalensis*	LC	A		x	
395	NORTHERN CARMINE BEE-EATER	LC	A		**x**	x

	Merops nubicus					
401	BROAD-BILLED ROLLER *Eurystomus glaucurus*	LC	A	x	x	x

Key: LC- Least Concern, p - Species with at least some Palearctic populations and A – Afro tropical Migrant).

Of the recorded species, only one (i.e. *Balearica regulorum*) is listed as Endangered (EN) on the IUCN Red List of Threatened Species. The rest are recorded as Least Concern (LC). This species adopts a generalist feeding strategy which makes it highly adaptable and has allowed it to persist in human modified habitats. The most significant threat to its survival is habitat loss and fragmentation with destruction of nesting sites which occur in wetlands.

The several rivers flowing through the project area provide refuge to bird communities as a natural habitat surrounded by highly disturbed terrestrial ecosystems. Most of the birds recorded in the area were encountered close to the riparian areas. The rivers have three major impacts on the avifauna, i.e.

- They provide the only readily accessible source of water in rather unfavorable surroundings. Without them, the general area would otherwise support fewer species at low densities
- They attract several species found only in areas with reliable supply of water such as the Pigmy and Pied Kingfishers, Grey Crowned Crane, Grey Heron etc.
- They create a moist microenvironment which supports production of food (in such forms as plant, invertebrates, fish etc.) not available in surrounding eucalyptus plantations. This gives them great importance as food hubs

3.1.4 Ecosystem services

As far as flora and fauna is concerned, the project does not raise any threatening conservation issues. The area is largely human settlements, planted forest reserves, cultivated and disturbed areas with no critical habitats. Environmentally sound implementation should reduce environmental impact of the project by adhering to proposed mitigation measures.

The habitats in the area are represented by low successional vegetation types which develop in areas of relatively high human influence. Such vegetation types result when human modified systems supplant natural ecosystems and undergo continuous cycles of burning, clearing, cultivation, grazing followed by regrowth. These types do not provide stable and suitable habitats for fauna. The riparian habitats are dominated by smallholder agricultural farms majorly dominated by cassava, tobacco and eucalyptus. The large stretches of natural woodlands are under pressure from charcoal burning.

The cultivated areas provide food sources for birds and other biodiversity; here they are often perceived as pests, whereas eucalyptus plantations are poor habitats for birds and vertebrate wildlife in general. The several rivers flowing through the project area provide refuge to bird communities as a natural habitat surrounded by highly disturbed terrestrial ecosystems. Plantations also provide nesting and roosting space for birds and other biodiversity.

3.2 Climate

3.2.1 Rainfall

West Nile region (which covers districts including Arua, Yumbe, Koboko and Moyo among others) receives a bi-modal rainfall pattern with average total rainfall of 1250-1267mm. The area experiences two seasonal rainfall periods, light rains between April and October. The wettest months are usually July-November with >120mm/month. The period December-March is dry with less than 60mm/month. The rain is associated with the northern and southern movements of the inter-tropical front. The prevailing wind is from the east to the west with frequent windstorms during the dry season. Mean monthly evaporation ranges from 130mm-180mm. Areas along the Nile receive lesser rain (860mm) than the rest of the region (Arua, Yumbe, Moyo, Koboko Local Governments).

Table 3-6: Monthly Rainfall Totals (mm) for 2013

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	No. of rain days
7.9	17.3	110.3	126.0	75.6	115.6	298.2	284.2	153.4	195.5	151.4	31.4	126

Source: Department of Meteorology-Arua station (2013)

3.2.2 Temperature

Data and information from the project area District Development Plans (DDPs) indicate that in the dry season (December -March) temperatures remain high (above 45^0 C) in most parts of the region. While during the wet season especially in July-November, temperatures only fall up to 29^0C.

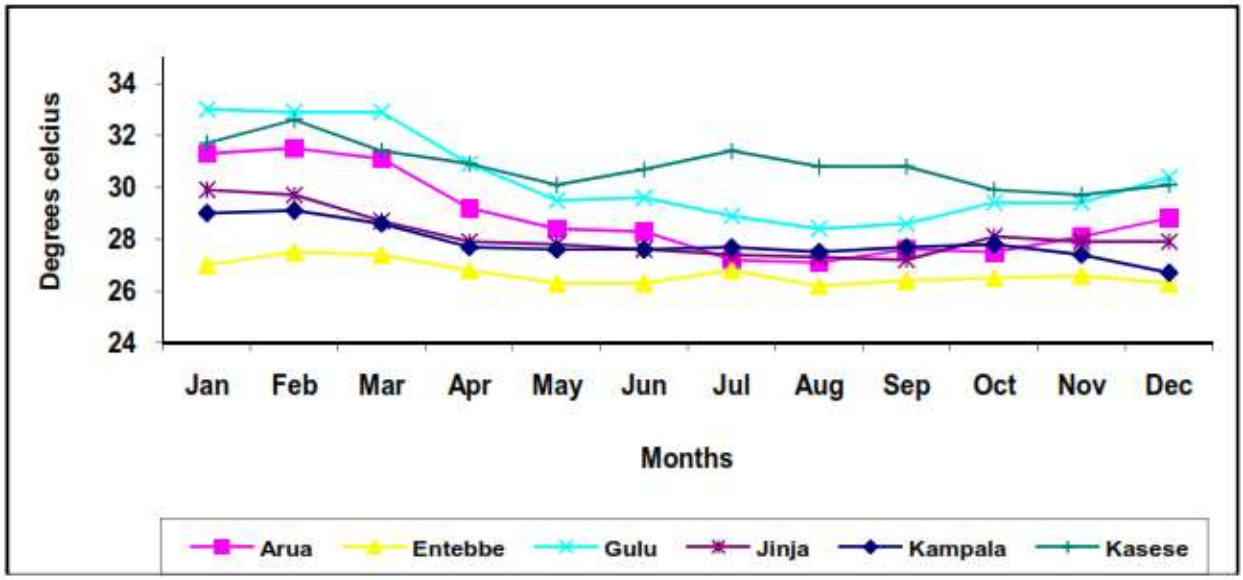

Figure 3-6: Long term mean maximum temperature for selected towns in the years 2009-2013

(*Source UBOS, 2013*)

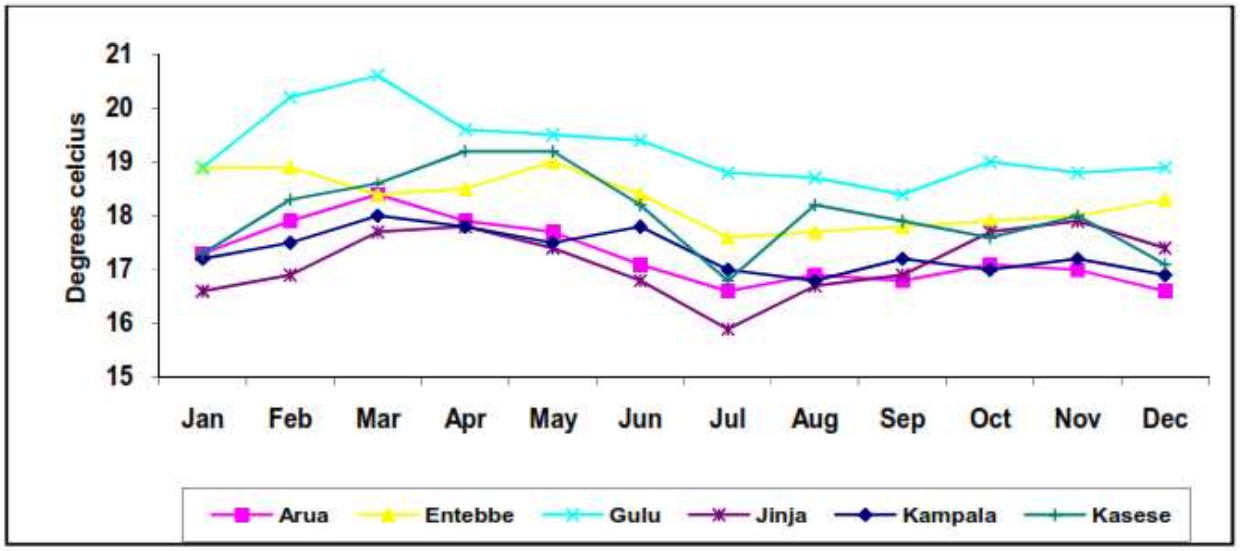

Figure 3-7: Long term mean minimum temperature for selected towns in the years-2009-2013
(Source UBOS, 2013)

3.3 Air quality

The proposed power lines will not be a source of air emissions as a result of its operations. The only emissions sources will be minor in regard to vehicle emissions due to movements to and from the proposed route. The project activities for the power transmission line installation will significantly contribute to the imbalances of air quality in areas that will be traversed by the power transmission lines. Therefore air quality measurements were taken at sensitive receptors in the vicinity of the power transmission line routes which include; schools, churches, health centers; residential areas and trading centers among others.

Baseline air quality was established through undertaking air quality measurements during a survey of the route. Particulate matter measurements were undertaken using CEM DT-9881M particle counter device.

The main air pollutants of concern that are likely to arise due to the proposed development are the particulate emissions. Fine particulate matter can penetrate deep into the lungs and research in recent years has strengthened the evidence that both short-term and long-term exposure to $PM_{2.5}$ are linked with a range of health outcomes including (but not restricted to) respiratory and cardiovascular effects. Research also shows a range of health effects (including respiratory and cardiovascular illness and mortality) associated with PM_{10}. No threshold has been identified below which no adverse health effects occur. (Source: WHO AQG 2000).

The project activities such as earthworks, construction material haulage (electric poles), and vehicle movements on unpaved roads will generate dust and depreciate the air quality along the power

transmission line routes. Dust emissions may hamper visibility, cause inconvenience to the local community, cause respiratory illnesses (e.g. silicosis and asthmatic attacks) and eye infections.

Table 3-7: Ugandan Air Quality Standards for particulate emissions

Emission	Averaging period	Ugandan Air Quality Standards for Ambient Air
Particulate matter (PM_{10})	1 year	60 μg/m^3
	24 hour	100 μg/m^3
Particulate matter ($PM_{2.5}$)	1 year	40 μg/m^3
	24 hour	60 μg/m^3

Table 3-8: WHO Air quality guidelines for particulate matter: 24hr concentrations

	PM_{10} (μg/m^3)	$PM_{2.5}$ (μg/m^3)	Basis for the selected level
Air Quality Guideline (AQG)	50	25	Based on the relationship between 24- hour and annual PM levels.

Table 3-9: Results for air quality measurements

No.	Coordinates (UTM, Arc 1960)	Location	$PM_{0.3}$ (µg/m³)	$PM_{0.5}$ (µg/m³)	$PM_{1.0}$ (µg/m³)	$PM_{2.5}$ (µg/m³)	$PM_{5.0}$ (µg/m³)	PM_{10} (µg/m³)	RH (%)	AT (°C)	Notes
(Onduparaka – Odramacaku – Abiria) line											
1.	E 0265921 N0333823	Media Centre, Arua Diocese, Adiofe Parish, Pajulu Sub County, Arua district.	1	1	4	4	9	15	69.7	26.0	Particulates were due to dust from the road.
2.	E 0265832 N0333844	St Mary's Ediofe Senior Secondary School, Adiofe Parish, Pajulu Sub County, Arua district.	0	0	2	3	6	12	68.8	26.5	Particulates were due to dust blown by wind.
3.	E 0266098 N0333525	Ediofe Health Centre III, Adiofe Parish, Pajulu Sub County, Arua district.	1	1	3	5	9	18	62.9	27.7	Particulates were due to dust from the road.
4.	E 0264844 N0333074	Residential area, Aiivu village, Komite Parish, Pajulu Sub County, Arua district.	1	1	3	5	22	27	57.9	29.7	Particulates were due to dust from the road.
5.	E 0264735 N0332879	Ombeteni trading Centre, Aiivu village, Komite Parish, Pajulu Sub County, Arua district.	1	2	5	8	17	65	64.3	27.9	Particulates were due to dust from the road.
6.	E 0263658 N0332007	Okwamane trading Centre, Odrudrumbuti village, Olubo Parish, Pajulu Sub County, Arua district.	1	1	3	5	17	28	58.3	29.4	Particulates were due to dust blown by wind.
7.	E 0263317 N0331851	Pajulu Health Centre III, Waiva village, Orugbo Parish, Pajulu Sub County, Arua district	1	1	4	6	15	40	54.5	31.1	Particulates were due to dust blown by wind.
8.	E 0258717 N0332778	Andreza trading Centre, Acacia village, Nyonva Parish, Adomi Sub County, Arua district.	2	3	6	12	46	125	48.1	32.1	Particulates were due to dust from Andreza road.
9.	E 0259106	Adumi health Centre IV, Ombaki	1	1	3	8	18	22	48.0	31.8	Particulates were due

No.	Coordinates (UTM, Arc 1960)	Location	$PM_{0.3}$ ($\mu g/m^3$)	$PM_{0.5}$ ($\mu g/m^3$)	$PM_{1.0}$ ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	$PM_{5.0}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	RH (%)	AT (^{O}C)	Notes
	N0336404	village, Ombaki Parish, Adomi Sub County, Arua district.									to dust from the road.
10.	E 0256745 N0337770	Adumi Nursery and Primary School, Ombaki village, Ombaki Parish, Adomi Sub County, Arua district:	1	1	3	6	14	27	55.7	29.4	Particulates were due to dust from the road.
11.	E 0255108 N0337829	Lia trading Centre, Vurra village, Mite Parish, Adumi Sub County, Arua district.	0	0	2	4	12	22	55.6	29.5	Particulates were due to dust blown by wind.
12.	E 0255512 N0344183	Odramachaku trading Centre, Nunu village, Anzu Parish, Ayivuni Sub County, Arua district.	1	2	7	15	40	81	48.8	30.4	Particulates were due to dust from the road.
13.	E 0256526 N0343220	Residential houses, Mittia/Nono village, Kubo Parish, Ayivuni Sub County, Arua district.	1	6	9	10	24	35	41.1	36.4	Particulates were due to dust from the murram road.
14.	E 0260054 N0341629	Fwe primary school, Pajacki village, Mbaraka Parish, Ayivuni Sub County, Arua district.	1	1	4	8	19	35	49.6	18.4	Particulates were due to dust from the road.
15.	E 0260551 N0341578	Ayivuni Sub County Headquarters, Awia village, Kubo Parish, Ayivuni Sub County, Arua district.	1	1	4	7	12	33	51.3	30.9	Particulates were due to dust from the murram road.
16.	E 0265183 N0336527	Onduparaka trading Centre, Ozovo village, Adarafu Parish, Pajulu Sub County, Arua district.	4	5	12	23	63	178	53.9	32.3	Particulates were due to dust from the murram road.
(Wandi-Yumbe-Moyo)line											
17.	E 0275127 N0343209	Wandi trading Centre, Ozoro Parish, Katirini Sub County, Arua district.	2	2	5	8	20	51	65.7	27.1	Particulates were due to dust from the murram road.

No.	Coordinates (UTM, Arc 1960)	Location	$PM_{0.3}$ ($\mu g/m^3$)	$PM_{0.5}$ ($\mu g/m^3$)	$PM_{1.0}$ ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	$PM_{5.0}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	RH (%)	AT (^oC)	Notes
18.	E0276505 N0344067	Oninia Primary School, Oninia Village, Onzoro Parish, Katirini Sub County, Arua district.	1	2	6	9	34	58	54.1	31.0	Particulates were due to dust from the murram road.
19.	E0278372 N0347677	Owaffa Primary School, Owaffa trading Centre, Edai Parish, Aii-vu Sub County, Arua district.	1	2	2	6	10	23	55.4	31.2	Particulates were due to dust from the murram road.
20.	E0285764 N0352472	Leju trading Centre, Ngabia village Alia Parish, Aii-vu Sub County, Arua district.	1	1	4	7	11	19	51.4	31.6	Particulates were due to dust blown by wind.
21.	E0287816 N0352777	Goup trading Centre, Jilla village, Otrevu Parish, Aii-vu Sub County, Arua district.	2	2	9	19	49	127	52.6	31.6	Particulates were due to dust from Alia-Yumbe road.
22.	E0290386 N0362124	Omugo Sub County headquarters, Drimveni village, Bura Parish, Aii-vu Sub County, Arua district.	1	1	4	5	15	22	52.9	31.5	Particulates were due to dust blown by wind.
23.	E0293788 N0362044	Otumbari trading Centre, Manipi Village, Otumbari Parish, Odupi Sub County, Arua district.	2	3	9	23	81	198	45.5	34.8	Particulates were due to dust from the murram road.
24.	E0297293 N0365792	Okpotani trading Centre, Elefe Village, Ombokoro Parish, Odupi Sub County, Arua district.	1	2	7	14	47	95	52.1	31.7	Particulates were due to dust from the murram road.
25.	E0302201 N0362257	Lugbari Primary School, Upper Ojja Village, Lugbari Parish, Odupi Sub County, Arua district.	1	1	4	6	12	30	57.2	31.9	Particulates were due to dust from the road.
26.	E0301126 N0366330	Abiribani trading Centre, Amia Village, Okavu Parish, Odupi Sub County, Arua district.	0	1	2	9	14	28	57.2	31.9	Particulates were due to dust blown by wind.

No.	Coordinates (UTM, Arc 1960)	Location	$PM_{0.3}$ (µg/m³)	$PM_{0.5}$ (µg/m³)	$PM_{1.0}$ (µg/m³)	$PM_{2.5}$ (µg/m³)	$PM_{5.0}$ (µg/m³)	PM_{10} (µg/m³)	RH (%)	AT (°C)	Notes
27.	E0304566 N0369945	Nyoko Primary School, Ambataruku Village, Nyoko Parish, Odravu Sub County, Yumbe district.	1	1	4	6	14	33	49.9	33.3	Particulates were due to dust from the road.
28.	E0305380 N0370219	Odravu trading Centre, Nyoko Parish, Odravu Sub County, Yumbe district.	1	3	7	12	18	26	50.2	32.8	Particulates were due to dust blown by wind.
29.	E0301453 N0369986	Odravu primary school, Kiiyi village, Luyi Parish, Odravu Sub County, Arua district.	1	1	3	4	8	15	65.7	28.2	Particulates were due to dust blown by wind.
30.	E0314926 N0366099	Okuyo trading Centre, Irunga village, Okuyo Parish, Ariwa Sub County, Yumbe district.	2	3	9	19	63	202	54.4	32.4	Particulates were due to dust from Okuyo-Obong road
31.	E0316910 N0363790	Ombechi trading Centre, Kaffe Parish, Ariwa Sub County, Yumbe district.	1	1	2	3	8	10	54.1	31.9	Particulates were due to dust blown by wind.
32.	E0321227 N0359162	Karunga trading Centre, Libonga Parish, Ariwa Sub County, Yumbe district.	1	1	5	9	25	79	60.3	31.6	Particulates were due to dust from the road.
33.	E0322231 N0357994	Ariwa primary school, Libonga Parish, Ariwa Sub County, Yumbe district.	0	0	3	6	12	22	61.8	31.5	Particulates were due to dust blown by wind.
34.	E0323938 N0356850	Okubani trading Centre, Awinga Parish, Ariwa Sub County, Yumbe district.	1	1	2	4	8	18	58.0	31.6	Particulates from the grinding mill.
35.	E0306931 N0373534	Wolo trading Centre, Okukunga village, Wolo Parish, Odravu Sub County, Yumbe district.	1	2	5	9	13	22	59.1	31.9	Particulates were due to dust from the road.
36.	E0308569	Lomunga trading Centre, Lomonga	4	4	8	9	19	50	48.3	33.7	Particulates were due

No.	Coordinates (UTM, Arc 1960)	Location	$PM_{0.3}$ ($\mu g/m^3$)	$PM_{0.5}$ ($\mu g/m^3$)	$PM_{1.0}$ ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	$PM_{5.0}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	RH (%)	AT (^{O}C)	Notes
	N0374254	Parish, Kululu Sub County, Yumbe district.									to dust from the road.
37.	E0317928 N0375003	Yoyo trading Centre, Yoyo Parish, Kululu Sub County, Yumbe district.	1	1	3	5	6	20	44.6	36.3	Particulates were due to dust from the road.
38.	E0306026 N0381581	Geya primary school, Ujji village, Geya Parish, Kululu Sub County, Yumbe district.	1	1	3	5	7	24	59.5	29.7	Particulates were due to dust from the road.
39.	E0307801 N0386781	Kerila trading Centre, Kerila Parish, Apo Sub County, Yumbe district.	4	6	20	41	145	324	62.0	29.0	Particulates were due to dust from the road.
40.	E0311363 N0388018	Manibe primary school, Kobbo village, Lori Parish, Kochi Sub County, Yumbe district.	1	1	3	4	3	17	61.2	29.0	Particulates were due to dust blown by wind.
41.	E0313871 N0391223	Lokopio Hill Technical Institute, Lokopio Village, Yayale Parish, Kochi Sub County, Yumbe district.	1	1	3	5	11	19	61.3	29.9	Particulates were due to dust from the road.
42.	E0308914 N0385972	Apo seed secondary school, Angwira Village, Yeta Parish, Apo Sub County, Yumbe district.	1	1	4	5	13	21	72.3	27.3	Particulates were due to dust blown by wind.
43.	E0315298 N0386178	Barakala trading Centre, Barakala Village, Baringa Parish, Rumogi Sub County, Yumbe district.	2	2	7	17	57	153	65.0	29.5	Particulates were due to dust from the road.
44.	E0321451 N0380665	Iyete trading Centre, Iyete Village, Iyete Parish, Rumogi Sub County, Yumbe district.	1	1	6	11	15	20	65.6	29.8	Particulates were due to dust blown by wind.
45.	E0327019 N0394237	Kochi health Centre III, Nabbala Village, Kochi Parish, Rumogi Sub County, Yumbe district.	1	2	5	7	15	53	59.5	31.6	Particulates were due to dust from the road.

No.	Coordinates (UTM, Arc 1960)	Location	$PM_{0.3}$ ($\mu g/m^3$)	$PM_{0.5}$ ($\mu g/m^3$)	$PM_{1.0}$ ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	$PM_{5.0}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	RH (%)	AT (^{O}C)	Notes
46.	E0327734 N0402578	Gobolo trading Centre, Maru Village, Gobolo Parish, Kochi Sub County, Yumbe district.	1	1	4	5	7	25	60.5	30.4	Particulates from the grinding mill.
47.	E0342776 N0396648	Lefori trading Centre, Coloa East Village, Coloa Parish, Lefori Sub County, Moyo district.	2	2	4	5	13	27	57.8	31.7	Particulates were due to dust from the road.
48.	E0350571 N0401574	Eria primary school, Eria Village, Eria Parish, Moyo Sub County, Moyo district.	0	0	1	4	4	9	58.0	30.8	Particulates were due to dust blown by wind.
(Yumbe/Midigo –Koboko) Line											
49.	E0303647 N0399011	Midigo trading Centre, Mocha Parish, Midigo Sub County, Yumbe district.	1	1	3	7	18	50	52.5	30.4	Particulates were due to dust from the road.
50.	E0299973 N0396196	Oyakwa trading Centre, Loyona village, Mulumbe Parish, Midigo Sub County, Yumbe district.	1	1	5	6	20	48	55.8	30.5	Particulates were due to dust from the road.
51.	E0292591 N0394886	Lube trading Centre, Noki village, Akaya Parish, Keyi Sub County, Yumbe district.	1	2	5	12	34	116	42.9	36.0	Particulates were due to dust from the road.
52.	E0289547 N0395106	Urunga primary school, Lile village, Urunga Parish, Keyi Sub County, Yumbe district.	0	0	3	5	6	10	49.6	26.5	Particulates were due to dust blown by wind.
53.	E0284774 N0393942	Lima trading Centre, Lima central village, Lima Parish, Ludara Sub County, Koboko district.	1	1	4	4	9	18	50.4	26.4	Particulates were due to dust blown by wind.
54.	E0281542 N0392025	Ujipaku trading Centre, Indiga central village, Ludara Parish, Ludara Sub County, Koboko district.	1	1	5	9	30	73	68.5	26.5	Particulates were due to dust from the road.

No.	Coordinates (UTM, Arc 1960)	Location	$PM_{0.3}$ ($\mu g/m^3$)	$PM_{0.5}$ ($\mu g/m^3$)	$PM_{1.0}$ ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	$PM_{5.0}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	RH (%)	AT (^{O}C)	Notes
55.	E0278092 N0389650	Alendure trading Centre, Madiyo Village, Podo Parish, Ludara Sub County, Koboko district.	1	2	4	7	23	30	65.6	24.6	Particulates were due to dust from the road.
56.	E0274029 N0387262	Umbeki trading Centre, Nyoka Village, Kuluba Parish, Kuluba Sub County, Koboko district.	1	3	6	15	23	43	68.8	26.5	Particulates were due to dust from the road.
57.	E0271331 N0388012	Olaba trading Centre, Keri Central Village, Kuluba Parish, Kuluba Sub County, Koboko district.	3	4	8	12	26	38	69.6	26.9	Particulates were due to dust from the road.

Particulate emissions ($PM_{2.5}$)

At all points were air quality measurements were taken, the concentration of Particles of 2.5μm diameter in ambient air was below the Ugandan Air Quality Standard which is 60μg/m^3.

Particulate emissions (PM_{10})

The concentration of particles of 10μm diameter in ambient air for most of the points at which air quality measurements were taken were below the Ugandan Air Quality Standard which is 100μg/m^3 except in the following areas:

- Andreza trading Centre located around coordinates E0258717 N0332778 in Acacia village, Nyonva Parish, Adumi Sub County, Arua district which had concentration of 125μg/m^3;
- Onduparaka trading Centre located around coordinates E0265183 N0336527 in Ozovo village, Adarafu Parish, Pajulu Sub County, Arua district which had a concentration of 178μg/m^3;
- Goup trading Centre located around coordinates E0287816 N0352777 in Jilla village, Otrevu Parish, Aii-vu Sub County, Arua district which had a concentration of 127μg/m^3;
- Otumbari trading Centre located around coordinates E0293788 N0362044 in Manipi Village, Otumbari Parish, Odupi Sub County, Arua district which had a concentration of 198μg/m^3;
- Okuyo trading Centre located around coordinates E0314926 N0366099 in Irunga village, Okuyo Parish, Ariwa Sub County, Yumbe district which had a concentration of 202μg/m^3;
- Kerila trading Centre located around coordinates E0307801 N0386781 in Kerila Parish, Apo Sub County, Yumbe district with a concentration of 324 μg/m^3;
- Barakala trading Centre located around coordinates E0315298 N0386178 Barakala Village, Baringa Parish, Rumogi Sub County, Yumbe district with concentration of 153μg/m^3;
- Lube trading Centre located around coordinates E0292591 N0394886 Noki village, Akaya Parish, Keyi Sub County, Yumbe district, with a concentration of 153μg/m^3

High particulate emissions were mainly due to dust emitted by moving vehicles on the murram roads thus during construction, dust suppression measures such as sprinkling of the unpaved roads with water (using water browsers) should be adopted.

There will be a temporary increase in fugitive dust emissions particularly; PM-10 and PM-2.5 from construction activities hence an increase in ambient air particulate matter concentrations at sensitive receptors in the proximity of the power transmission line route.

Construction dust may result in more of a nuisance than a health hazard. Therefore, if appropriate mitigation measures are not put in place to control air pollution, human health and environment will be greatly affected.

3.4 Geology, Soils and Topography

3.4.1 Geology

Most of West Nile is under laid by rocks of the basement complex of Precambrian age which are composed largely of granite fascia grade rocks, which generally form enclaves in the gneiss complex.

On hilltops, Grey granite and gneiss are left exposed in many places. These granites and gneiss are intensively metamorphosed and deformed.

The site lies within zone 2 of the seismic zoning of Uganda implying there is a low risk of earthquake occurrence at the site. (Seismic Code of Practice for Structural designs; Uganda National Bureau of Standards, First Edition: June 2003).

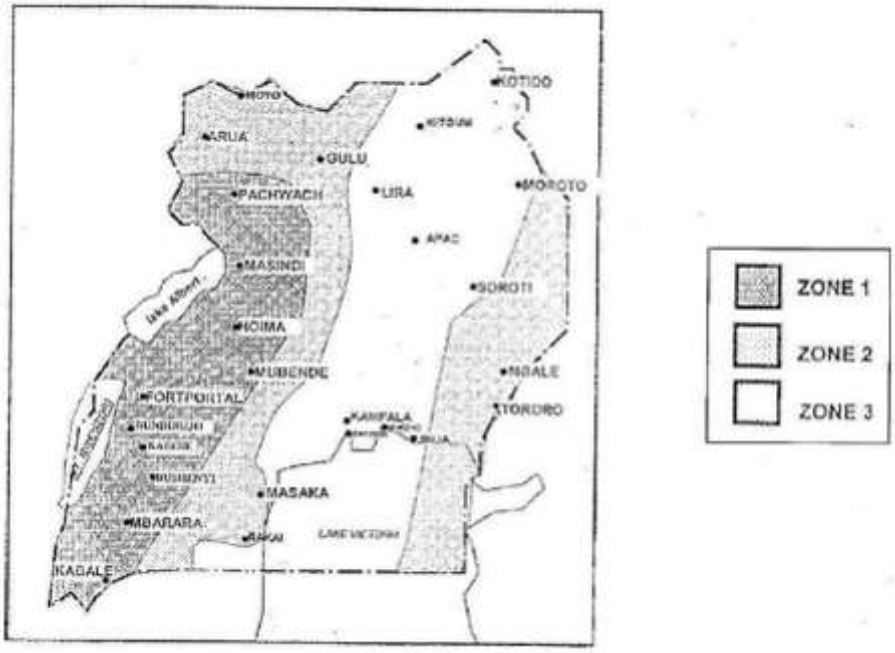

Figure 3-8: Seismic zoning of Uganda

3.4.2 Soils

The soils covering most of the West Nile region are mainly ferralitic and sand loams with fine textile and rather loose structure, which are easily eroded and leached. Most soils are acidic. The commonest soil types include: dark cotton soils, clay loams latosols varying from dark grey to dark brownish which are slightly acidic and mainly derived from granite, gneissic and sedimentary rocks. They occur on gently undulating - hilly topography of the region.

In some sections are Brown - yellow clay loams with laterite horizon and Light - grey- white mottled loamy soils with laterite horizon ground, structure-less loamy sands.

3.4.3 Topography

Koboko district

Koboko District comprises mainly of flat rolling plains occurring at 3,160 to 5,283 feet above sea level with isolated undulating hills mainly in the western and northern parts of the District towards

the Sudan border, with a slight slope towards the east. The area where the three international borders meet consists mainly of hills and rocks hosting remains of some indigenous savannah woodlands.

Moyo

The District's topography is characterized by low plains and rolling hills along the Nile River, at 900m above sea level rising to a series of hills and peaks. The highest peak is Mt. Otze at 1500m above sea level. The Nile River bank raises sharply upwards producing a landscape characterized by plateaus, flat topped hills, inter sparse with deep valleys and giving rise to steep slopes.

Arua

Arua district comprises mainly of rolling plains rising from the Nile floor in the rift valley (600m above sea level) to the - Nile water divide (1200 to 1400 meters above sea level). Arua's landscape can generally be grouped into three topographical zones.

a) **Madi Plateau** - Occurs at an altitude of about 900 meters above sea level. It occupies the eastern parts of the district in Terego and Madi - Okollo counties. Several broad valleys that cut across to enter River Nile dissect this plateau.

b) **Western highland** - this upper plateau occurs at an altitudinal range of 1200 to 1800 meters above sea level. The parent rocks include basement complex metamorphose which is responsible for the formation of the hilly terrain. The zone generally covers the central western parts of Arua district especially in Ayivu and Vurra Counties. The slopes in Vurra consist of many facets.

c) **Rift valley** - The rift valley escarpments are highest in the South and fade off to the North. They consist of several faults carps arranged, roughly parallel with the Albert Nile. These scarps separate the Rift valley plains from the Madi plateau. The rift valley low lands consist of wide seasonal swamps. All major valleys are aggraded and consist of alluvial and swamp deposits.

The major valleys are aggraded with alluvial and swamp deposits. The aggradations are partly geomorphic, but also associated with dense growth of papyrus and other plants which block streams and cause deposition of sediments.

3.5 Drainage and water resources

3.5.1 Yumbe

Apart from subterranean hydrology, there is no major surface water body in the district except Albert Nile with few dendrites and parallel patterned tributaries that originate from the inland-Rivers Kochi, Datcha and Newa. The proposed line starting at Wandi will pass sections of rivers Kochi, Oru, Ora, Racha, Nyawa, and seasonal rivers such as Jure, Ozurugo, Iveta, Dodoga as well as streams such as Onvasitia.

3.5.2 Arua

Arua district generally lacks adequate surface and ground water resources. In Arua district the sources of water include ground water, rivers, springs, wells, gravity flow scheme. The coverage of water resources over various counties is fairly equal. Major problems attributed to water are only experienced in Madi-Okollo County where there are fewer water bodies and water quality is rather low.

Although the Nile is a very reliable water source and has attracted significant settlement patterns along it, it is not strategically located and covers less than 0.2% of the total area of the district. It benefits only Madi-Okollo County.
The Albert Nile is fed by streams and ground water during the heavy rains and it dries up during the dry season through evaporation and also to the surrounding unconsolidated sands, silt and gravel which recharges the water content of the surrounding countryside through natural means. Part of the Albert Nile is found in the east of the district. Other important rivers are Enyau, Jurei, Ala, Ora, and Kochi which all drain into the Nile in the east. There are also numerous streams in the district.

Wetlands in Arua district cover approximately 2.8% (87 Km^2) of the total land area of the district. This allows water to stay in one place long enough to maximize infiltration and thus access to water supplies for plants.

In Arua district, the line traverses through four rivers Ega, Kawa, Orika and Seva and three streams Esia, Krukrue and another which had no name according to the inhabitants.

3.5.3 Moyo

Drainage occurs towards the Nile, through a series of rivers, which are seasonal and mainly supplied by rainwater. Moyo district has about 107.5 km2 (5.55%) of its total area under open water. Fresh water is obtained from the Nile River and other smaller streams.
Wetlands cover approximately 9.3% of the total area of the district. The district also has about 196.0km^2 of permanent wetlands and 38.2km^2 of seasonal wetlands mainly in the sub-counties of Lefori, Itula, Aliba, Laropi and Dufile. Wetlands in the district are mainly used or commonly reclaimed for growing crops, grazing livestock, mining sand, bricklaying, rice growing and vegetable harvesting in both dry and rain season.

The proposed line will pass Lefori wetland and Yii River within Lefori Sub-county.

3.5.4 Koboko

Koboko district generally lacks adequate surface and ground water resources. River Apa, Kaya at the Sudan border, Kechi, Ora and Kochi are the most important rivers in the district. They all have their source from Democratic Republic of Congo border and drain to the east into rivers that empty into the River Nile.

Wetlands cover a small proportion of the total District area. No rivers or wetlands were encountered along the Ludara-Midigo-Kei line during the physical and biodiversity survey.

3.5.5 Wet areas along the proposed route

Olika River near Okwomane T.C in Pajule

Ega Stream in Pajule

Reclaimed wetland around coordinates 36N 0258785 0338170

Esi river in Adumi

River Kawa and wetland around coordinates 36N 0258047 0341058 in Ayivuni

Ivete seasonal river 36N 0294415 0362838

Ozurugo seasonal river in Ebia Village Odupi

Dodonga River 36N 0303816 0366396

River Ora

River Racha in Aji village Odravu S-County

Jure seasonal River in Odravu 36N 0308569 0377270

Figure 3-9: Wet areas along the proposed line route

Borehole in Adumi Sub-county 36N0255108 0337829

Water tank in Omugo Sub-county 36N0290438 0362144

Collecting water at Oru river

Borehole in Odupi Sub-county

Figure 3-10: Sources of water for domestic use

Two representative water samples along the proposed power transmission line routes were taken for laboratory analysis. Asample from Kochi River located around coordinates 36N0326505 0393904 in Nabbara village, Kochi Parish, Kochi Sub County, Yumbe district showed complying physiochemical characteristics as compared with the national standards for untreated portable water with exception of pH, TSS, colour, turbidity and ammonia.

Another water sample from River Oru located around coordinates 36N 0292717 0361472 in Azapi village, Otumbari Parish, Omugo Sub County, Arua District showed complying physiochemical characteristics as compared with the national standards for untreated portable water with exception of pH, TSS, colour, and turbidity.

The results for water quality analysis are provided in Appendix 5 of this project brief.

3.6 Noise

Noise is 'unwanted sound' and can be considered a nuisance, particularly when sensitive receptors are exposed to it at high magnitudes or unusual frequencies.
Vibration can also cause a nuisance, whilst potentially causing damage to structures.

A noise monitoring survey was undertaken during the study to determine baseline levels and identify potential issues that may require mitigation during project implementation.

In many places, work will be done in close proximity to residences, trading centres or businesses located near the right-of-way. This will lead to increased noise levels for residents in the proximity of the proposed route. Noise will generally be emitted from vehicular traffic (delivering materials to the campsite and transportation of workers and materials to site) as well as the use of construction equipment.

Noise measurements were undertaken using the AWA5661 sound level meter at various points near the power transmission line routes to get a baseline against which future monitoring of noise levels will be based. The average noise measurements as taken during the site visit are detailed in Table 3-10 below.

Table 3-10: Results of noise measurements

No	Coordinates (UTM Arc 1960)	Date and time	Location	Noise level dB(A)	Maximum permissible noise levels dB(A)-Day time	Background Noise Sources
(Onduparaka – Odramachaku – Abiria) Line						
1.	E 0265921 N0333823	17 /05/2016 9:39am	Media Centre, Arua Diocese, Adiofe Parish, Pajulu Sub County, Arua district.	Average/Leq:59.7 Maximum: 72.1 Minimum: 45.0	55(Mixed residential)	-Human beings conversing -Motor cycles movement -Birds' sound
2.	E 0265832 N0333844	17 /05/2016 9:50am	St Mary's Ediofe Senior Secondary School, Adiofe Parish, Pajulu Sub County, Arua district.	Average/Leq:52.1 Maximum: 70.1 Minimum: 43.0	55(Mixed residential)	-Human beings conversing -Motor cycles moving on the road
3.	E 0266098 N0333525	17 /05/2016 10:06am	Ediofe Health Centre III, Adiofe Parish, Pajulu Sub County, Arua district.	Average/Leq:60.2 Maximum: 70.5 Minimum: 47.0	55(Mixed residential)	-People at the health Centre -Motor cycles moving on the road
4.	E 0264844 N0333074	17 /05/2016 10:29am	Residential area, Aiivu village, Komite Parish, Pajulu Sub County, Arua district.	Average/Leq:61.2 Maximum: 72.9 Minimum: 44.5	50(Residential buildings)	-People in the trading Centre -Motor cycles moving on the road
5.	E 0264735 N0332879	17 /05/2016 10:44am	Ombeteni trading Centre, Aiivu village, Komite Parish, Pajulu Sub County, Arua district.	Average/Leq:65.7 Maximum: 79.3 Minimum: 54.9	55(Mixed residential)	-People in the trading Centre -Loud music -Generator
6.	E 0263658 N0332007	17 /05/2016 11:16am	Okwamane trading Centre, Odrudrumbuti village, Olubo Parish, Pajulu Sub County, Arua district.	Average/Leq:70.4 Maximum: 88.9 Minimum: 51.4	55(Mixed residential)	-People in the trading Centre -Loud music
7.	E 0263317 N0331851	17 /05/2016 11:35am	Pajulu Health Centre III, Waiva village, Orugbo Parish, Pajulu Sub County, Arua district.	Average/Leq:50.6 Maximum: 76.3 Minimum: 43.0	55(Mixed residential)	-People at the health Centre -Loud music
8.	E 0258717 N0332778	17 /05/2016 12:30Pm	Andreza trading Centre, Acacia village, Nyonva Parish, Adumi Sub County, Arua district.	Average/Leq:68.8 Maximum: 73.6 Minimum: 50.4	55(Mixed residential)	-People in the trading Centre -Loud music
9.	E 0259106	17 /05/2016	Adumi health Centre IV, Ombaki	Average/Leq:62.5	55(Mixed	-Human beings conversing

No	Coordinates (UTM Arc 1960)	Date and time	Location	Noise level dB(A)	Maximum permissible noise levels dB(A)-Day time	Background Noise Sources
	N0336404	12:47Pm	village, Ombaki Parish, Adumi Sub County, Arua district.	Maximum: 78.6 Minimum: 51.4	residential)	-Motorcycles moving on the road
10.	E 0256745 N0337770	17 /05/2016 1:34Pm	Adumi Nursery and Primary School, Ombaki village, Ombaki Parish, Adomi Sub County, Arua district.	Average/Leq:57.3 Maximum: 79.0 Minimum: 36.8	55(Mixed residential)	-Cows mowing -Motorcycle movements -Birds' sound
11.	E 0255108 N0337829	17 /05/2016 1:47Pm	Lia trading Centre, Vurra village, Mite Parish, Adumi Sub County, Arua district.	Average/Leq:58.3 Maximum: 75.0 Minimum: 31.8	55(Mixed residential)	-Motorcycle movements -Birds' sound -People in the trading Centre
12.	E 0255512 N0344183	17 /05/2016 2:25Pm	Odramachaku trading Centre, Nunu village, Anzu Parish, Ayivuni Sub County, Arua district.	Average/Leq:71.7 Maximum: 90.0 Minimum: 72.0	55(Mixed residential)	-Motorcycle movements -Loud music -People in the trading Centre
13.	E 0256526 N0343220	17 /05/2016 2:38Pm	Residential houses, Mittia/Nono village, Kubo Parish, Ayivuni Sub County, Arua district.	Average/Leq:57.9 Maximum: 72.8 Minimum: 42.8	50(Residential buildings)	- Music -Motor cycles moving on the road
14.	E 0260054 N0341629	17 /05/2016 4:06Pm	Fwe primary school, Pajacki village, Mbaraka Parish, Ayivuni Sub County, Arua district.	Average/Leq:51.8 Maximum: 61.2 Minimum: 37.2	50(Residential buildings)	- Music -Motor cycles moving on the road
15.	E 0260551 N0341578	17 /05/2016 4:15Pm	Ayivuni Sub County Headquarters, Awia village, Kubo Parish, Ayivuni Sub County, Arua district.	Average/Leq:59.2 Maximum: 75.1 Minimum: 36.8	50(Residential buildings)	- Cows mowing -Human beings conversing
16.	E 0265183 N0336527	17 /05/2016 5:06Pm	Onduparaka trading Centre, Ozovo village, Adarafu Parish, Pajulu Sub County, Arua district.	Average/Leq:70.4 Maximum: 76.9 Minimum: 60.3	55(Mixed residential)	-Loud music -Human beings conversing -Sewing machine
(Wandi-Yumbe-Moyo) line						
17.	E 0275127 N0343209	18/05/2016 9:01am	Wandi trading Centre, Ozoro Parish, Katirini Sub County, Arua district.	Average/Leq:64.9 Maximum: 71.1 Minimum: 52.4	55(Mixed residential)	-Human beings conversing -Vehicles moving on the road

No	Coordinates (UTM Arc 1960)	Date and time	Location	Noise level dB(A)	Maximum permissible noise levels dB(A)-Day time	Background Noise Sources
18.	E0276505 N0344067	18/05/2016 9:24am	Oninia Primary School, Oninia Village, Onzoro Parish, Katirini Sub County, Arua district.	Average/Leq:54.3 Maximum: 80.6 Minimum: 37.0	55(Mixed residential)	-Human beings conversing -Vehicles moving on the road -Children shouting
19.	E0278372 N0347677	18/05/2016 9:49am	Owaffa Primary School, Owaffa trading Centre, Edai Parish, Aii-vu Sub County, Arua district.	Average/Leq:64.3 Maximum: 76.6 Minimum: 38.0	55(Mixed residential)	-Human beings conversing -Vehicles moving on the road
20.	E0285764 N0352472	18/05/2016 10:26am	Leju trading Centre, Ngabia village, Alia Parish, Aii-vu Sub County, Arua district.	Average/Leq:62.9 Maximum: 80.2 Minimum:42.6	55(Mixed residential)	-Human beings conversing -Loud music
21.	E0287816 N0352777	18/05/2016 10:40am	Goup trading Centre, Jilla village, Otrevu Parish, Aii-vu Sub County, Arua district.	Average/Leq:57.1 Maximum: 73.5 Minimum:42.4	55(Mixed residential)	-Human beings conversing -Birds' sound
22.	E0290386 N0362124	18/05/2016 11:30am	Omugo Sub County headquarters, Drimveni village, Bura Parish, Aii-vu Sub County, Arua district.	Average/Leq:59.1 Maximum: 81.5 Minimum:41.9	55(Mixed residential)	-Human beings conversing -Birds' sound -Wind blowing
23.	E0293788 N0362044	18/05/2016 12:12pm	Otumbari trading Centre, Manipi Village, Otumbari Parish, Odupi Sub County, Arua district.	Average/Leq:61.7 Maximum: 71.2 Minimum:51.5	55(Mixed residential)	-Human beings conversing -Loud music -Vehicles moving on the road
24.	E0297293 N0365792	18/05/2016 12:50pm	Okpotani trading Centre, Elefe Village, Ombokoro Parish, Odupi Sub County, Arua district.	Average/Leq:59.1 Maximum: 72.1 Minimum:50.5	55(Mixed residential)	-Human beings conversing -Loud music -Vehicles moving on the road
25.	E0302201 N0362257	18/05/2016 1:18pm	Lugbari Primary School, Upper Ojja Village, Lugbari Parish, Odupi Sub County, Arua district.	Average/Leq:54.0 Maximum: 76.9 Minimum:36.0	55(Mixed residential)	-Human beings conversing -Birds' sound -Vehicles moving on the road
26.	E0301126 N0366330	18/05/2016 2:01pm	Abiribani trading Centre, Amia Village, Okavu Parish, Odupi Sub County, Arua district.	Average/Leq:58.5 Maximum: 70.0 Minimum:30.0	55(Mixed residential)	-Human beings conversing -Birds' sound

No	Coordinates (UTM Arc 1960)	Date and time	Location	Noise level dB(A)	Maximum permissible noise levels dB(A)-Day time	Background Noise Sources
27.	E0304566 N0369945	18/05/2016 3:21pm	Nyoko Primary School, Ambataruku Village, Nyoko Parish, Odravu Sub County, Yumbe district.	Average/Leq:55.5 Maximum: 78.6 Minimum:36.0	55(Mixed residential)	-Human beings conversing -Birds' sound -Vehicles moving on the road
28.	E0305380 N0370219	18/05/2016 3:30pm	Odravu trading Centre, Nyoko Parish, Odravu Sub County, Yumbe district.	Average/Leq:60.3 Maximum: 79.6 Minimum:35.0	55(Mixed residential)	-Human beings conversing -Birds' sound -Motorcycles moving on the road
29.	E0301453 N0369986	19/05/2016 12:30pm	Odravu primary school, Kiiyi village, Luyi Parish, Odravu Sub County, Arua district.	Average/Leq:53.6 Maximum: 74.0 Minimum:41.6	55(Mixed residential)	-Human beings conversing -Birds' sound -Wind blowing
30.	E0314926 N0366099	19/05/2016 1:32pm	Okuyo trading Centre, Irunga village, Okuyo Parish, Ariwa Sub County, Yumbe district.	Average/Leq:68.1 Maximum: 87.8 Minimum:50.5	55(Mixed residential)	-Human beings conversing -Loud music
31.	E0316910 N0363790	19/05/2016 1:44pm	Ombechi trading Centre, Kaffe Parish, Ariwa Sub County, Yumbe district.	Average/Leq:52.0 Maximum: 68.4 Minimum:37.6	55(Mixed residential)	-Human beings conversing -Birds' sound Wind blowing
32.	E0321227 N0359162	19/05/2016 2:15pm	Karunga trading Centre, Libonga Parish, Ariwa Sub County, Yumbe district.	Average/Leq:59.6 Maximum: 73.4 Minimum:49.9	55(Mixed residential)	-Human beings conversing -Birds' sound -Soft music
33.	E0322231 N0357994	19/05/2016 2:24pm	Ariwa primary school, Libonga Parish, Ariwa Sub County, Yumbe district.	Average/Leq:58.4 Maximum: 68.9 Minimum:39.9	55(Mixed residential)	-Human beings conversing -Birds' sound
34.	E0323938 N0356850	19/05/2016 2:31pm	Okubani trading Centre, Awinga Parish, Ariwa Sub County, Yumbe district.	Average/Leq:71.0 Maximum: 82.5 Minimum:55.1	55(Mixed residential)	-Human beings conversing -Grinding mill
35.	E0306931 N0373534	19/05/2016 3:30pm	Wolo trading Centre, Okukunga village, Wolo Parish, Odravu Sub	Average/Leq:72.0 Maximum: 80.5	55(Mixed residential)	-Human beings conversing -Motorcycles moving on the

No	Coordinates (UTM Arc 1960)	Date and time	Location	Noise level dB(A)	Maximum permissible noise levels dB(A)-Day time	Background Noise Sources
			County, Yumbe district.	Minimum:48.1		road.
36.	E0308569 N0374254	19/05/2016 4:01pm	Lomunga trading Centre, Lomonga Parish, Kululu Sub County, Yumbe district.	Average/Leq:61.6 Maximum: 80.0 Minimum:49.9	55(Mixed residential)	-Human beings conversing -Motorcycles moving on the road.
37.	E0317928 N0375003	19/05/2016 4:35pm	Yoyo trading Centre, Yoyo Parish, Kululu Sub County, Yumbe district.	Average/Leq:62.0 Maximum: 78.0 Minimum:39.9	55(Mixed residential)	-Human beings conversing -Motorcycles moving on the road.
38.	E0306026 N0381581	19/05/2016 5:14pm	Geya primary school, Ujji village, Geya Parish, Kululu Sub County, Yumbe district.	Average/Leq:69.8 Maximum: 86.0 Minimum:42.9	55(Mixed residential)	-Human beings conversing -Motorcycles moving on the road.
39.	E0307801 N0386781	20/05/2016 8:45am	Kerila trading Centre, Kerila Parish, Apo Sub County, Yumbe district.	Average/Leq:65.8 Maximum: 80.0 Minimum:50.0	55(Mixed residential)	-Human beings conversing - Vehicles moving on the road.
40.	E0311363 N0388018	20/05/2016 9:06am	Manibe primary school, Kobbo village, Lori Parish, Kochi Sub County, Yumbe district.	Average/Leq:55.8 Maximum: 77.6 Minimum:42.5	55(Mixed residential)	-Vehicles moving on the road. -Birds' sound
41.	E0313871 N0391223	20/05/2016 9:26am	Lokopio Hill Technical Institute, Lokopio Village, Yayale Parish, Kochi Sub County, Yumbe district.	Average/Leq:64.8 Maximum: 80.5 Minimum:37.3	55(Mixed residential)	-Vehicles moving on the road. -People conversing
42.	E0308914 N0385972	20/05/2016 10:02am	Apo seed secondary school, Angwira Village, Yeta Parish, Apo Sub County, Yumbe district.	Average/Leq:50.9 Maximum: 77.3 Minimum:32.1	55(Mixed residential)	-Birds' sound. -People conversing -Wind blowing
43.	E0315298 N0386178	20/05/2016 10:21am	Barakala trading Centre, Barakala Village, Baringa Parish, Rumogi Sub County, Yumbe district.	Average/Leq:70.2 Maximum: 87.3 Minimum:50.1	55(Mixed residential)	-People conversing -Loud music
44.	E0321451 N0380665	20/05/2016 10:57am	Iyete trading Centre, Iyete Village, Iyete Parish, Rumogi Sub County,	Average/Leq:69.8 Maximum: 72.6	55(Mixed residential)	-People conversing -A motor cycle moving on the

No	Coordinates (UTM Arc 1960)	Date and time	Location	Noise level dB(A)	Maximum permissible noise levels dB(A)-Day time	Background Noise Sources
			Yumbe district.	Minimum:35.0		road.
45.	E0327019 N0394237	20/05/2016 12:02pm	Kochi health Centre III, Nabbala Village, Kochi Parish, Kochi Sub County, Yumbe district.	Average/Leq:58.8 Maximum: 73.6 Minimum:48.5	55(Mixed residential)	-People conversing -Vehicular movement - Slashing machine
46.	E0327734 N0402578	20/05/2016 12:41pm	Goboro trading Centre, Maru Village, Goboro Parish, Kochi Sub County, Yumbe district.	Average/Leq:60.0 Maximum: 83.8 Minimum:37.9	55(Mixed residential)	-People conversing -Soft music
47.	E0342776 N0396648	20/05/2016 12:41pm	Lefori trading Centre, Coloa East Village, Coloa Parish, Lefori Sub County, Moyo district.	Average/Leq:66.7 Maximum: 77.7 Minimum:49.5	55(Mixed residential)	-People conversing - Music from the nearby shop
48.	E0350571 N0401574	20/05/2016 1:55pm	Eria primary school, Eria Village, Eria Parish, Moyo Sub County, Moyo district.	Average/Leq:44.5 Maximum: 58.6 Minimum:30.0	50(Residential buildings)	-Birds' sound -Wind blowing
(Yumbe/Midigo –Koboko) Line						
49.	E0303647 N0399011	20/05/2016 4:44pm	Midigo trading Centre, Mocha Parish, Midigo Sub County, Yumbe district.	Average/Leq:67.8 Maximum: 86.9 Minimum:61.4	55(Mixed residential)	-People conversing -Vehicular movement
50.	E0299973 N0396196	21/05/2016 8:15am	Oyakwa trading Centre, Loyona village, Mulumbe Parish, Midigo Sub County, Yumbe district.	Average/Leq:68.5 Maximum: 80.9 Minimum:56.9	55(Mixed residential)	-People conversing -Music from the nearby shop
51.	E0292591 N0394886	21/05/2016 8:30am	Lube trading Centre, Noki village, Akaya Parish, Keyi Sub County, Yumbe district.	Average/Leq:67.9 Maximum: 85.3 Minimum:55.2	55(Mixed residential)	-People conversing -Music from the nearby shop -Motor cycles moving on the road
52.	E0289547 N0395106	21/05/2016 8:44am	Urunga primary school, Lile village, Urunga Parish, Keyi Sub County,	Average/Leq:48.9 Maximum: 68.8	55(Mixed residential)	-People conversing -Birds' sound

No	Coordinates (UTM Arc 1960)	Date and time	Location	Noise level dB(A)	Maximum permissible noise levels dB(A)-Day time	Background Noise Sources
			Yumbe district.	Minimum:31.0		-Wind blowing
53.	E0284774 N0393942	21/05/2016 9:03am	Lima trading Centre, Lima central village, Lima Parish, Ludara Sub County, Koboko district.	Average/Leq:60.5 Maximum: 70.7 Minimum:36.0	55(Mixed residential)	-People conversing -Birds' sound
54.	E0281542 N0392025	21/05/2016 9:16am	Ujipaku trading Centre, Indiga central village, Ludara Parish, Ludara Sub County, Koboko district.	Average/Leq:67.7 Maximum: 86.9 Minimum:55.1	55(Mixed residential)	-People conversing -Grinding mill
55.	E0278092 N0389650	21/05/2016 9:37am	Alendure trading Centre, Madiyo Village, Podo Parish, Ludara Sub County, Koboko district.	Average/Leq:58.9 Maximum: 72.5 Minimum:45.6	55(Mixed residential)	-People conversing -Motor cycles moving on the road
56.	E0274029 N0387262	21/05/2016 9:49am	Umbeki trading Centre, Nyoka Village, Kuluba Parish, Kuluba Sub County, Koboko district.	Average/Leq:62.5 Maximum: 76.8 Minimum:44.0	55(Mixed residential)	-People conversing -Motor cycles moving on the road -Birds' sound
57.	E0271331 N0388012	21/05/2016 10:05am	Olaba trading Centre, Keri Central Village, Kuluba Parish, Kuluba Sub County, Koboko district.	Average/Leq:68.3 Maximum: 79.4 Minimum:46.9	55(Mixed residential)	-People conversing -Vehicular movement

In areas where noise measurements were taken, noise levels were higher than the Maximum permissible limits for Day time i.e. 50 dB (A) (Residential buildings) and 55 dB (A) (Mixed residential with some commercial and entertainment) as prescribed in the first schedule of the National Environment (Noise Standards and Control) Regulations, 2003, except in the following areas:

- St Mary's Ediofe Senior Secondary School, located around coordinates E0265832 N0333844 in Adiofe Parish, Pajulu Sub County, Arua district.
- Pajulu Health Centre III located around coordinates E0263317 N0331851 in Waiva village, Orugbo Parish, Pajulu Sub County, Arua district.
- Oninia Primary School located around coordinates E0276505 N0344067, Oninia Village, Onzoro Parish, Katrini Sub County, Arua district.
- Lugbari Primary School located around coordinates E0302201 N0362257 in Upper Ojja Village, Lugbari Parish, Odupi Sub County, Arua district.
- Odravu primary school located around coordinates E0301453 N0369986 in Kiiyi village, Luyi Parish, Odravu Sub County, Arua district.
- Ombechi trading Centre located around coordinates E0316910 N0363790 in Kaffe Parish, Ariwa Sub County, Yumbe district
- Apo seed secondary school, located around coordinates E0308914 N0385972 Angwira Village, Yeta Parish, Apo Sub County, Yumbe district.
- Eria primary school, located around coordinates E0350571 N0401574 in Eria Village, Eria Parish, Moyo Sub County, Moyo district and
- Urunga primary school, located around coordinates E0289547 N0395106 in Lile village, Urunga Parish, Keyi Sub County, Yumbe district.

Areas with noise levels higher than the permissible standards were mainly trading centers with noise sources generated from vehicular movements, people around the area and loud music in the nearby shops/bars.

3.7 Solid and hazardous waste management and disposal

Construction of the proposed power lines will generate moderate quantities of waste especially at worker's camps and also very minor quantities during operation and maintenance. These have the potential to impact the soils and groundwater if management and disposal methods are not effectively implemented.

3.8 Economic baseline

Most districts in West Nile are highly dependent on agriculture employing over 80% of the total population in each district. Agriculture is mainly subsistence (80%) and takes place on small holdings of approximately two acres using mainly simple farming tools (hoes, pangas and harrowing sticks). Only a small percentage (0.5% for Arua district) of the population is engaged in commercial agriculture. Family members constitute the single most important source of labour.

Both food and cash crops are grown. The major food crops include cassava, beans, groundnuts, simsim, millet, cotton, coffee and maize for Arua, cassava, sweet potatoes, maize, G/nuts, simsim, sorghum, cowpeas in Moyo, cassava, sweet potatoes, maize, sorghum, millet, rice, tobacco, cotton, coffee, beans, cow peas, pigeon peas, groundnuts, cabbages, tomatoes and onions in Yumbe district and tobacco, goat rearing, Rice, Apiculture and groundnuts for Koboko district.

Tobbaco garden in Olevu village

Maize and Eggplant garden in Ediofe village

Figure 3-11: Gardens along the proposed line route

Other important economic activities in the region include formal employment, petty and formal trade and cottage industry with businesses such as welding and furniture workshops.

Economic activities in West Nile likely to benefit from the power line include, saloons, shops, bars, stationary shops (photocopying and computer services) and welding workshops (a full list of potential load centers is in chapter 2).

Primary school in Aiivu using solar power

A barber in Aiivu

Shops using solar power in Kerile T.C

A milling machine using diesel in Kerile T.C

A barbar who also charges phones in Ariwa

A drug shop in Ariwa

Telecom mast in Ariwa

Furniture workshop in Kei

Solar power usage in Barakala T.C

Pajule HC III

Otumbari Trading Center

Okpokani Trading center

Figure 3-12: Potential load centers and economic activities along the power line route

3.9 Land tenure and housing

Like in many rural Districts of Uganda, land in rural West Nile is mainly communally owned and governed by the customary system of tenure ship. Under this tenure ship arrangement, land ownership is vested in the lineage and is allocated by a father to his sons, who in turn, assign it to their wives and children for cultivation.

While in theory, it sounds as if no single individual or household owns land under such tenure ship arrangement, in practice; the ownership is actually vested in the users. In every community, it is clear which portion of land belongs to which household, and usually the head of the household is recognized as the defacto owner.

It is also the head of the household (land owner) who has the responsibility to rent or sell out potion of such land in case of need; though this is usually done after consultation with and the consent of the larger members of the lineage is obtained.

As indicated above land acquisition under the customary tenure ship is through inheritance. These being patrilineal societies, it is the sons of the father and not the daughters who inherit the land. Women therefore tend to be excluded from owning land, although they are allowed the right of use. Those who want to have private ownership of land can also apply for lease offer from the state However, before the state can grant private lease to any single individual, it has to ascertain that there is no customary claim over the land in question (Yumbe and Koboko District Local Government, 2016). Usually, it has to consult with the elders, neighbors and all opinion leaders in such an area.

Typical land holdings vary generally from half to about three acres per household on average and more than half of the farmers would like to cultivate more land. This situation varies significantly; farmers in the less populated areas have bigger plots than farmers elsewhere in the region.

Majority of people stay in temporary houses/huts made of mud, wattle and grass, for instance 90.2% of Arua's population live in temporary houses only 6.8% live in permanent houses and 2.9% live in semi-permanent houses (Arua District Local Government, 2016).


Housing types in Pajule


Housing types in some trading centers in Aiivu Sub-county

Odramachaku T.C

Housing units in Odravu

Figure 3-13: Types of housing units in the project area

3.2 Social Services and infrastructure

Urbanization within the West Nile Region has not been matched with a corresponding increase in provision of services and infrastructural facilities like roads, housing, education, health, sewage and sanitation including waste management facilities and landfills. For instance in Moyo District, over 95% of the Rural Growth Centers are occupied by informal settlements. There are inadequate urban services and few amenities in most of the rural growth centers. Only about 20% have water in their households, about 28% buy water from venders and about 52% fetch water from boreholes and natural springs. Only about 5% have access to modern energy much as the national grid passed through some of the centers. Up to 73% used paraffin and only 3.6% used electricity in West Nile 87% use firewood for cooking, 11% charcoal and 0.3 use electricity (UBOS 2013). Traditional pit latrines are the dominant excreta management system in most of the rural growth centers. There exist limited or no waste disposal facilities of landfills, incinerators, and lagoons. The district has no sewage systems in all urban areas including the Town council. Waste sorting for proper management and disposal is inexistent at urban areas posing serious health threats to the urban dwellers. Landfills are inexistent in almost all the urban areas. Waste transportation services are inexistent at the urban areas for collection and disposal of wastes generated.

The most common disease symptoms reported in West Nile include respiratory infections (14.4%), malaria (21.2%), and dirhoea (7.3%) (*UBOS 2013*).

3.10 Administrative Units

Arua district

Arua District lies in the North Western Conner of Uganda. It is bordered by the District of Maracha in the North West; Yumbe District in the North East; Democratic Republic of Congo in the West; Nebbi District in the South; Zombo District in the South East; and Amuru District in the East.

Arua District comprises 5 counties, 27 Sub-counties (including the divisions in the Urban Councils), 119 parishes (LCIIs) and 939 villages (LCIs). The district has one Urban Councils namely, Arua Municipal Council. The district covers a total area of 4,274.13 Km^2, 87% of which is arable.

Koboko district

Koboko District comprises of one county, 7 Sub-counties (including urban council), 47 parishes (LCIIs) and 389 villages (LCIs). The district has one Urban Council namely, Koboko Town Council. Two new sub-counties of Abuku from Lobule and Dranya from Midia have only been operational for two years. Their structures are yet taking shape with interim council and executives. A number of the new parishes are not operational and have no Parish Chiefs to manage them. New villages were also created mostly in Kuluba and Ludara as a result of new settlements that have taken place in areas that were mainly occupied by forests.

Table 3-12: Number of Administrative Units in Koboko by Sub-county

SN	Names of Sub Counties/ Town Councils.	No. of Parishes.	No. of Villages.
1	Midia	7	54
2	Dranya	6	41
3	Ludara	9	103
4	Kuluba	7	53
5	Koboko T.C.	4	20
6	Lobule	9	83
7	Abuku	5	36
Total		**47**	**394**

Yumbe district

Yumbe district is located in the northwestern corner of Uganda with one international border: South Sudan in the North, on the southern and western side: Arua and Moyo and River Nile in the east.

Yumbe district is a one county district known as Aringa County, and made up of twelve sub counties: Apo, Drajini, Romogi, Kuru, Kei, Odravu, Kochi, Kerwa, Kululu, Lodonga, Ariwa and Midigo; and one town council called Yumbe Town council.

Moyo district

Administratively, the district is divided into two counties namely, West Moyo and Obongi. It has eight sub-counties and one Town Council, 44 parishes and 241 villages as shown in Table 3-12 below.

Table 3-11: Summary of administrative units in Moyo per Sub County

Name of the County	Name of LLG	Number of Parishes	Number of villages
Obongi	Aliba	4	21
	Gimara	5	22
	Itula	8	34
West Moyo	Dufile	4	20
	Metu	6	52
	Moyo	5	36
	Lefori	4	24
	Laropi	4	21
	Moyo Town	4	11
Total		44	241

The proposed power transmission line will traverse through the Sub Counties of Pajulu, Adumi, Ayivuni, Katrini, Aii-vu, Odupi, Odravu, Omugo, Ariwa, Kululu, Apo, Rumogi, Kochi, Lefori, Moyo, Midigo, Keyi, Ludara, and Kuluba.

Table 3-12: Administrative boundaries through which the transmission line will traverse

District	Sub County	Parish
Arua	Pajulu	Adiofe
		Komite
		Olubo
		Orugbo
		Adarafu
	Adumi	Ombaki
		Nonya
		Mite
	Ayivuni	Anzu
		Kubo
		Mbaraka
	Katrini	Onzoro
	Odupi	Otumbari
		Lugbari
		Okavu
		Ombokoro
	Omugo	
	Aii-vu	Otrevu
		Alia
		Bura
		Edai
Yumbe	Ariwa	Okuyo
		Awinga
		Libonga
		Kaffe

	Odravu	Nyoko
		Luyi
		Wolo
	Kululu	Lomonga
		Yoyo
		Geya
	Apo	Kerila
		Yeta
	Kochi	Lori
		Yayale
	Romogi	Baringa
	Midigo	Mocha
		Mulumbe
	Kei	Akaya
		Urunga
Moyo	Lefori	Coloa
	Moyo	Eria
Koboko	Ludara	Layima
		Podo
	Kuluba	Kuluba

3.11 Demographic Characteristics

Arua district

Arua had a total population of 559,075 persons as of the Night of 12th/13th September 2002. This population is projected to have grown to 751,900 persons in 2011.

The total population in Arua district from the 2014 census was 85,189 people of which 373,762 were males and 411,427 were females. The population of the project areas in Arua district from 2014 census was as shown in the Table 3-15 below.

Table 3-13: Population in areas that will be traversed by the transmission line-Arua district

District	Sub County	Total Males	Total Females	Total population
Arua	Pajulu	27,935	32,275	60,210
	Adumi	14,371	16,256	30,627
	Ayivuni	10,737	11,791	22,528
	Katrini	15,072	17,139	32,211
	Odupi	19,970	21,454	41,424
	Omugo			

	Aii-vu	19,538	20,840	40,378

Koboko district

Koboko had a total population of 129,200 persons (65,400 females and 63,800 males) in 2002. Over a period of 12 years the population more than doubled from 62,337 to 129,200 in 1991 to 2002. The district's population in 2014 census was 208,163 people of which 102,091 were male and 106,072 were females. The population of the project areas in Koboko district from 2014 census was as shown in the Table 3-16 below.

Table 3-14: Population in areas that will be traversed by the transmission line-Koboko district

District	Sub County	Total Males	Total females	Total population
Koboko	Ludara	15,938	15,883	31,821
	Kuluba	20,519	20,300	40,819

Yumbe district

According to the population figures of the previous censuses, the district population was 77,980 in 1980. Ten years later in 1991, the population was 99,794 and the in 2002 census the total population was 251,785.

Yumbe district population growth rate between 1991 and 2002 was 7.93 percent per annum and the growth rate between 2002 and 2014 was 5.47 percent per annum.

The district's population in 2014 census was 485,582 of which 229,811 were males and 255,771 were females. The population of the project areas in Yumbe district from 2014 census was as shown in the Table 3-17 below.

Table 3-15: Population in areas that will be traversed by the transmission line-Yumbe district

District	Sub County	Total Males	Total Females	Total population
Yumbe	Ariwa	12,487	11,956	24,443
	Odravu	21,004	23,314	44,318
	Kululu	18,106	19,278	37,384
	Apo	19,385	21,042	40,427
	Kochi	18,876	21,366	40,242
	Romogi	21,593	22,339	43,932
	Midigo	17,488	20,363	37,851
	Kei	21,084	24,675	45,759

Moyo district

The results from 2014 population and housing census indicated that Moyo district had a total population of 137,489, of which 67,937 were males and 69,552 were females. Total number of households was 25,894 and the average household size was 5.3.

Moyo district population growth rate between 1991 and 2002 was 7.69 percent per annum and the growth rate between 2002 and 2014 was -2.9 percent per annum.
The population of the project areas in Moyo district from 2014 census was as shown in the Table 3-19 below.

Table 3-16: Population in areas that will be traversed by the transmission line-Moyo district

District	Sub County	Total Males	Total Females	Total population
Moyo	Lefori	6,014	6,419	12,433
	Moyo	11,861	12,819	24,680

3.12 Physico-Cultural Resources

The Department of Museums and Monuments (DMM) was consulted as part of the preparation of this Project Brief. DMM indicated PCRs in Uganda are not adequately surveyed, and the possibility of presence of archaeological or cultural resources cannot not be ruled out. DMM pointed out the presence of archeological sites along the Wandi - Yumbe route, and none reported for Odramachaku-Abiria line and the Midigo-Ludara line.

From literature review and field surveys, the following PCRs have been identified

- Major historical site in the project area is Dufuly Fort located in Alikua village, Aliapi parish Maracha County in Arua district built in memory of the Belgians who died in the area in 1911 when the West-Nile region was still under the Belgian protectorate.
- A number of iron smelting sites belonging probably to Early Iron Working which were noted on the terrain mostly exposed by human activities and animals as evidenced by scatters of pieces of iron slag. The project may also encounter pottery sites characterised by both decorated and plain shards, most of which are in poor state of conservation
- Burrial grounds – these are quite common in the region and out to be avoided, considering the respect or attachment to them by the local community.

4 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 Introduction

Environmental Impact Assessment is a legal requirement that must be carried out for all proposed developments which are likely to have significant impacts on the environment so that any negative impacts can be eliminated or mitigated. This project is listed under the Third schedule of the National Environment Act. It falls under category 10; Electrical infrastructure, including (b) electrical transmission lines.

The study team therefore reviewed and assessed the conformity of the proposed development to the existing national policies, laws and institutional requirements, pointing out the relevant clauses for attention of REA. REA's environmental and social management systems, Multilateral Environmental Agreements to which Uganda is a signitory, and industry best practices and standards, including the WB environmental safeguards applicable or triggered by this project have been reviewed.

4.2 National Environmental Policy, legislation and regulations

The applicable national environmental policies are presented in Table 4.1, and the laws, regulations and standards in Table 4-2.

Table 4-1: Summary of Ugandan Policies

Policy	Description
The National Environment Management Policy, 1994	The National Environment Management Policy for Uganda seeks to 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. The policy also seeks to integrate environmental concerns in all development policies, planning and activities at national, district and local levels, with full participation of the people. Other objectives are to Conserve, preserve and restore ecosystems and maintain ecological processes and life support systems, especially conservation of national biological diversity; Optimize resource use and achieve a sustainable level of resource consumption; Raise public awareness to understand and appreciate linkages between environment and development; and Ensure individual and community participation in environmental improvement activities. Relevant stakeholders were engaged during the Environmental impact study of the proposed rural erectrification projects in West Nile to seek their issues of concerns which will be addressed by implementing an ESMP presented in chapter 9 of this project brief.
The National Wetland Conservation and Management Policy, 1995	The National Wetlands Conservation and Management Policy, 1995 provides for, among others, important policy standards that Environmental Impact Assessment, and Audit procedures is a requirement for all activities to be carried out that will have an impact on wetlands. Furthermore, the policy aims at maintaining an optimum diversity of uses and users and consideration for other stakeholders when using a wetland. The proposed rural electrification projects' route traverse through some wetlands such as Ediofe wetland located around UTM coordinates E0265988 N0333127 and some rivers/streams which are associated with wetlands were identified in the project area. Such rivers include; Olika River/stream, River Ega, River Seva, River Esi, Kawa River, along Onduparaka distribution line; Inawa River, Oru River, Inventre River, Ibia River, Onvastia stream, River Ora, River Racha, Enventre River system, River Ono (Enaw), Jure River, Kochi River, and Nyawa River, along Wandi-Yumbe-Moyo distribution line. The wetlands and areas that have surface water will be protected from earth works and contamination since they form important habitats for many organisms.
The National Water Policy, 1999	The objective of this policy is to provide guidance on development and management of the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs, with full participation of all stakeholders and mindful of the needs of future generations. The water bodies along the right of way will be protected from earth works and contamination to avoid siltation and other associated impacts.
The Wildlife Policy,	The policy recognizes that wildlife is a key socio-economic resource for Uganda and outlines the status and threats to wildlife

Policy	Description
1999	in Uganda at the time. The policy also stipulates the protected areas in Uganda and their conservation importance. The policy motivates for a 'new approach' to wildlife management in Uganda. The policy states that there is a need to cater for the co-existence of wildlife and human populations, but this must be done in a manner in which the primary objective of conserving the nation's biological diversity is not lost. A National Wildlife Policy Framework is outlined in order to address the following challenges. 1. Protection of areas with high levels of biological diversity that are representative of the major habitats of Uganda. 2. Sustained management of Uganda's wildlife and the protection of threatened and endangered species. 3. Inclusion of the private sector, communities, NGOs, and others in policy implementation and the management of the country's natural resources. 4. Provision of a framework for the management of wildlife outside protected areas, with district authorities and rural communities playing a central role. 5. Management of wildlife conservation areas according to a comprehensive national strategy, and approved management plans. 6. Establishment of wildlife-related monitoring and research which directly contributes to wildlife management and conservation. The policy also addresses conservation of wildlife in and out of protected areas, policies for people occupying protected areas and wildlife use rights. During the environmental impact study, forest reserves which are habitats for wildlife were identified along the power transmission line route i.e. Otrevu Forest Reserve, Eria Forest Reserve, Otumbari Forest Reserve, and Mt. Kei Forest Reserve. Detailed locations for the forest reserves are listed in a Biological survey report attached in appendix1 of this report. Mitigation measures have thus been proposed under chapter 8 of this report to minimize negative impacts on wildlife.
The National Energy Policy, 2002	The goal of the Energy policy is to meet the energy needs of the Uganda's population for social and economic development in an environmentally sustainable manner. The policy recognizes linkages between the energy sector and other sectors such as environment, water resources, agriculture, land use, forestry, economy, industry, education, health, transport and decentralization and hence at the sector level, the policy strengthens the provisions of the National Environment Management Policy, 1994 that emphasizes the need for Environmental Impact Assessment. This policy recognizes the energy sector as potentially having more significant environmental impacts than most other economic sectors. Since energy development and environmental damage are related, the policy recognizes need to mitigate both physical and social environmental impacts of energy projects.

Policy	Description
	Objective (5) of the policy aims at managing energy-related environmental impacts and it states that the Government will ensure that environmental considerations are given priority by energy suppliers and users to protect the environment and monitor compliance with environmental protection guidelines. To meet these objectives, Government is required to: • Promote the use of alternative sources of energy and technologies that are environmentally friendly. • Sensitize energy suppliers and users about environmental issues associated with energy. • Work towards the establishment and acceptance of broad targets for the reduction of energy related emissions that are harmful to the environment and energy users. • Promote efficient utilization of energy resources. • Strengthen the environment-monitoring unit in the energy sector. Therefore, undertaking the Environmental impact study for the proposed rural electrification projects reveals that the Government of Uganda is fulfilling policy objective 5.
Uganda's Vision 2040	In 'Vision 2040' Ugandans set themselves many goals to achieve by the year 2040. The goals range from political, economic, social, environmental, and cultural among others. Concerning the environmental goals, Uganda aspires to have a sustainable social-economic development that ensures environmental quality and the resilience of the ecosystem. The elements of this aspiration, which should be taken into consideration include; • Social-cultural systems which foster both intra and intergenerational equity in the use of environmental resources • Stability of the national and global biological and physical systems which guarantees the resilience of the ecosystem overtime • Pollution-free, healthy and beautiful environment. REA has adhered to the above aspiration by ensuring sound environmental management in all its developmets. According to this vision, for Uganda to shift from a peasantry to an industrialized and largely urban society, it must be propelled by electricity as a form of modern energy. To achieve the targets of this Vision, Uganda will develop and generate modern energy to drive the industry and services sectors. It is estimated that Uganda will require 41, 738 MW by 2040 thus increasing its electricity per-capita consumption to 3,668 kWh. Furthermore the access to the national grid must significantly increase to 80 percent. To improve access and availability of electricity to the rural and urban areas, especially to economic zones and other productive areas, new transmission lines to evacuate power will be built and rural electrification programmes accelerated.

Policy	Description
	Government will provide incentives to lower the cost of electricity infrastructure, facilities and equipment. REA is commited to supply power to all the ERT III project areas.
The National Gender Policy, 2007.	The overall goal of this policy is to mainstream gender issues in the national development process in order to improve the social, legal/civic, political, economic and cultural conditions of the people of Uganda, particularly women. Thus, in the context of the power sector, this policy aims to redress imbalances that arise from existing gender inequalities and promotes participation of both women and men in all stages of energy project cycle, equal access to, and control over significant economic resources and benefits. This policy will especially apply to recruitment of construction workforce for the rural electrification projects where women should have equal opportunity as men for available jobs. This policy also requires provision of a work environment that is safe and conducive to women as is for men considering gender disaggregated differences and vulnerabilities. This for example applies to onsite worker's sanitation facilities where women should have separate facilities from those for men for example in the workers' campsite.
The Uganda National HIV and AIDS Policy, 2011.	In Uganda current effort to combat HIV/AIDS is characterized by a policy of openness by Government, and this has, to a large extent, been emulated by civil society, political and social institutions, and workplaces. HIV/AIDS is recognized by Ministry of Health as a considerable risk in construction of infrastructure projects and it (together with the ministry responsible for labour) encourages employers to develop in-house HIV/AIDS policies, provide awareness and prevention measures to workers and avoid discriminating against workers living with or affected by HIV/AIDS. To ensure HIV/AIDS is addressed in the workplace, the policy encourages employee awareness and education on HIV/AIDS. To protect the infected and affected persons from discrimination, employers are required to keep personal medical records confidential. Employees living with, or affected by, HIV and AIDS, and those who have any related concerns, are encouraged to contact any confidant within the organization to discuss their concerns and obtain information. It is anticipated that during construction phase, there may be an influx of people into the project area possibly resulting into sexual fraternization and a risk of HIV/AIDS spread. The policy also guides about HIV/AIDS management including awareness and provision of condoms in workplaces. A number of workers are expected to come in the project areas during construction of the power transmission lines and these are likely to be exposed to an environment that encourages the spread of HIV/AIDS. HIV/AIDS awareness and sensitization will be undertaken by the contractor among workers and the local community members within the project areas. Signage on HIV/AIDS awareness will be put at the work places or staging areas, and where

Policy	Description
	need be condoms will be availed to the workers and the local community during construction works.
The Forestry Policy, 2001	The policy stresses the ecological and socio-economic importance of protecting the country's forest resources. Implementation of the policy is the responsibility of the National Forestry Authority (NFA), which also provides guidelines for management of forest reserves, community forests, and private forests. The forest policy entails provisions for safeguards and conservation of forests so as to ensure sufficient supplies of forest products, protect water resources, soils, fauna, and flora. The policy also mandates government with responsibility to control unsustainable forest exploitation practices. Four forest reserves under the jurisdiction of Uganda's National Forest Authority were identified along the proposed distribution line routes and these include: Otrevu Forest Reserve which is approximately 100 hectares located on Arua Yumbe Road, Otumbari Forest Reserve which is 83 hectares also located on Arua Yumbe Road, Eria Forest Reserve located on Yumbe Moyo road, Mt. Kei Forest Reserve which is 40 hectares located in Koboko District on Midigo-Ludara-Toff along Kei road. Mitigation measures have thus been proposed (with guidance from NFA) to minimize impact on flora and fauna.
Renewable Energy Policy for Uganda, 2007	The overall objective of the Renewable Energy Policy is to diversify energy supply sources and technologies in Uganda. In particular, the policy goal is to increase use of renewable energy from 4% (in 2007) to 61% of the total energy consumption by 2017

Table 4-2: Summary of Key Environmental Legislation

Legislation	Description
Environmental Legislation	
The Constitution of Uganda	The Uganda Constitution of 1995 states in articles 39 and 41 that everyone has a duty to maintain a sound environment. Every person in Uganda has a right to a healthy and clean environment and as such can bring legal action for any pollution or disposal of wastes. It also stipulates that Parliament shall by law provide measures intended to protect and preserve the environment from abuse, pollution and degradation. **Implementation:** This ESIA is being conducted to ensure compliance with national environmental requirements. A Project Brief and ESMP will be prepared and environmental concerns addressed in the project design and implementation.
National Environment Act CAP 153	The National Environment Act Cap 153 was enacted in 1995 and stipulates the principles of environmental management and the rights to a decent environment; institutional arrangements; environmental planning, environmental regulations, environmental standards; environmental restoration orders and environmental easements; records, inspection and analysis; financial provisions; offences; judicial proceedings and international obligations. The third schedule of the Act lists projects for which an environmental impact study is mandatory. Section (1) (a) provides for ESIA for 'an activity out of character with its surroundings'. Section (10) covers electrical infrastructure. ***Section 22 of the National Environment Act stipulates a requirement to undertake environmental audits for projects for which environmental impact assessments were carried out, and for ongoing monitoring and reporting on compliance with statements made in the environmental impact assessment.*** Section 36 (1) 'No person shall(a) reclaim or drain any wetland; (b) erect, construct, place, alter, extend, remove or demolish any structure that is fixed in, on, under or over any wetland; (c) disturb any wetland by drilling or tunnelling in a manner that has or is likely to have an adverse effect on the wetland; (d) deposit in on or under any wetland any substance in a manner that has or is likely to have an adverse effect on the wetland; (e) destroy, damage or disturb any wetland in a manner that has or is likely to have an adverse effect on any plant or

Legislation	Description
	animal or its habitat; (f) Introduce or plant any exotic or introduced plant or animal in a wetland, unless he or she has written approval from the authority given in consultation with the lead agency.
The National Environment (Environmental Impact Assessment) Regulations, 1998	These regulations apply to all projects included in the Third Schedule to the NEA, and to any major repairs, extensions or routine maintenance of any existing project which is included in the Third Schedule to the NEA. These regulations stipulate about project briefs, environmental impact assessment studies, environmental statements, the review process of environmental impact statements (EIS), decisions after EIS review, access to information and EIS reports and post-assessment audits. The first schedule to these regulations lists issues that need to be considered during EIA studies these include ecological considerations, social considerations, landscape, and land use.
The National Environment (Wetlands, River banks and Lakeshores Management) Regulations, 2000 under the National Environment Act Cap 153, 1995	Section 12 (1) of the regulations provides that '*subject to the provisions of these regulations, a person shall not carry out any activity in a wetland without a permit issued by the Executive Director*.' Section 23 (1) (a) of the regulations points out that a person who intends to '*use, erect, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in, under, or over the river bank or lake shore*;' shall make an application to the Executive Director (of NEMA) in form A set out in the First Schedule to these regulations. The regulations in Section 34 also provides that '*a developer desiring to conduct a project which may have a significant impact on a wetland, river bank or lake shore, shall be required to carry out an environmental impact assessment in accordance with Sections 20, 21 and 22 of the National Environment Act*'.
The National Environment (Waste Management) Regulations, 1999 under the National Environment Act Cap 153, 1995	These regulations require waste disposal in a way that would not contaminate water, soil, air or impact public health. This is in relation to onsite waste storage, haulage and final disposal. According to the regulations, waste storage, transportation and treatment or disposal should be done by licensed entities.
The Electricity Act, 1999	This Act created the Electricity Regulatory Authority ("*the Authority*" in this Act), an independent body responsible for regulating the electricity sector in Uganda and licensing private investors.

Legislation	Description
	The Authority retains power to award licenses for power generation; promote efficiency, economy and safety on the part of licensees and the efficient and safe use of electricity. This ensures that the design and operation of generation, transmission and distribution by licensees will have efficiency built in and approved standards. Section 68 of the Act provides guidelines for the placement of electricity supply lines on land, stating that a developer shall as much as possible minimise damage to the environment and shall ensure prompt payment of fair and adequate compensation to all interested persons for any damage or loss sustained by construction of electricity supply infrastructure. Further, the Act under section (49) (2) requires, when necessary, decommissioning (removal of installations) of the project to be done in accordance with the National environmental Act and prevailing applicable standards.
The Electricity (Primary Grid Code) Regulations, 2003	This code provides the guidelines and procedures for the licensees of the electric power system to operate the Uganda power system. Section 10 of this regulation requires the licensee to ensure safety of the distribution system, including protection systems, the use of certified technicians for installations and keeping it clear of vegetation.
The Electricity (Tariff Code) Regulations, 2003	This instrument provides clarity and guidance about the procedures the Authority follows in the process of computing tariffs
The Electricity (Safety Code) Regulations, 2003	These Regulations apply to electrical systems, and to associated plant and apparatus under their ownership or control. It emphasizes general safety precautions, precautions for work on or near high voltage and low voltage systems
The Uganda Wildlife Act, Cap 200, 2000	The main objective of the Uganda Wildlife Act, Cap 200 of 2000 is to protect wildlife resources and enable derivation of benefits. Need for sustainable management is recognized within the framework of effective planning and stakeholder participation. The Act allows local community involvement and opens up wildlife management to the non-governmental/private sector by making it possible for the private sector to manage protected areas / wildlife and provide services. The Uganda Wildlife Act provides for, *inter alia,* the sustainable management of wildlife, and establishes the Uganda Wildlife Authority (UWA) as the body mandated with the co-ordination, monitoring and supervision of wildlife management. It does so in partnership with neighbouring communities and stakeholders. It was established as a result of a merger between the Uganda National Parks and the Game Department.

Legislation	Description
	Wildlife is defined by the Act to mean any wild plant or wild animal or species native to Uganda and includes wild animals that migrate through Uganda. Specifically, UWA is responsible for the management of all National Parks, Wildlife Reserves, Wildlife Sanctuaries and also provides guidance for Community Wildlife Areas. UWA is also mandated in consultation with NEMA to carry out audits and monitoring of projects likely to affect wildlife. The Act under Part IV deals with the procedure of declaration of wildlife conservation area, including wildlife protected areas and wildlife management areas. The wildlife management areas include community wildlife areas. Section 21 lists general offences in wildlife conservation areas. Section 24 provides for the authority to carry out an otherwise unlawful act in a wildlife conservation area, and requires an Environmental Impact Assessment. The Act in Section 15 (1) & (2) requires that any developer desiring to undertake any project which may have significant impact on any wildlife species or community undertakes an ESIA in accordance with the National Environment Act.
The National Forestry and tree Planting Act, 8, 2003	Under section 32 of this Act, activities prohibited in Forest Reserves are listed, and allowed only with a licence issued by NFA, and include tree cutting, clearance or occupation of land, contracting or re-opening of tracks
The Water Act, Cap 152	The Act provides for the use, protection and management of water resources and supply in Uganda. Section 31, Sub-section (1) of the Water Act deals with prohibition of pollution to water and stipulates that a person commits an offence who; unless authorized under this Part of the Act, causes or allows: (i) Waste to come into contact with any water (ii) Waste to be discharged directly or indirectly into water (iii) Water to be polluted Under Section 107, the Water Resources Regulations of 1998; Water (Waste Discharge) Regulations (1998); the Water Supply Regulations (1999) and the Sewerage Regulations (1999) have been put in place to implement the Act and are aimed at minimizing pollution of public waters by developers and other users.
The Water	According to Regulation 4 (1) of the Water (Waste Discharge) Regulations (1998): '*No person shall discharge effluent or*

Legislation	Description
Resources (Waste Discharge) Regulations No. 32, 1998	*waste on land or into aquatic environment contrary to the standards established regulation 3; unless he or she has a permit in the format specified in the First Schedule issued by Director of DWRM.'*
The Roads Act CAP 348	The Roads Act of 1964 also makes provision for the existence of a road reserve. The Act defines the road reserve as the area bounded by imaginary lines parallel to and not more than fifty feet (approximately 15 metres) from the centreline of any road and declared to be a road reserve. The Act furthermore states that no person shall erect any building or plant, trees or permanent crops within a road reserve. The Roads Act also allows the road authorities to dig and take materials from the road reserve for the construction and maintenance of roads.
National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999 under the National Environment Act Cap 153, 1995	This regulation sets the standards of effluent or waste water before discharge into the water or on land, and makes it an obligation to mitigate pollution.
The National Environment (Noise Standards and Control) Regulations, 2003 under the National Environment Act Cap 153, 1995	These regulations provide for permissible noise levels (for different environments), control and mitigation of noise, licensing and enforcement. Section7(1)states that "No person shall emit or engage in any activity that emits or is likely to emit noise above a maximum permissible level specified in Section 6 and Schedule 1 of these Regulations, unless permitted to do so by these Regulations. Section 8(1) provides for the duty to control noise. It shall be the duty of the owner or occupier of a facility or premise or machinery to use the best practicable means of ensuring that the emission of noise from those premises does not exceed the standards and limitations set in these regulations. Section 8 (2) provides for the owner of machinery, or the

Legislation	Description
	owner or occupier of an industry or establishment shall install, at the premises sound level meters for the measurement and monitoring of sound from the industry or establishment to ensure that the noise emitted does not exceed the permissible noise level.
The Investment Code Act, Cap 92, 1991	Section 18(2) (d) of the Act requires an investor to take necessary steps to ensure that development and operation of an investment project does not cause adverse ecological and socio-economic impacts.
The Petroleum Supply Act, 2003	The Petroleum Supply Act, 2003, which repealed the Petroleum Act, Cap 97 of the 1964 Laws of Uganda and the Uganda Oil Board Statute of 1991, requires that anyone intending to enter the petroleum supply chain must apply to the commissioner of Petroleum Supply for the grant of a petroleum construction permit or grant of a petroleum license. The Petroleum Supply (General) regulations provide for construction permits and licensing of operations of petroleum installations or facilities. Environmental Impact Assessments and/ or Environmental Audits have to be carried out prior to issuance of new licenses or permits.
The Local Governments Act, Cap 243, 2000	This Act provides for governance and devolution of central government functions, powers and services to local governments that have their own political and administrative set-ups. According to Section 9 of the Act, a local government is the highest political and administrative authority in its area of jurisdiction and shall exercise both legislative and executive powers in accordance with the Constitution.
Social Legislation	
The Public Health Act, 281, 1964	Section 7 of the Act provides local authorities with administrative powers to take all lawful, necessary and reasonable practicable measures for preventing the occurrence of, or for dealing with any outbreak or prevalence of, any infectious communicable or preventable disease to safeguard and promote the public health and to exercise the powers and perform the duties in respect of public health conferred or imposed by this act or any other law. Section 105 of the Public Health Act (1964) imposes a duty on the local authority to take measures to prevent any pollution dangerous to the health of any water supply that the public has a right to use for drinking or domestic purposes.
The Historical and	The Historical and Monuments Act, 1967 is currently under review. The Act provides for the preservation and

Legislation	Description
Monuments Act, 1967	protection of historical monuments and objects of archaeological, paleontological, ethnographical, and traditional interest. Under this Act the Minister responsible may cause any of the aforesaid objects to be declared as preserved objects. The Act prohibits any person from carrying out activities on or in relation to any object declared to be preserved or protected. Section 10 of this Act spells out the procedures and requirement to declare and inspect newly discovered sites that may have archaeological, paleontological, ethnographical, historical and traditional significance for purposes of protection.
The Land Act, Cap 227, of 1998	The Land Act, Cap 227 of 1998 provides for the tenure, ownership and management of land. Under Section 44 the Government or the local government shall hold land in trust for the people and protect natural lakes, ground water, natural streams, wetlands and any other land reserved for ecological purposes for the common good of the citizens of Uganda. Part II of this Act addresses forms of land holding. Part III addresses control of land use. Section 43 specifically addresses the utilization of land in accordance with the various statutes and acts of environmental concern, which include the National Environment Act, The Water Act, and any other law. In addition Section 45 addresses the control of environmentally sensitive areas. Land management issues and administration are handled in Part IV and V. Section 59 lists the functions of the district Land Board including (f) – to compile a list of rates of compensation payable in respect of crops, buildings of a non permanent nature, and any other thing that may be prescribed; e) – review every year the list of rates of compensation. Section 76 provides the Jurisdiction of District land tribunals; Section 77 specifically addresses computation of compensation.
The Land Acquisition Act 1965	This Act makes provision for procedures and method of compulsory acquisition of land for public purposes. The Minister responsible for land may authorize any person to enter upon the land, survey the land, dig or bore the subsoil or any other actions necessary for ascertaining whether the land is suitable for a given public purpose. However, compensation should be paid to any person who suffers damage as a result of such actions
The Occupational Safety and Health Act, 2006	The Occupational Safety and Health Act of 2006 consolidates, harmonises and updates the law relating to occupational safety and health and repeals the Factories Act of 1964. It makes provisions for the health, safety, welfare and appropriate training of persons employed in work places.

Legislation	Description
The Employment Act, 2006 and other related Acts	Employment Act, 2006 repeals Employment Act, Cap 219 enacted in 2000. This Act is the principal legislation that seeks to harmonise relationships between employees and employers, protect workers interests and welfare and safeguard their occupational health and safety through: (i) Prohibiting forced labour, discrimination and sexual harassment at workplaces (Part II; Part IV); (ii) Providing for labour inspection by the relevant ministry (Part III); (iii) Stipulating rights and duties in employment (weekly rest, working hours, annual leave, maternity and paternity leaves, sick pay, etc. (Part VI); and (iv) Continuity of employment such as continuous service, seasonal employment, etc (Part VIII). The Employment Act 2006 is the governing legal statutory instrument for the recruitment, contracting, deployment, remuneration, management and compensation of workers. The Employment Act 2006 is based on the provisions of Article 40 of The Constitution of Uganda. The Act mandates Labour officers to regularly inspect the working conditions of workers to ascertain that the rights of workers and basic provisions are provided and workers' welfare is attended to. The Act also provides for the freedom of association of workers permitting workers to join labour organizations. This provision is also supported by the Labour Unions Act 7, 2006, which provides elaborate guideline and regulation for membership. Other related laws requiring the proponent to ensure workers' safety social security and protection include: the Labour Disputes (Arbitration and settlement) Act, 2006, Workers' Compensation Act, Cap 225, the Interpretation Act, Cap 3; Occupational Safety and Health Act 9, 2006; The National Social Security Act Cap 222, and the Labour Unions' Act, 2005.
The Workman's Compensation Act, 2000	The law requires that compensation be paid to a worker who has been injured or acquired an occupational disease or harmed in any way in the course of his work. Section 6 & 7 provide for the compensation for fatal injury as 46 months of earning. For permanent incapacity compensation is 60 and 72 months earning respectively. Section 15 puts medical examination for an injury to be the Employer's responsibility and prescribes a form of notification of injury to the Commissioner for Labor. The injured worker and employer may agree on the compensation or it can be determined by a court of law when there is disagreement between the parties, and appeals can be made to the High Court for settlement.
The Physical Planning Act, 2010	The physical planning Act 2010 was passed to consolidate the law on physical planning in order to make the whole country a planning area. Amongst the principles of this Act is to repeal the Town and Country Planning Act, Cap 246

Legislation	Description
	which is now outdated. Hence the Physical Planning Act establishes a National Planning board which shall be responsible for physical planning. Clause 32 of this Act provides for a landowner to use services of a qualified planner to prepare a local physical plan which shall be submitted to the local physical planning committee for adoption with or without modifications. Part 8 is concerned with control of development and clause 38 of this part specifies that an applicant for development permission in a planning area must obtain an Environmental Impact Assessment certificate in accordance with the National Environment Act.
The Local Government Act, 1997	The Local Government Act, 1997 provides for decentralization and devolution of Government functions, powers and services from the central to local governments and sets up the political and administrative functions of local governments. The local governments are responsible for the protection of the environment at the district level. This therefore, implies that local governments shall be consulted on projects to be located within their jurisdiction and on matters that affect their environment.

4.3 World Bank Safeguard Policies

The objective of the World Bank's environmental and social safeguard policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for bank and borrower staffs in the identification, preparation, and implementation of programs and projects. Safeguard policies have often provided a platform for the participation of stakeholders in project design, and have been an important instrument for building ownership among local populations. (World Bank, 1999-2006).

4.3.1 Environmental Assessment (OP/BP 4.01)

Section 7 requires that a range of EA instruments be used depending on the project. Section 8 categorizes the project according to type, location, sensitivity and scale of the project and the nature and magnitude of its potential environmental impacts. This policy emphasizes consultation and public disclosure. Section 14 requires that developers of category A and B projects consult the project-affected groups and local nongovernmental organizations (NGO) about the project. The policy also requires that relevant material be provided in timely manner prior to consultation and in a form and language that is understandable by groups being consulted (section 15). Before the project can be upraised by the bank, an EA report for such project (category A and B) has to be disclosed to the affected persons and the public. Furthermore the developer is required to report on compliance monitoring of the EMP.

This project is under category B considering the impacts are readily identified, mitigated and managed. Consultations and engagement with stakeholders has been undertaken as part of this assessment and is presented in Section 6.

4.3.2 Cultural Property (OP/BP 4.11) Physical Cultural Resources

These procedures assist in preserving physical cultural resources (PCR) and held in avoiding the destruction or damage. PCR includes resources of archeological, paleontological, historical, religious (including grave yards and burial sites), or other cultural significance.

i. It defines Physical Cultural Resources as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.
ii. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water.
iii. Their cultural interest may be at the local, provincial or national level, or within the international community.
iv. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices.

The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from

project activities, including mitigation measures, may not contravene either the borrower's national legislation, or its obligations under relevant international environmental treaties and agreements.

Archeological sites, historical and burial sites were not found along the power transmission line route. Additional consultations with the local communities will be undertaken during ESMP implementation. The contractor to implement a chance finds procedure summarized in Section 8.20.

4.3.3 Involuntary Resettlement (OP/BP 4.12)

This involuntary resettlement may cause severe long-term hardship, impoverishment, and environmental damage unless appropriate measures are carefully planned and carried out. Therefore the bank has the following objectives on involuntary resettlement

- To avoid involuntary resettlement and where this is not feasible, resettlement activities should be conceived and executed as sustainable development programs through meaningful consultation;
- Providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

The power distribution line route design minimises the need for resettlement. It will mainly follow the road reserve which is public land hence no compensation for land will be required, nor resettlement requirement.

4.3.4 Natural Habitats (OP/BP 4.04)

The policy promotes environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions. The policy limits the circumstances under which projects can damage natural habitats. Specifically it prohibits projects which would lead to significant loss or degradation of any critical natural habitats, while in Non-critical Natural Habitats feasible alternatives can achieve the projects potential overall net benefits.

The natural habitats along this power line routes include wetlands, woodlands and thickets, but from the baseline survey findings, these will be marginally affected as per design.

4.3.5 Forests: OP/BP 4.36

This safeguard policy provides measures for protection of forests through impact evaluation and conservation of forest during project development.

This policy has been triggered because the proposed power distribution line route has sections in 4 plantation Central Forest Reserves. However, these have been assessed as of low ecological sensitivity. The design of the line along the road reserve also minimizes the need to clear trees along the right of way.

4.3.6 World Bank Safeguard Policy BP 17.50- Public Disclosure

This policy encourages Public Disclosure (PD) or Involvement as a means of improving the planning and implementation process of projects. This procedure gives governmental agencies responsibility of monitoring and managing the environmental and social impacts of development projects particularly those impacting on natural resources and local communities. The policy requirees that effective PD is carried out by project proponents and their representatives. The BP requires that Public Involvement should be integrated with resettlement, compensation and indigenous peoples' studies. Monitoring and grievances address mechanism should also be incorporated in the project plan.

In the conduct of the environmental assessment for this project, public participation and stakeholders' consultation has been undertaken, and the views the local communities and their leaders, as well as government lead agencies, incorporated in the project mitigation plan. Stakeholder enegagement will continue throughout the contruction and operations phase, and a Grievanc Management Mechanism has ben proposed.

4.4 World Bank Group General EHS Guidelines and Guidelines on Electric Power Transmission Lines and Distribution

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, the EHS Guidelines are applied as required by their respective policies and standards. The industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors.

Environmental issues during the construction phase of power transmission and distribution projects specific to the industry sector include the following:

- Terrestrial habitat alteration
- Aquatic habitat alteration
- Electric and magnetic fields
- Hazardous materials and oil spills associated with heavy equipment operation and fueling activities.

  Avoidance of critical habitats has been empahsised in the design phase, especially through utilisation of road reserves and existing infrastructure such as access roads.

  Most occupational health and safety issues during the construction, operation, maintenance, and decommissioning of power distribution projects are common to those of large facilities,

and their prevention and control is discussed in the General EHS Guidelines. These impacts include, among others, exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards; exposure to dust and noise; falling objects; work in confined spaces; exposure to hazardous materials; and exposure to electrical hazards from the use of tools and machinery.

Impacts on community health and safety listed in the guidelines include electrocution, electromagnetic interference, visual amenity, noise and ozone, and air craft navigation safety. These aspects are discussed in Chapter 8.

The contractor will implement the recommended mitigation measures during the construction phase of the power distribution lines, and the system operator to address impacts during the operations and decommissioning phase.

4.5 Multilateral Environmental Agreements/international Conventions to which Uganda is a Party

Uganda has signed and /or ratified a range of international agreements relating to the environment, both regionally and globally. The National Environment Act provides for the implementation of the international Conventions on environment ratified by Uganda. The relevant conventions for the proposed power distribution lines are discussed below:

4.5.1 Convention for the Protection of the Ozone Layer and Its Montreal Protocol

This 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 1987and was last revised in 1999 at Beijing. It has been ratified by 96 countries including Uganda.
The ozone depleting substances are Chlorofluorocarbons (CFCs) and Hydro fluorocarbons (HCFCs). The ozone shield is important because it protects plants and animal life on land from the sun's ultraviolet rays, which can cause cancer, cataracts, and damage to the immune system. Thinning of the ozone layer may also alter the DNA of plants and animals. They also act as greenhouse gases, with several thousand times the per-molecule greenhouse potential of carbon dioxide.
The signatory are required to;

- Recognize that worldwide emissions of certain substances can significantly deplete and otherwise modify the ozone layer in a manner that is likely to result in adverse effects on human health and the environment.
- Determined to protect the ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge.
- Acknowledge that special provision is required to meet the needs of developing countries.
- Accept a series of stepped limits on CFC use and production.

- Uganda has put a law in place to guide in adherence to this protocol; The National Environment (Management of Ozone Depleting Substances and products) Regulations 2001. Requirements under this convention should be borne in mind during selection of equipment and machinery for running the project.

4.5.2 United Nations Framework Convention on Climate Change (UNFCCC)

The convention on climate change sets an overall frame work for intergovernmental efforts to tackle the challenge posed by climate change. It recogonises 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 in September 1993 and its enforcement was in March 1994. Uganda ratified the convention in March 2002 while entry into force was February 2005. Greenhouse gases are gases in 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.

The emission of greenhouse gases especially carbondioxide is limited to vehicles, generators and equipment during construction and detailed mitigation measures to control such emissions have been proposed in section 8 of this project brief.

4.5.3 Rio Declaration (Or Agenda 21)

The concept of public participation in development planning project is a key aspect in this convention. From the most important conventions and declarations, one should note the Rio World Conference on Environment and Development in 1992 (in Brazil), followed by the Aarhus Convention in 1998 (in Denmark), public participation in environmental matters became like a human right.

"Free access to information for the public and active participation in development project processes" Moreover, the World Commission encourages stakeholders' involvement to be ensured by government s in all stages of projects starting from early planning.

The public was involved right away from the planning stage for the power distribution lines and will be engaged throughout the different phases of the project development.

4.5.4 The Convention on Biological Diversity 1992 (CBD)

The convention on biodiversity 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 convention 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. Uganda signed the convention on biodiversity in June 1992, and ratified it in September 1993. On ratification Uganda became a contracting party to CBD.

Baseline conditions along the power distribution line routes were determined and will be used as the basis for future monitoring (See details in the biodiversity report attached in Appendix 1).. Measures for mitigation, including conservation are proposed inethe ERT III ESMF and in this Project Brief (sections 8 and 9).

4.5.5 The Convention on Wetlands of international importance (RAMSAR Convention)

The convention's main objective is to ensure the wise use and conservation of wetlands owing to their richness in species therein, their high economic value and the fact that they are a source of livelihood for local communities.

Uganda signed the convention on wetlands in 1971and ratified it in 1988. Even before ratifying the convention on wetlands ion 1988, Uganda had already taken measures to prevent the degradation of wetlands. In 1986 the government banned the large-scale drainage on wetlands until the policy on wetlands had been developed.

This was followed by the formulation of the National Wetlands conservation and management programme in 1989. The programme embarked on developing a policy on wetlands that was established in 1995. Functioning of the wetlands programme has since followed a path of implementing Uganda's obligations to the conventions on wetlands.

Wetlands are now legally protected under the 1995 constitution, The National Environment Statute (1995), and the Land Act 1997. According to these laws it is an offence for a person to significantly alter or change any wetland without written permission from NEMA. This applies even when a wetland is a personal possession.

The convention on wetlands contributes to the conservation and wise use of wetlands in Uganda in the following ways;

- Uganda stands to benefit from technical assistance provided by the development partners to prevent changes that are detrimental to wetlands.
- Special attention is being given to Uganda as a member state to the convention in the management and conservation of listed sites which may undergo ecological change as a result of technological development, pollution or other human interference.
- Uganda stands to benefit from the RAMSAR small grants that are given to assist in management of wetlands
- Uganda can benefit from information gathered by the Ramsar Bureau since the Bureau maintains links with organizations and institutions involved in conservation training and

education throughout the world and passes on information to the convention member states.

- As a contracting party to the convention, Uganda stands to benefit from the wetland conservation fund or through contacts with the development agencies running training programmes. The Ramsar Bureau recognizes the need for adequate financial resources for training programmes, particularly in developing countries, and provides help in soliciting funds.

The proposed power distribution lines will cross some wetland sections and the contractor on behalf of REA will ensure that wetland values are not interrupted. No poles to be erected in the wetlands considering the wide span of 100m in the design.

4.5.6 African Convention on the Conservation of Nature and Natural Resources-1982

Under this convention in article 11, the contracting states shall undertake to adopt the measures necessary to ensure conservation, utilization and development of soil, water, flora, and faunal resources for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.

4.6 Institutional Framework

4.6.1 Ministry of Energy and mineral Development

The mandate of the Ministry of Energy and Mineral Development (MEMD) is "To establish, promote the development, strategically manage and safeguard the rational and sustainable exploitation and utilization of energy and mineral resources for social and economic development".

Under ERT III, the MEMD houses a PCU, with a Safeguards Officer (Environmental Specialist), responsible for project Environmntal and Social aspects. The Ministry is also responsible for development of potential small hydropower sites, exploring additional generation from geothermal sources, Market and street lighting, and consumer awareness on energy efficiency.

4.6.2 Elecetricity Regulatory Authority

The Electricity Regulatory Authority is established as a statutory body in accordance with the Electricity Act 1999, Cap. 145. The Act empowers ERA to regulate the generation, transmission, sale, export, import and distribution of electrical energy in Uganda. The functions of the Authority are spelt out in Section 11 of the Act and further highlighted in Section 2.4 of this report. REA is required to submit to ERA: a feasibility study and an environment impacts assessment; apply for a distribution licence or notify ERA of concessionaire/licencee, provide commissioning report to ERA including transformer tests and as built drawings. Electrical Installations should be carried out be ERA Certified personnel.

4.6.3 Rural Electrification Agency

Rural Electrification Agency (REA) is the Secretariat of the Rural Electrification Board (REB) which manages the Rural Electrification Fund (REF). REA is responsible for developing and promoting rural electrification. The Rural Electrification Board (REB), as the governing body of REA, provides subsidies to support rural electrification projects.

Under ERT III REA is responsible for Rural Energy Infrastructuree, and Energy Development, Cross Sectoral Links (including installation of solar PV systems for institutions such as schools, health centers and water pumping stations).

REA is responsible for implementation of the ESMF, and specifically the ESMP developed for this lines. The PIU has in place an Environmental Specialist, Social Development Specialist who will ensure the environmental and social aspects, and grievances, are addressed. The ESMP also proposes a budget to ensure implementation of the ESMP.

4.6.4 Uganda Electricity Transmission Company

The Uganda Electricity Transmission Company Limited (UETCL) is the System Operator and owns transmission lines above 33kV. UETCL is the bulk supplier and single buyer of power for the national grid in Uganda. It is the purchaser of all generated power in the country that is fed into the national grid. Generators of electricity are expected to sign a Power Purchase Agreement (PPA) with UETCL.

4.6.5 Uganda Energy Credit Capitalisation Company

UECCC's mandate is to provide a reliable framework for pooling resources from Government, Investors and Development Partners and channel the same to viable renewable energy projects.

4.6.6 National Environment Management Authority

National Environment Management Authority (NEMA) was established under the National Environment Act Cap. 153 as the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management in Uganda. In this context, NEMA will be responsible for review and approval of the Project Brief, ensuring proposed mitigation measures are implemented, monitoring compliance with approval conditions, and ensuring any other impacts that may arise are mitigated.

4.6.7 National Forestry Authority

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

4.6.8 Uganda Wildlife Authority

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

4.6.9 Wetlands Management Department

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

4.6.10 Directorate of Water Resources Management

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

4.6.11 Ministry of Lands, Housing and Urban Development

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

4.6.12 Concessionnaires

The Electricity Act Provides for Concessionnaires in the distribution of electrical power. Uganda has been divided into service territories. The West Nile Region or projct area is divided into two territories, with West Nile served by WENRECO and North North West under UEDCL.

4.6.13 Uganda National Raods Authority

The mandate of UNRA is to develop and maintain the national roads network, advise Government on general roads policy and contribute to addressing of transport concerns, among others. Some of UNRA responsibilities include: management of the National Roads Network; maintenance and development of the national roads network; and establishing and maintaining road reserves among others. UNRA is a key stakeholder under the ERT III because the distribution lines components largely fall under road reserves.

4.6.14 Ministry of Local Government

The 1997 Local Government Act provides for decentralization and devolution of government functions, powers and services from the central to Local Governments and sets up the political and administrative functions of local governments. The Local Governments are responsible for the protection of the environment in their respective areas of jurisdiction. Local Governments shall be

consulted on projects to be located within their jurisdiction and on matters that affect their environment.

At the District Level, the District Environmental Officers, District Engineer and Community Development Officers in the respective areas of project implementation will participate in monitoring the projects to ensure that mitigation measures are adequate and advice or point out additional compliance requirements following their inspections. The District Land Boards and Lands Officers will provide guidance on issues of compensation or land acquisition.

4.6.15 The Ministry of Finance, Planning and Economic Development

The mandate of the Ministry is to:

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

4.6.16 The Role of the Contractors

The Role of the Contractor, which will be as per the contract will be accountable for the overall implementation of the mitigation measures and this will be monitored and supervised by the PCU's Safeguards Officer. As such, an ESMP will be prepared for each sub-project. In the schedule of works, the Contractor will include all proposed mitigation measures, and the Supervising Engineers will also ensure that, the schedules and monitoring plans are complied with. This will lend a sense of ownership to the Contractor. The Contractor on his part will also be responsible for planning, implementing and reporting on mitigation measures during the execution of the project works. The Contractor will also be required to apply standard quality assurance procedures in full compliance with the NEMA's Approvals.

4.6.17 Role of Supervising Consultant

The Supervising Consultant should have in his team an Environment Specialist who will have overall responsibility of ensuring that, project implementation process complies with NEMA Approval conditions as well as contract provisions. The Environmental Specialist shall work closely with PCU's Safeguards Officer in supervising the contractor. In addition, he/she will conduct scheduled site supervision to monitor state of environmental compliance as documented or executed by the Contractor's Environmentalist. The Safeguards Officer will also be attending site meetings and providing in-put to the Project Monthly Progress Reports.

4.7 REA Requirements

4.7.1 REA ESMF

This ESMF provides guidance on how environmental and social aspects shall be identified, assessed and managed. It provides a general impact identification framework to assist project implementers to screen the projects and institute measures to address adverse environmental and social impacts. The Framework guides on literature reviews; field reconnaissance studies, public consultations and

discussions with relevant sector institutions, including districts, private sector, statutory agencies and local communities.

4.7.2 The Resettlement Policy Framework for ERT III

This RPF seeks to ensure that possible adverse impacts of proposed project activities are addressed through appropriate mitigation measures, in particular, against potential impoverishment risks. Whenever a Resettlement Action Plan is required, it will be prepared in accordance with guidance provided in this RPF, including Detailed Measurement Surveys, a Socio-economic Study and Identification (Census) of PAPs/displaced persons, and Public Consultation and Disclosure (PCDP).

This RPF seeks to ensure that possible adverse impacts of proposed project activities are addressed through appropriate mitigation measures, in particular, against potential impoverishment risks.
These risks can be minimized by:

- Avoiding displacement of people without a well-designed compensation and relocation process;
- Minimizing either land acquisition or the number of PAPs or both, to the extent possible;
- Compensating for losses incurred and displaced incomes and livelihoods; and
- Ensuring resettlement assistance or rehabilitation, as needed, to address impacts on PAPs livelihoods and their well-being.

4.7.3 REA Environment, Health and Safety Policy

REA is committed to:

- environmental sustainability of our projects
- prevention of injury and ill health at the workplaces for employees, contractors and visitors
- prevention of pollution and un-necessary disturbance of fragile ecosystems; and
- Continual improvement of our overall health, safety and environmental performance.

5 ESIA METHODOLOGY

This chapter outlines the methodology used to assess the environmental baseline and to identify, predict & assess the environmental impacts of the project on each relevant environmental component. It also covers the methodology for the identification of mitigation and monitoring measures that have been recommended to address these impacts and identification of relevant stakeholders.

5.1 ESIA Process

The Environmental Impact Assessment guidelines 1997 and the EIA regulations 1998 recognize the following stages for EIAs in Uganda.

- Project brief formulation
- Screening
- Scoping
- ESIA study
- Decision making
- Environmental Monitoring and Auditing

An overview of the EIA process, responsibilities and necessary inputs and outputs for a typical energy project is provided in the figure below.

Note that a Project Brief has been prepared for this project considering that the project impacts could readily be identified, avoided or mitigated. The PB however has benefited from detailed consultations with stakeholders including affected persons, and an Environmental and Social Management Plan presented in section 9.

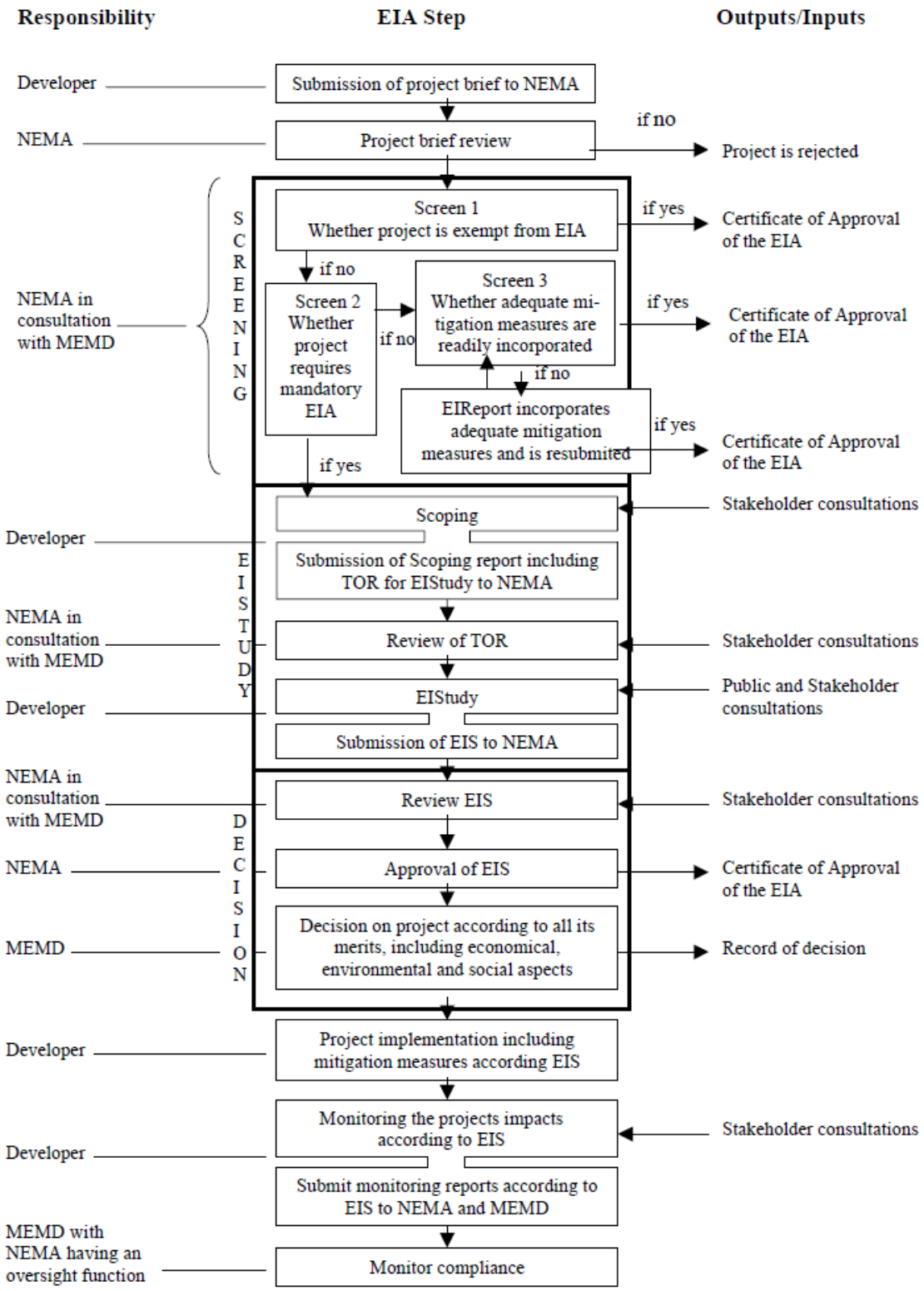

Plate 5-1: EIA process flow for energy projects

5.2 Impact Assessment Approach

The sections below describe the significance criteria that have been used to ensure a systematic and consistent approach to the assessment of impacts and the mitigation measures included inProject Brief.

The approach mainly includes reconnaissance visits, stakeholder engagement and consultations, socio-economic and biodiversity surveys carried out to identify key environmental and social issues on-sites and to identify and develop an effective public involvement plan, so that all affected persons will be involved.

Reconnaissance trips along/on the sites, and the main parts of the proposed distribution networks and local villages and businesses in such areas were undertaken with the objective of inter-phasing with the stakeholders and gaining site information in terms of environmental and socio-economic issues to be traversed by the project;

The environmental and social aspects that were identified during the reconnaissance and field studies included Ecology and Biodiversity; Air Quality; Geology, Soil, Groundwater and Land Contamination; Noise and Vibration; Water Resources & Wastewater Management; Solid and Hazardous Waste; Economic Impacts; Social Impacts; Traffic and Transportation; Worker safety, health and Welfare; Electromagnetic Radiation; Cultural Heritage and Archaeology, Landscape and Visual impacts.

The significance of social and environmental impacts was established based on the comparison with the baseline situations in the project areas and along the routes. Generally the Environmental and Impact study involved various methods including:

- Review of relevant literature and secondary baseline data on legislation, policies and guidelines, bio-physical and social environment, including among others, area land use, sensitive receptor systems and ecology likely to be affected.
- Field studies, which included flora and fauna species counts, receptor systems baseline data including baseline noise measurements, water quality analysis and site mapping;
- An inventory of activities in the neighborhood likely to be affected by proposed distribution lines;
- Safety and health impacts on workers during construction and operation, protection from injury and adequacy of sanitation provisions for the workers;
- Consultations with stakeholders, including the regulatory agencies, and the local community in the different districts where the lines will transverse, District Local Government Authorities (District Environment Officer, District Engineer, Physical Planner, Community Development Officer) for the different districts where the lines will pass to capture concerns related to construction and operation phases;

- Study and analysis of engineering designs and drawings for civil solutions to be implemented by the developer, including associated utilities such as water supply, sanitation and facility safety measures;
- Prediction and analysis of environmental impacts resulting from the distribution lines, and proposing appropriate mitigation measures, and preparation of an Environment and Social Management Plan (ESMP) for implementation by relevant stakeholders;
- Preparation of a Project Brief and presentation to NEMA for review and approval.

5.3 Impact Assessment Significance criteria

In order to obtain a credible assessment of environmental impacts, the assignment of an 'impact significance' to each identified impact needs to be a robust, consistent and transparent process. The methodology to assess 'impact significance' is outlined below and follows an International Best Practice based on the assumption that the significance of an impact on resources or receptors is considered to result from an interaction between three factors:

i. The nature and magnitude of the impact or change;
ii. The number of resources or receptors affected; and
iii. The environmental value (sensitivity) of those resources or receptors to the change.

A three-step approach has been used to determine the significance of environmental effects, as follows:

- Step 1 – evaluation of value / sensitivity of resource;
- Step 2 – assessing the magnitude of the impact on the resource; and
- Step 3 – determining the significance of effects.

The environmental value (or sensitivity) of the resource or receptor has been defined by using the criteria below:

Table 5-1: Environmental Value of Receptor or Resource

Value (sensitivity)	Description of Value
Very High	• High importance and rarity on an international scale and limited or no potential for substitution. • The receptor has already reached its carrying capacity, so any further impact is likely to lead to an excessive damage to the system that it supports. • Locations or communities that are highly vulnerable to the environmental impact under consideration or critical for society (e.g. indigenous peoples, hospitals, schools).
High	• High importance and rarity on a national scale, and limited potential for substitution. • The receptor is close to reaching its carrying capacity, so a further impact may lead to a significant damage to the system that it supports. • Locations or communities that are particularly vulnerable to the environmental impact under consideration (e.g. residential (areas, vulnerable/marginalized groups).
Medium	• High or medium importance and rarity on a regional scale, limited potential for substitution. • The receptor is already significantly impacted, but it is not close to reaching its carrying capacity. Further impacts will get increase the stress of the underlying system, but evidence does not suggest that it is about to reach a critical point. • Locations or groups that are relatively vulnerable to the environmental impact under consideration (e.g. commercial areas).
Low	• Low or medium importance and rarity on a local scale. • The receptor is not significantly impacted and shows a large spare carrying capacity. Impacts are not likely to generate any noticeable stress in the underlying system. • Locations or groups that show a low vulnerability to the environmental impact under consideration (e.g. industrial areas)
Very Low	• Very low importance and rarity on a local

	scale. • The receptor is not impacted and shows a very large spare carrying capacity. Impacts are very unlikely to generate any noticeable stress in the underlying system. • Locations or groups that show a very low vulnerability to the environmental impact under consideration (e.g. industrial areas).

The existence of receptors that are legally protected (e.g. designated areas, protected habitats or species) is taken into consideration for the assessment of the sensitivity of the receptors.

The magnitude of the impact is defined where possible in quantitative terms. The magnitude of an impact has a number of different components, for example: the extent of physical change, the level of change in an environmental condition, its spatial footprint, its duration, its frequency and its likelihood of occurrence where the impact is not certain to occur.

The criterion that has been used for assessing the magnitude of impacts includes the geographical scale of the impact, the permanence of impact and the reversibility of the impacted condition. A brief description of the magnitude of the impacts is provided in Table 5-2 below.

Table 5-2: Criteria for Magnitude of Impacts

Magnitude of Impact	Description of Magnitude
Major	**Adverse:** Loss of resource and/or quality and integrity; severe damage to key characteristics, features or elements. A major impact is usually large scale, permanent and irreversible. **Beneficial**: Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Moderate	**Adverse:** Significant impact on the resource, but not adversely affecting the integrity; Partial loss of/damage to key characteristics, features or elements. Moderate impacts usually extend above the site boundary, and are usually permanent, irreversible or cumulative. **Beneficial:** Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	**Adverse:** Some measurable change in attributes quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. Minor impacts usually are only noticeable within the

	site and are temporary and reversible. **Beneficial:** Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	**Adverse:** Very minor loss or detrimental alteration to one or more characteristics, features or elements. **Beneficial:** Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction

In addition to the factors outlined in the table above, the possibility of any standards being breached will be taken into consideration in the determination of the magnitude of the impact. The significance of effects is a combination of the environmental value (or sensitivity) of a receptor or resource and the magnitude of the project impact value (change).

The table below shows the criterion used for determining the significance of effects. Definitions of the different significance categories are provided for in Table 5-3.

Table 5-3: Criteria for Determining Significance of Effects

		Magnitude of Impact (Degree of change)				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Environmental Value (Sensitivity)	Very High	Neutral	Minor	Moderate or Major	Major	Major
	High	Neutral	Minor	Minor or moderate	Moderate or Major	Major
	Medium	Neutral	Negligible or Minor	Minor	Moderate	Moderate or Major
	Low	Neutral	Negligible or minor	Negligible or minor	Minor	Minor or moderate
	Very Low	Neutral	Negligible	Negligible or minor	Minor	Minor

Table 5-4: Definition of Significance of Effects

Significance category	Criteria
Very large	Only adverse effects are assigned this level of importance as they represent key factors in the decision-making process. Effects are associated with sites and features of national or regional importance. Effects exceed statutory limits. Mitigation measures are unlikely to remove such effects.
Large	Important considerations at a local scale but, if adverse, are potential concerns to the project and may become key factors in the decision making process. Mitigation measures and detailed design work are unlikely to remove all of the effects upon the affected communities or interests.
Moderate	These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource. They represent issues where effects will be experienced but mitigation measures and detailed design work may ameliorate or enhance some of the consequences upon affected communities or interests. Some residual effects will still arise.
Minor	Local issue unlikely to be of importance in the decision-making process. Effects do not exceed statutory limits. Nevertheless they are of relevance in enhancing the subsequent design of

	the project and consideration of mitigation or compensation measures.
Neutral/negligible	No effect or effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error. No mitigation is required.

5.4 Mitigation measures and management plans

Whereas the aim of this Project brief is to ensure the project is implemented in an environmentally acceptable manner, by ensuring that the choice and design of installing the distribution lines is inherently acceptable from an environmental perspective. It also aim to establish a sound basis for mitigation, monitoring, and management at the project level.

After the environmental and social impacts are assessed, mitigation measures are recommended to avoid, minimize or compensate for negative impacts and enhance positive impacts. The mitigation chapter specifies who will be responsible for implementing each mitigation measure, the implementation schedule, and where possible, the associated cost. It also outlines the residual impacts.

6 STAKEHOLDER CONSULTATIONS AND ENGAGEMENT

For projects that have environmental and social impacts, consultation is not a single conversation but a series of opportunities to create understanding about the project among those that are likely to be affected or might have an interest in it, and to learn how these stakeholders view the project and its related risks, impacts, opportunities, and mitigation measures. Listening to stakeholder concerns and feedback can be a valuable source of information to help identify environmental and social risks (real and perceived) and improve project design and outcomes of the Environmental and Social Assessment and of the project.

6.1 Objectives

Stakeholder engagement can be described as the systematic effort to understand and involve stakeholders and their concerns in the project activities and decision making processes. Stakeholders are defined as any group or individual who can affect, or can be affected by, the project. Stakeholder engagement for the Rural Electrification lines in this Project Brief was undertaken with the following objectives: The main objectives for stakeholder engagement are:

- To inform the relevant stakeholders about the proposed project;
- To capture views and concerns of the relevant stakeholders with regard to the proposed project;
- To enhance ownership of the project within the host community;
- To provide a basis for stakeholder participation in impact identification and mitigation.

This chapter presents the methodology and results of stakeholder engagement. The PB addresses concerns raised by various stakeholders from meetings, focus group discussions and comments in response to the Project Information Document.

The Stakeholder Engagement involved:

- Identification of key stakeholder groups, including their roles. mandate, and influence;
- Providing a strategy and schedule of sharing information, engagement and consulting with each of these groups.

6.2 Stakeholder Engagement requirements

6.2.1 Ugandan requirements

Under sub-regulation (1) of regulation (12) of the Environmental Impact Assessment regulations for Uganda (1998), the developer is supposed to take all measures necessary to seek the views of the people in the communities which may be affected by the project during the process of conducting the EIA study.

6.2.2 WB Requirements

All the World Bank Safeguard Policies, including OP 4.01 Environment Assessment emphasize stakeholder consultations and engagement.

Stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts. Stakeholder engagement is an on-going process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and on-going reporting to Affected Communities. The nature, frequency, and level of effort of stakeholder engagement may vary considerably and will be commensurate with the project's risks and adverse impacts, and the project's phase of development.

The WB require clients to identify the different stakeholders who may be interested in their actions or be affected by the proposed development and consider how external communications might facilitate a dialog with all stakeholders. Where projects involve specifically identified physical elements, aspects and/or facilities that are likely to generate adverse environmental and social impacts to Affected Communities the client will identify the Affected Communities and will meet the relevant requirements.

WB guidance on stakeholder consultation state that the client will develop and implement a Stakeholder Engagement Plan that is scaled to the project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities, including effective participation of those identified as disadvantaged or vulnerable.

6.3 Disclosure of information

Development of the Rural Electrification lines in West Nile, have been widely disclosed during the preparation of this Project Brief. The key stakeholders have been engaged by REA, and the ESIA Team including meetings with Regulatory Agencies, and with District Local Governments in the Project Area. In preparation of this Project Brief, engagements and consultations have taken place with the stakeholders identified during the inception phase. Meetings were held at all districts and sub counties affected by the power lines.

A Project Information Document (PID) was developed and shared with key stakeholders and communities affected by the power line and their input sought. Disclosure of information has been key in helping affected communities and other stakeholders understand the risks, impacts and opportunities of the project. The PID and sensitisation processes focused on the following:

- The purpose, nature, and scale of the project;
- The timing and duration of proposed project construction activities;
- Any risks to and potential impacts on such communities and relevant mitigation measures;

- The envisaged stakeholder engagement process; and
- The grievance mechanism.

6.4 Roles and influence of stakeholders

Government, through the Ministry of Energy and Mineral Development and the Rural Electrification Agency, is a key stakeholder critical to the success of the project, thus routine engagement with various regulatory and public service authorities are required. On a practical level, local government authorities usually have long-established relationships with project-affected or beneficiary communities and other local and national stakeholders and as such play a role in convening and facilitating discussions between the project proponent and stakeholder representatives, and in grievance management. It is easier for the government to create a forum to facilitate dialogue among key stakeholders. In addition, local governments provide services, communicate to the local population, or integrate local development plans with the operational needs of the project.

NGOs and CBOs can be important stakeholders for the proponent to identify and engage on a proactive basis; they may have expertise valuable to effective stakeholder engagement and/or can be sources of local knowledge, conduits for consulting with sensitive groups, and partners in planning, implementing and monitoring various project-related programs.

6.5 Project Stakeholders

Stakeholders are persons or groups who:

- Are directly and/or indirectly affected by the project;
- Have "interests" in the project that determine them as stakeholders;
- Have the potential to influence project outcomes or company operations.

Potential stakeholders are affected communities, local organizations, NGOs, and government authorities. Stakeholders also include politicians, electricity distribution companies holding concessions in the area, major load centers for the power including industries, rural growth centres, health centres and schools, telcomunication base stations, and the media. The women are of particular interest given their disadvantage in gaining benefits from infrastructure projects, including employment during construction, compensation, vulnerability to HIV/AIDS, access to electricity, productive use of electricity, and the benefits of improved social services with electrification.

The project's geographic sphere of influence was delineated in the inception phase or initial stages of of preparation of this Project Brief, and from field visits. This included not only the project sites where the lines traverse, but also all related facilities, including main transport routes and areas potentially affected by cumulative impacts, or unplanned but predictable developments.

This analysis was used to establish and articulate the project's area of influence and determine who might be directly affected or indirectly. All villages along which Wandi - Yumbe-Moyo and

Onduparaka – Odramacaku - Abiria distribution line is proposed to transverse were identified as Directly Affected Communities.

In addition, there are stakeholders outside the affected area, which identified through "interest-based" analysis. These are government authorities involved in the issue of licenses and permits for installation and operation as well as energy and electricity development monitoring. Others include operators and owners of infrastructure that could be affected along the power line route including water, telecommunication and roads. There is also the private sector or productive users of electricity including grinding mills, welders, carpenters, hoteliers and various traders. The identified stakeholders are outlined Table 6, including their mandate or interest in the project, and how they have been engaged.

Table 6-1: Key stakeholders, their mandate or interest and engagement mechanism

Category	Stakeholder	Mandate/Interest	Mode of engagement
Government-National	Electricity Regulatory Authority	The Electricity Regulatory Authority is established as a statutory body in accordance with the Electricity Act 1999, Cap. 145. The Act empowers ERA to regulate the generation, transmission, sale, export, import and distribution of electrical energy in Uganda. The functions of the Authority are spelt out in Section 11 of the Act and further highlighted in Section 4.2 of this report.	Formal Meeting
	Uganda Electricity Transmission Company	The Uganda Electricity Transmission Company Limited (UETCL) is the System Operator and owns transmission lines above 33kV. UETCL is the bulk supplier and single buyer of power for the national grid in Uganda. It is the purchaser of all generated power in the country that is fed into the national grid.	Formal Meeting
	Uganda Electricity Distribution Company Ltd, WENRECO	Hold the Concession for various territories for power distribution, covering Moyo District	Formal Meeting
	Rural Electrification Agency	Rural Electrification Agency (REA) is the Secretariat of the Rural Electrification Board (REB) which manages the Rural Electrification Fund (REF). REA is responsible for developing and promoting rural electrification. The Rural Electrification Board (REB), as the governing body of REA,	Formal Meeting

		provides subsidies to support rural electrification projects.	
	Wetlands Management Department	Wetlands Management Department (WMD) is mandated to manage wetland resources and its goal is to sustain the biophysical and socio-economic values of the wetlands in Uganda for present and future generations.	Formal Meeting
	Uganda National Roads Authority	The mandate of UNRA is to develop and maintain the national roads network, advise Government on general roads policy and contribute to addressing of transport concerns, among others. Most of the distribution lin is along UNRA road reserves	Formal Meeting
	Directorate of Water Resources Management	The Directorate of Water Resources Management (DWRM) is responsible for developing and maintaining national water laws, policies and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction and wastewater discharge permits; Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of transboundary waters resources and peaceful cooperation with Nile Basin riparian countries.	Formal Meeting
	National Forestry Authority	The National Forestry Authority (NFA) is a Government statutory entity responsible for the	Formal Meeting

		management of Central Forest Reserves (CFRs) on a sustainable basis, as well as, to supply high quality forestry-related products and services in Uganda. Some CFRs are traversed by the power line route, thus NFA to be consulted on the options of the route and sections to be cleared	
	Uganda Wildlife Authority	UWA is mandated to ensure sustainable management of wildlife resources and supervise wildlife activities in Uganda both within and outside the protected areas.	Formal Meeting
	National Environment Management Authority	National Environment Management Authority (NEMA) was established in May 1995 under the National Environment Act Cap. 153 as the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management in Uganda. In this context, NEMA is responsible for regulating the impact of renewable energy investments on the environment.	Formal Meeting
	Ministry of Lands Housing and Urban development	The **Mandate** is "To ensure a rational: sustainable and effective use and management of land and orderly development of urban and rural areas as well as safe, planned and adequate housing for socio-economic development".	Formal Meeting with Chief Government Valuer on land acquisition methodology for Project
	Ministry of	The mandate of the Ministry of	Formal Meeting with

	Energy and Mineral Department	Energy and Mineral Development (MEMD) is "To establish, promote the development, strategically manage and safeguard the rational and sustainable exploitation and utilization of energy and mineral resources for social and economic development". The MEMD applied for financing of the ERT III project from the World Bank to the tune of USD 135m, with Government providing additional USD 33.2m. REA is the implementing agency for this project. The Project Development Objective of Energy for Rural Transformation III Uganda Project is to increase access to electricity in rural areas of Uganda.	ERT III Project Team
	Department of Museums and Monuments	OP 4.10 – Physical Cultural Resources;	Formal Meetings at District Headquarters with Technical Staff and Political Leaders
	Ministry of Gender Labor and Social Development.	Operational Health and Safety, Labour and Gender ssues concerning workers.	Formal meeting
Concessionaires	WENRECO	Holds licence for area distribution network.	Formal Meeting
Customer (user groups)	User Groups	Key load centres and users in the project area, including schools, administrative centres, industries, etc	Focus Group Meetings
Government-Local	District Local Governments –	The 1997 Local Government Act provides for	Formal Meetings at District Headquarters

	Nebbi, Arua, Yumbe, Moyo and Koboko (Environment, Natural Resources, Physical Planning, Community Development Department)	decentralization and devolution of government functions, powers and services from the central to local governments and sets up the political and administrative functions of local governments. The local governments are responsible for the protection of the environment at the district level. Local governments shall be consulted on projects to be located within their jurisdiction and on matters that affect their environment.	with Technical Staff and Political Leaders
	Affected Sub Counties		Formal Meetings at Subcounty Headquarters with Technical Staff and Political Leaders
	Villages affected, LC1s		Formal Meetings and Focus Group Discussions with Community and Political Leaders
Local communities	Communities in Project Affected Areas (land owners, and those near and/or along project components)	**OP 4.01:** includes requirements for consultations with project affected persons **EIA Regulations, Uganda:** Under sub-regulation (1) of regulation (12) of the Environmental Impact Assessment regulations for Uganda (1998), the developer is supposed to take all measures necessary to seek the views of the people in the communities which may be affected by the project during the process of conducting the EIA study.	Focus Group Discussions; Formal Meetings with Local leaders and affected persons
Vulnerable groups	Elderly, women, youths, those identified as very poor	The WB OP 4.01 requires that they are appropriately enaged	Focus Group Discussions; Formal Meetings with Local leaders and affected persons
Media	Local radio	Information flow and	

	stations	sensitisation of the project affected persons.	
NGOs, Civil Society &Community Based Organisations		Environmental Protection, Land acquisition, land rights issues; Governance; Local benefits; Social services including water and sanitation, health and HIV/AIDS; Poverty eradication; Livelihood support; Institutional development	Meetings, Telephone consultations

6.6 Disclosure methods

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

Information was made available to stakeholders through a Project Information Document or brochures, and followed up with phone calls, meetings and Focus Group Discussions, as appropriate. The Ugandan requirements include the disclosure of the Project Brief/ESIA report. REA is to voluntarily disclose this Report to comply with international best practice. The stakeholders were reminded that copies of the Project Brief/ESIA will be made available by NEMA on its website or public library. The stakeholders will also be involved in the review process of the report once submitted to NEMA.

6.7 Results of stakeholder engagement

The environmental assessment team undertook stakeholder consultation and engagement with all key stakeholders and the public, and this has given them the opportunity to contribute to the overall project design by making recommendations and raising concerns. In addition, the process created a sense of responsibility, commitment and local ownership for smooth implementation of the project.

Comments from stakeholders especially the local community where the power line will transverse show that the negative Environmental and Social impacts of the proposed project are limited, localized and reversible and can be readily addressed through proposed mitigation measures.

Table 6-2: Schedule of stakeholders and Public Consultations

Activity	Stakeholder	Project Interest	Information Requirements	Engagement Mechanism	Consultation date
Awareness creation and consultation	Local community in Sub-counties where the power lines traverses	Disclosure of the proposed project. Views and concerns regarding the construction of the proposed construction.	Anticipated impacts and expectations from the proposed project.	Community meetings, focus Group Discussions	17th-21st May 2016
Awareness creation and consultation	Sub-county officials including, Sub-county Chiefs, Technical Committees and CDOs	Disclosure of the proposed project. Vital information at Sub-county level, community mobilisaation	Sub-county baseline environmenta, economic & social information Views and concerns.	Formal Meeting	17th-20th May 2016
Awareness creation, stakeholder consultations and engagement	Arua, Yumbe, Moyo and Koboko Districts Local Government Technical and Political leaders (Including CAO/DCAO, Natural Resources and Environment Officers, District Engineers, Planners and Land Officers.	Land use and approval process. Disclosure of the proposed project.	Mitigation of likely impacts of the project. District Development Plans Baseline environmental, economic & social information. Project sitting and approval requirements. Grievance management.	Formal meeting	17th-21st May 2016

Stakeholders at National Level	ERA, UETCL, MEMD, WMD, Departments of Labour and OSH, Departments of Meseums and Monuments	Power line routine, linkages with national grid, environmental and social safeguards during impementation	Regulatory requirements during construction, including permits and licences Environmental and social impact mitigation and monitoring Grievance management	Formal meetings	24th May to 10th June 2016

6.7.1 Emerging issues from local community consultations

Awareness creation and consultations with communities in various rural growth/trading centers within Sub-counties where the proposed line will pass in Arua, Yumbe, Koboko and Moyo was done through community meetings. Some of the meetings were orgnaised by Sub-county officials, while others were organized by LC 1 Officials. The ESIA team presented the power line proposed routing and distribution network, and planned construction activities, and responded to questions raised by the community.

Table 6-3 presents a summary of emerging issues captured during stakeholder engagement and public participation while figure 6-1 shows pictures of local community meetings.

Table 6-3: Emerging issues from local community consultations

Emerging issue	Description	Action to be taken by the developer
Project benefits to the community	All communities welcomed the project, anticipating that business in the area will boom, businesses such as saloons, drug shops (which store vaccines), stationary and welding workshops. The noted that businesses especially for women will operate for longer hours; and that there will be improved security with lighting provided	Further engagement with the community to be undertaken to deepen benefits of the electrification to the end users e.g household level connections, productive use, gender targets
Compensation	The local community inquired about compensation modlaities e.g for structures or crops within the road, poles on private land	REA has in place a Resettlement Framework that addresses compensation issues. Community sensitization to continue during project implementation
Public safety	The fear of electric shocks if power lines fall on their households was raised by all stakeholders, especially during the rainy season. They recommended that there should be staff to rectify falling poles and lines immediately.	REA to ensure competent constractors are employed to provide adequate supervision during construction. The line operator will address all line maintainace issues.
Low level of awareness of electricity benefits and risks	The local community noted that some of the fears raised during the meetings were as a result of people not being aware of risks and dangers, benefits, health hazards of wires and treated poles and uses of power. They thus recommended that sensitization of the people is vital before power is connected.	Community sensitization to continue during project implementation and operations
Employment of local communities	The community were interested in being considered for employment during the construction/installation phase, as a local benefit, especially for the youth. The renumeration should also be adequate, timely, and they shouldn't be exploited. In Odupi sub-county, it was noted that many youths have electrical education, thus it was recommended that only project management	The Contractor will be advised to take on local labor, especially for jobs where skills are readily available. Contractor to comply with national labor laws

Emerging issue	Description	Action to be taken by the developer
	staff should be hired from outside the project area	
Local community perceptions	The following questions were raised; • If a pole falls on someone's house during installation, will that person be compensated? • When will the project start, hopefully it will not end at this stakeholder meeting? • Will the power be brought into our homes? • Won't electricity burn our huts? • How will houses 2 or more Kilometers from the road benefit? • When will the project take off so that we start preparing?	Sensitisation of affected communities to continue during construction phase and operations to address gaps in project fears and perceptions, and project benefits
Emission of radiations	Some communities raised the fear of radiation emissions from distribution lines and impacts this might have on their lives and crops.	Adequate clearance is provided for in the design from houses. The radiations are insignificant at the safe distances proposed.
Unreliable power supply	Members of the local community observed that in towns and trading centers that are already connected, power supplied is unreliable (always off). If one source (they assume it is WENRECO) is to be relied on, then they will not benefit much, yet many people are interested in having power.	There will be adequate supply once the line is connected to the national grid. There are also potential hydro-power sites in the region that can be fed into these lines and stabilize the power. Construction of this line to provide an incentive to hydropower investors in the region.
High connection and consumption fees	The people are willing to have power connected in their homes and businesses, but connection and wiring fees are normally high. They recommended that since this power is intended for the rural community, charges should be pocket friendly because they can't afford high rates. Women proposed that price of power should not be high because their income is low.	REA to address end user connections and tariff issues for local community in liason with MEMD
Increased spread of HIV/AIDS	In some areas, the local community noted that an influx of workers might lead to high rates of spread of HIV/AIDS. It was proposed project workers should be sensitized and that the	HIV/AIDS sensitisation to be conducted for Contractor workers and local communities

Emerging issue	Description	Action to be taken by the developer
	workers and local community should be encouraged to practice self-control. Family heads should also be sensitized. Workers should be sensitized on what the community wants and what it doesn't.	
Fears and challenges	Project vehicles over speeding and some companies sacrifice human life before a project starts. We have grass thatched houses, it might be hard for us to use the power.	REA to set up Grievance Management Measures, with participation of local communities
Social impacts	There was concern about the girl-child issues, especially by project workers for sex, early pregnancies and abandoned babies.	Contractor to be given strict guidelines to be enforced, especially on child labour and sexual abuse. Contractor to have in place a code of conduct for workers.


Meeting at Odramacaku trading center


Meeting at Edromi trading center


Meeting at Adumi Sub-county


Meeting at Aiivu Sub-county

Meeting at Kerile trading center in Apo Sub-county

Meeting at Ariwa Sub-county

Figure 6-1: Community members during stakeholder engagement meetings

6.7.2 Emerging issues for Local Government Officials in the districts of Arua, Yumbe, Moyo and Koboko

Local Government officials including Chief Administration Officers or their Deputies, Environment/Natural Resources Officers, District Planners, District Engineers and Lands Officers, Sub-county Chiefs or LC 3 Chairpersons and Community Development Officers (CDO) in Arua, Yumbe, Moyo and Koboko were informed and consulted about the proposed project through formal meetings. This was done at district or sub-county headquarters after prior arrangement with the officials.

Table 6-4 below presents a summary of emerging issues raised by the local government officials during stakeholder engagement.

Table 6-4: A summary of emerging issues from Local Government Authorities

Emerging issue	Description	Action to be taken by the developer
Compensation	District Local Government Officials observed that the community has farmed and built structures within the road reserves. Land issues or compliants in the RoW need to be addressed prior to project implementation. In trading centers, there will be need for compensation because people constructed without knowledge. Sub-county officials requested that owners of land on which workers' camps are to be constructed should be compensated.	REA to apply its Resettlement Framework, which provides for compensation of permanent structures, crops destroyed. The Contractor to make arrangement for camp locations, including lease or hire of premises.
Consideration for affected CFRs	During installation of poles, Central Forest Reserves and Locally owned woodlots should be given consideration.	All affected crops, trees in CFRs outside the road reserve to be compensated, in liason with NFA.
Social issues of HIV/AIDS	High rates of HIV/AIDS spread should be handled. During project implementation, REA should contract a company to sensitize workers and the community about HIV/AIDS.	REA and Contractor to work with DLGs, HIV/AIDS agencies to sensitise workers and local community, provide conselling services and supply of condoms, for both male and female workers
Project benefits	Government Officials said that the project is welcome because trading centers will grow and business in the area will boom. They recommended that transformers should be established where there is potential of an area becoming a trading center not only in trading centers because it will boost uniform growth of the area. At Sub-county level, officials said the project will enable them to undertake office secretarial work easily.	REA undertook a FS for this project, and all potential load or growth centres have been identified and will benefit from the project; REA to consider additional load centres where appropriate
Community consumption of power	The officials inquired as what is being planned as a motivation to encourage the community to tap power so that power doesn't just by-pass them.	ERT III to address consumr connections. Under the proposed scheme, the GoU will pre-finance cost of connections

Emerging issue	Description	Action to be taken by the developer
	In Moyo district, officials noted that power is only brought at the roadside yet the rural community is off the road so it doesn't portray the rural electrification purpose.	and consumers are expected to pay back the cost of connection (and ready board and earthing for those who cannot afford house wiring themselves). It would fund the connection costs, including service drops (electric meters, service connection cable, and accessories) and ready boards in case customers who cannot afford internal house wiring costs
Fears and challenges	District and Sub-county officials inquired about the quality and type of wires to be used because there is threat of electrocution in case poles fall. They also observed where there are settlements, there will be threats of electric shocks and EMF emissions to people within the corridor. In Yumbe districts, officials observed that during wiring of the town, transmission wires were installed too low, which caused an accident leading to death of one person. In Moyo district officials observed that in some recent power connection and installation project, materials used like wires are weak and with time they have surged causing potential threats to people and their property. They recommended that materials to be used in this project should be of high quality. Other social impacts identified were family break-ups, early marriages and high school dropout rates.	REA to ensure adequate supervision of works, so that specification in design are complied with.
Exploitation of girls	It was noted that from experience in other projects, project workers tend to exploit young girls leaving them with pregnancies and HIV/AIDS. They recommended that efforts to handle such instances should be	Contractor will be required to have in place a code of conduct for employees. The community encouraged to report any such grievances to local authorities or

Emerging issue	Description	Action to be taken by the developer
	in place.	to REA for action.
Cultural sites	They said that in case holy cultural sites are encountered, elders in the area should be consulted before project implementation.	All areas of physic-cultural or spiritual importance to be mapped out in liason with the community.
Employment opportunities	They suggested that local communities should be offered employment opportunities.	The contractor will be advised to consider employment of locals where required skills are readily available
Unreliable power supply	Stakeholders in all districts said that power supply is unreliable, they thus recommended that there is need to identify other suppliers or other sources. For instance in Yumbe district, officials said Agbinika Falls are a potential source of hydro power. In Moyo district currently power is referred to as (Aziku-meaning disappearing without bidding farewell).	There will be adequate supply once the line is connected to the national grid. Construction of this line to provide an incentive to hydropower investors in the region. Hydro-power sites in the districts can be evacuated by this line

Yumbe District Officials

Odupi Sub-county officials

Figure 6-2: Meetings with Local Government

6.7.3 Emerging issues from Government Lead Agencies

Prior arrangements requesting for formal meetings with lead agencies including UNRA, NFA, UETCL, OSH, ERA and MEMD were done to give officials ample time to prepare to meet the Project Brief team. Meetings were held at lead agency offices with different officials whose expertise the heads of the agency saw fit to provide informed points of views.

Table 6-5: Summary of emerging for government lead agencies

Emerging issue	Description	Action to be taken by the developer
Challenge of compensating	All lead agencies noted that there is need to compensate PAPs so that the project is not rejected by the community. It was recommended that the issue of consent verses compensation should be assessed. They recommended that community sensitization should be continuous throughout project implementation.	REA has in place a Resettlement Policy Framework being implemented for its projects. Community sensitization to be undertaken during project implementation
Submission of line drawings	NFA and UNRA requested for drawings of the proposed line so that they can be overlaid on the two lead agency maps to eliminate double expenses for the government. There is need to harmonize plans, considering UNRA is in the process of upgrading and widening most of the roads in West Nile. REA should provide them with the exact routes the project is going to pass through so that they know and plan accordingly.	REA to engage with UNRA, NFA and other agencies on power line routing
Economic value of trees	NFA requested the economic value of trees and ecosystem services to be lost should be computed and presented in the Project Brief. The line cuts through the CFRs of Eria – 2.39Km, Otrevu 3.9Km, Utambari – 2.37 Km, Mt. Kei – 3km.	REA to carry out valuation of trees to be cleared in the CFR in liason with NFA.
Distance from the road reserve	UNRA recommended that poles should be installed as far from the road reserve as possible because of future plans to widen roads while NFA recommended that poles should be installed in the road reserve as much as possible to minimize tree cutting. The implications were that compensation to NFA by REA for lost trees will be high, while for UNRA costs of pole relocation during road widening will be high.	REA to engage with UNRA, NFA and other agencies on appropriate power line routing
Issues of waste management at staging areas.	Waste especially at staging areas should be adequately managed, stored, transported and disposed of in accordance to government regulations.	Contractor have in place a waste management plan and ensure its implementation

Pollution from Creosote oils	Creosote impacts should be clearly discussed in this report.	Addressed in Chapter 8
Social impacts	Identified impacts by lead agencies were teenage pregnancies, high rates of HIV/AIDS prevalence, and poor conduct of contractor workers (such as using vulgar language), family break-ups and many others. Workers should thus be advised and sensitized on community likes and dislikes and workers should be continuously sensitized on HIV/AIDS and given protective gear like condoms.	REA to ensure contractor has in place and implements the code of conduct for employees
Assessment of property	There are some complaints that in some areas where REA worked in, they did assessment for affected property but did not compensate the affected communities and this negatively affects other Government departments whenever they are implementing other projects in such areas.	REA has in place a Resttlement Framework applied to all its projects
Sensitive ecosystems	Stakeholders were concerned about the likely backfilling of sensitive ecosystems such as wetlands and abandoned borrow pits.	Contractor to avoid as much as possible sensitive sites such as wetlands; All material sources points to be restored
Assessment before establishment of staging areas	Stakeholders proposed impact assessment of sites where staging areas are to be built and project briefs be submitted to NEMA for approval.	Screening of camps sites where required to be undertaken and approval sought, as well as any other project components not considered in this assessment that may require approval from regulatory authorities

7 PROJECT ALTERNATIVES

The project alternatives suggested in this report have focused on deciding whether the distribution lines should be installed underground or overhead and whether or not the project should be implemented. Also the design of the line routing, types of LV conductors, and construction methods for HV lines were considered.

7.1 Option 1: Underground Electric Distribution Lines

Low voltage distribution lines can sometimes be placed underground in most residential areas. This option is believed to reduce impacts to area aesthetic, but it poses threats such accidental cuts/shocks during cultivation and construction works.

The distance to be covered by the distribution lines in each project area is quite long (345km) to physically limit underground line construction due to the associated cumulative energy losses and excavation challenges such as may be encountered in wetland and hilly areas amongst others.

Underground distribution line construction will also present the following disadvantages:

- An increase in soil disturbance and soil erosion;
- A complete removal of trees;
- High costs of underground cables;
- Increased construction and maintainance costs.

Due to the above challenges this option was found unsuitable for the proposed project.

7.2 Option 2: Overhead Distribution Lines

This project brief suggests that overhead distribution lines be constructed because of the following;

- They will be less disruptive to the surroundings;
- The lines will be installed along existing roadsides and over fields;
- Overhead lines much cheaper than underground cables to construct and maintain; and
- The life span of overhead distribution lines is higher than the underground distribution lines.

Generally, overhead cables are being seen as the lowest cost solution for reliable delivery of power and therefore, the ESIA team recommends adoption of the Option of Overhead Distribution lines as the most feasible in the implementation of the proposed Project.

The designs route the lines mainly along existing road reserves, and have wide spans to avoid excavations in wetlands and water courses.

7.3 Option 3: Alternative routings and designs

The outing of the power lines have been designed to minimise impacts on the environment, to follow as much possible existing road reserves and to ensure access to laod centres is maximised at minimum costs. Most of the load centres are at or near rural growth centres and subcounty headquarters which are located along the major roads. The design of the routings also avoids sensitive environemnts, with wider spans considered for wetland sections. It has also been proposed Mt. Kei Central Forest Reserve, a plantation forest marginally affected along Midigo-Ludara T-Kei line be avoided. Species of conservation concern along the routes including *Tamarindus indica* and *Vitellaria paradoxa,* be avoided or conserved.

The routings have been designed with T-offs to ensure access to areas away from the main roads.

H-pole arrangement of distribution lines will be adopted in which case, the conductors will run horizontal not in vertical perspective to reduce potential collision with the birds, thus reducing the magnitude to moderate negative.

7.4 Option 4: Do Nothing

This would involve leaving out completely the implementation of the project in order to avoid any negative impacts on the environment. This Option will ensure that the social and general environmental settings in the areas where the distribution line would pass would be unaffected. However, the long-term macroeconomic development plans and the regional grid interconnectivity benefits would be missed altogether.

The target areas would remain without power and result in failure to achieve the long term GoU rural electrification goals and plans. Since this Option is not consistent with the long-term development objectives of Uganda, it is not the preferred option.

7.5 Load forecast options

Load forecast have informed the choice of the type and size of the LV conductors. Using a direct method based on the following customer categories in the proposed project area and using information from WENRECO on similar areas that have recently been electrified, the loading forecast was determined. Load flow estimates were made based upon the existing and planned 33 kV extensions. This also enabled feasibility study team to estimate the respective connection rate, and annual consumption growth rates for:

- Domestic consumers
- Commercial consumers
- Institutions
- Industry

Power demand projections were made without and with OBA support as outlined below:

Scenario 1: Without OBA subsidy

It is expected that without OBA subsidy, the challenge of up-front payment of connection costs will affect the rate of connectivity; consequently the following have been assumed in the forecast:

- Connection rates: Households/ Businesses/ Institutions/ Industry: 20%/ 50%/60%/ 80%
- Average monthly consumption (kWh): Households/ Businesses/ Institutions/ Industry: 80/500/600/1000
- Annual load growth (Year 1-5): low/base/high: 3%/5%/8%
- Annual load growth (Year 6 – 10): low/base/high: 1%/2%/4%
- Load factor: 0.4

In the base scenario the initial annual demand in Year 1 is estimated as 19.93 GWh with a peak demand of 5.69MW growing to 26.75 GWh with a respective peak of 7.63 MW in Year 10; see figures 7-1 and 7-2.

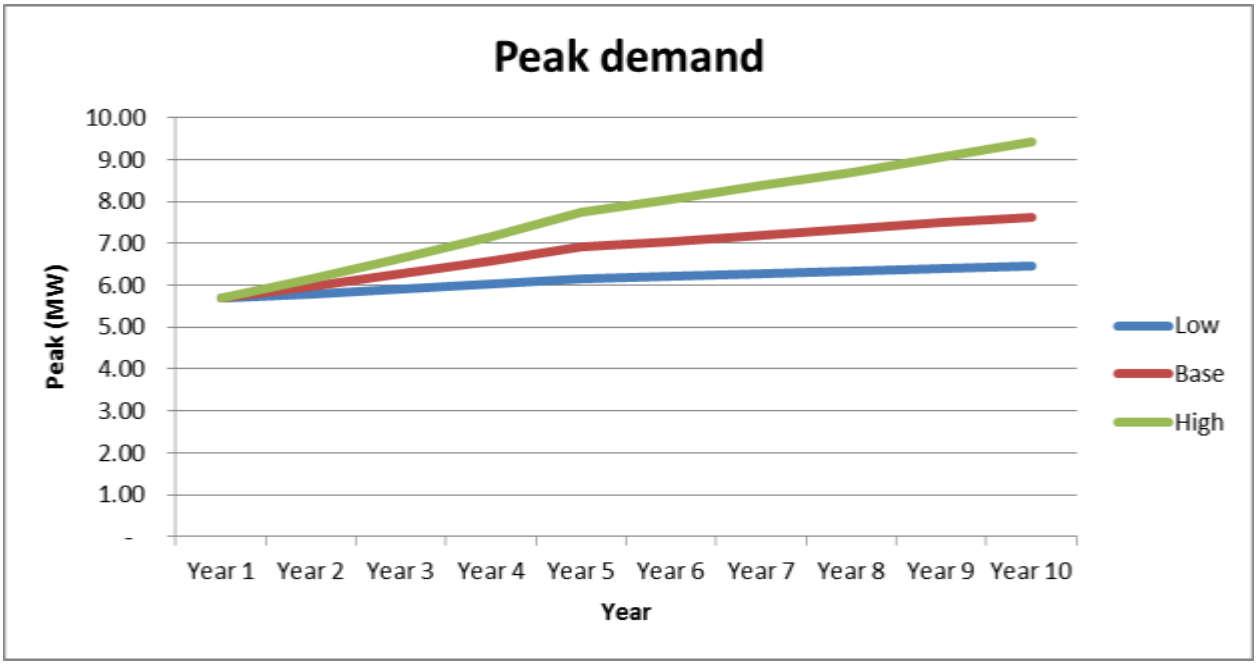

Figure 7-1: Peak demand growth forecast

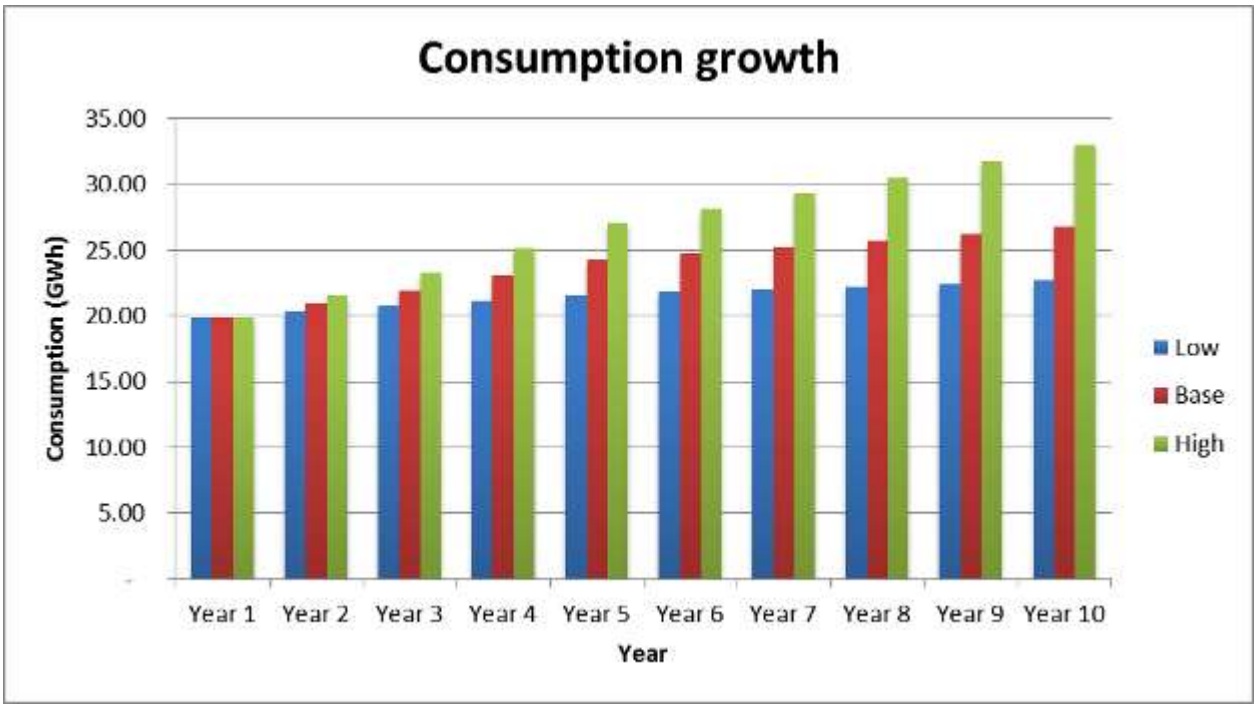

Figure 7-2: Consumption growth forecast

Scenario 2: With OBA support

It is expected that with OBA subsidy more customers will be connected as the up-front payment of connection costs will be dealt with, however the average consumption rate and growth will be lower since some of the customers brought on board will be in the low consumption category. Consequently the following have been assumed in the forecast:

- Connection rates: An additional 40% of households would be connected in Year 2 utilizing the OBA subsidy;
- Average monthly consumption of the OBA supported customers: 40 kWh
- Annual load growth for OBA supported customers low/base/high: 1%/1.5%/3%

In the base scenario the initial annual demand in Year 1 is estimated as 21.02 GWh with a peak demand of 6.0 MW growing to 27.99 GWh with a respective peak of 7.99 MW in Year 10; see figures 7-3 and 7-4 below:

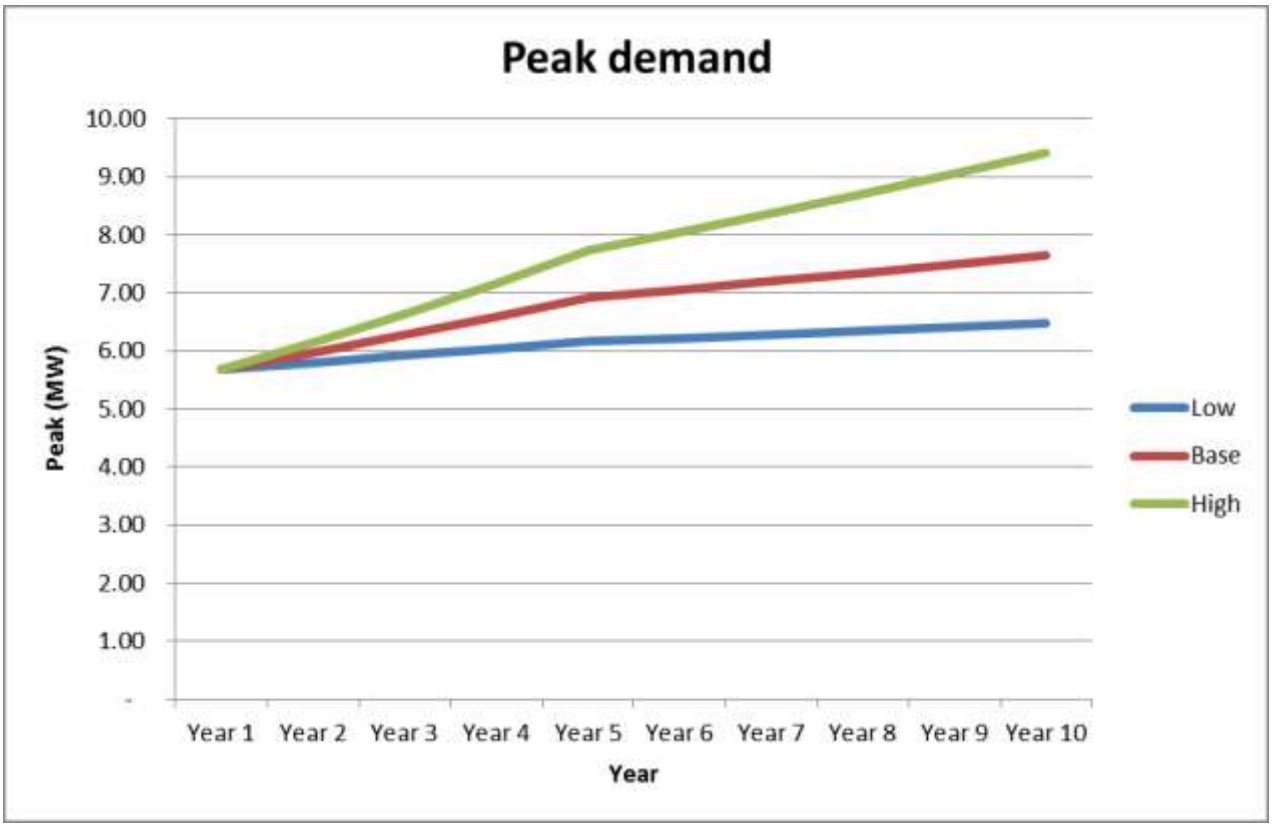

Figure 7-3: Peak demand growth forecast

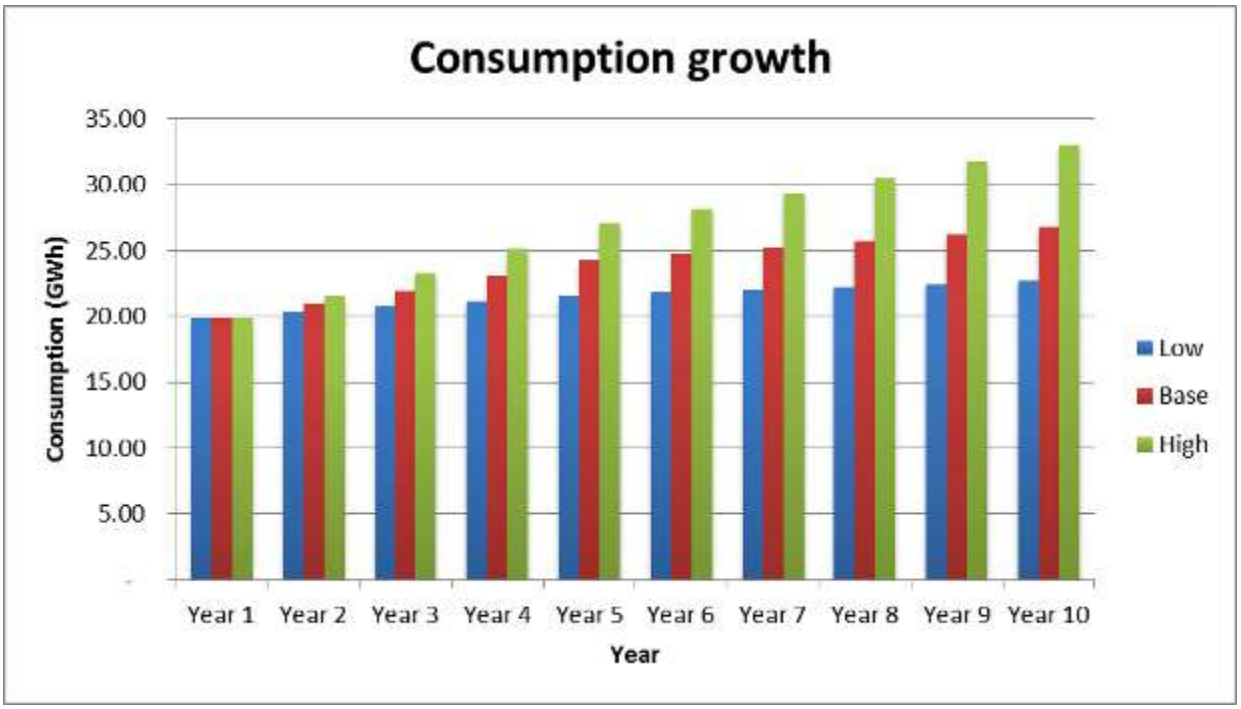

Figure 7-4: Consumption growth forecast

8 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION MEASURES

Following desk studies, site investigations and views obtained through public consultations, the potential significant environmental and social impacts of the proposed project were identified.

The construction of the proposed electricity distribution lines will have minimal impacts on the surrounding environment. Whereas positive impacts should be enhanced, negative ones should be mitigated or eliminated. This section identifies the predicted impacts that could arise as a result of implementing the proposed project. Mitigation measures to minimize or eliminate the negative impacts are discussed as well as means of enhancing positive impacts and benefits to the affected community. The potential significant environmental and social impacts of the proposed project are presented and their level of significance evaluated as per the methodology described in section 5.3 above.

8.1 Positive impacts

8.1.1 Possible full time operation of public utilities

The project areas have public utilities whose fulltime operation is not possible due to limitation of electricity supply. Such limitations have had an impact on service levels, water supply, communication and transportation sectors. For instance, in Arua District, the operations of Arua Airfield are limited to daytime as a result of erratic power supply (amongst other constraints), and affect international transit flights in the region to Juba and the Democratic Republic of Congo (DRC).

Improved in power supply will have positive impact on social services and businesses in the region, improving livelihoods

Enhancement measures

- Ensure that the distribution lines are maintained periodically to reduce on power shutdowns/shortages;
- Consumers should ensure timely clearance of electricity bills

8.1.2 Support to Telecommunications infrastructure operations

Telecommunication booster stations in the project areas are mainly operated through diesel generators on 24-hour basis which makes the services they support to be expensive (Community radios, internet cafes as well as phone charging) in this fast growing sector and the generators also contribute to increased GHG emissions.

With steadyelectrical power supply from the national grid, the costs of operations of telecom companies will significantly reduce, as well as availability of mobile communication. This as well impacts on businesses and social services positively.

Enhacement measure

- Ensure that the distribution lines are maintained periodically to reduce on power shutdowns/shortages that would interfere with telecommunication
- Telecommunication base stations to be of priority as load centres to be connected

8.1.3 Incentive to investment climate in the Region

The project will be an incentive to enhanced investment climate in the project areas. At the moment, most investments such as in hospitality industry such as hotels and a host of others, are operated through electricity from generators to run their operations which in the end translates to higher costs of the services and goods they provide.

8.1.4 A boost to the recreational and social leisure

In a number of rural settings and upcoming trading centers in the proposed project areas, choices of recreational options are limited and operate to 8:30pm largely due to lack of electricity. The availability of electricity improves the choices for recreation and extends the time for recreation thereby enabling recreation. In addition, in the urban centers the youth expressed the need for electricity for safe operations of their television sets and fridges which is currently a problem due to lack of stable and reliable power supply.

8.1.5 A stimulus to utility providers

It envisaged that, improvement and extension of the electricity distribution grid to the projectvareas can be a stimulus to improve operations of other utility providers especially water supply. Currently most of the towns in the regions do not have piped water systems and it is therefore hoped that, better power supply can be a stimulus towards improvement of water supply system.

8.1.6 Improved qua;lity of life and livelihoods

Lack of reliable electricity is a disincentive towards acquiring household items such as fridges and television sets. During consultations, women welcomed the project emphasizing that, it will enable families acquire fridges which will help planning and running of their homes.

8.1.7 Incentives for small-scale enterprises

There are a number of women and youth amongst vulnerable groups operating some income generating activities such as hair and beauty salons, restaurants, ice cream selling as well as tailoring enterprises. However, due to lack of electricity, their operations are hampered and very costly and some have even abandoned the businesses due to lack of electricity for their operations.

With cheaper electrical power available, there will be more sustainable women and youth enterprises to be developed, improving employment and income levels, and quality of life in the region.

8.1.8 Reduction of Carbon Emissions

A relevant aspect of the project could be the reduction of carbon emissions as there is likely to be reductions in the use of diesel run generators to run mills, use of paraffin and fuel wood as a source of energy for lighting and cooking. However, the magnitude of this impact will depend on level of affordability of the electricity by the locals.

8.1.9 Growth of agribusinesses and opening up investment opportunities

Local and national investors will greatly benefit from the proposed distribution lines.
Availability of electricity in the rural areas will help to set up infrastructure that use power and which in turn will likely lead to improved lives. Such infrastructure includes telecommunication boosters, agro-processing facilities such as grinding mills, milk coolers etc, hair and beauty salons, restaurants among many other businesses. The project will be an incentive to enhance investment climate in the project areas. Currently most establishments use power from diesel generators which in the end translates to higher costs of the services and goods they provide.

Support to the communications sector, telecommunication booster stations in the region operate through diesel generators on 24hour basis which makes their services to be expensive (mobile phone access, community radios, internet cafes as well as phone charging) in this fast growing sector. Diesel generators are expensive to run on a 24 hour basis and the initial capital investments on solar systems are also high.

Enhancement measures

- Ensure that the distribution lines are maintained periodically to reduce on power shutdowns/shortages;
- Clients should ensure timely clearance of electricity bills;
- Local community should be sensitized on energy saving techniques to prevent electricity bills skyrocketing.

8.1.10 Improved Security

Improvement and extension of the electricity will lead to improved security through better street lighting in the urban areas and their environs which will contribute to security of residents and investments.

The planned extension of power will provide security lighting in these establishments such as hospitals, prisons, police posts hence improving the general safety in the areas. Improved security through better street lighting in the semi-urban areas and their environs will contribute to development.

8.1.11 Reduced noise pollution , GHG emissions

The project will lead to reduced noise pollution from a number of power generators operated to run businesses in urban areas and their environs. Due to absence of power supply, most electricity operated businesses in the West Nile Region are run by power from generators of varying sizes and capacities, which lead to noise pollution and release of GHG emissions to the environment.

Enhancement measures

- REA to engage a Concessionaire who will be responsible for lime operations and maintainance
- Ensure that the distribution lines are maintained periodically to reduce on power shutdowns/shortages;
- Clients should ensure timely clearance of electricity bills;
- Local community should be sensitized on energy saving techniques to prevent electricity bills skyrocketing;
- REA to implement Government strategies to increase connections, reduce end user tariffs and promote modern energy use

8.1.12 Improved delivery of social services

The extension of electricity will bring about improved delivery of services by sectors such as health especially vaccination, deliveries and surgical operations, education, telecommunication, water supply and general facilitation of trade activities The operations of health facilities will very much be augmented by the planned extension of electricity to these areas.

The costs of public administration will also significantly reduce. This will increase efficiency and effectiveness which currently to a certain is hampered due to electricity limitations.

8.1.13 Employment Generation

On a short-term, the project will bring about creation of jobs during the construction phase (people in the project areas are likely provide labor force etc.). This impact will benefit the local retail business owners who would mainly benefit from secondary effects of increased incomes and the spending power of construction workers.

Employment opportunities will arise and will benefit both the the local community, regional and national community during construction, as well as during operations.Creation of job opportunities during project development, construction and operation will provide a number of employment opportunities for skilled, semi-skilled and unskilled labor. Recruitment of unskilled manual labor should give preference to local people wherever feasible. This impact will be beneficial to both men and women, especially when selling merchandise to workers.

From stakeholder comments, some of the benefit to be accrued included:

- Improved lighting at a cheaper cost, electricity will replace the kerosene lamps that are not only more expensive but also environmentally hazardous;
- Increased radio listening time on account of cheaper electricity as compared to batteries;
- Increased productive hours;
- Eliminate the costs of self- electricity generation by existing commercial and industrial enterprises;
- The global benefits associated with savings in green house gaseous emissions due to replacement of kerosene and diesel.

Enhancement measures

The community meetings revealed that people are optimistic that the proposed construction works will generate employment opportunities. To prevent conflicts and bad attitudes towards the contractors and their workers, it is therefore necessary that the contractors give priority for employment to the local people within the project area with respect to their skills. Workers employed to work at the construction site should be paid in time and issued with appointment letters or signing an agreement.

8.2 Potential negative impacts

8.2.1 Clearance of vegetation and crops

Sensitive receptors:

The allignment of the distribution line will to the most extent be restricted to the road reserve which UNRA regularly maintains. Clearance of vegetation will take place along the RoW, acces roads to pole sites, at pole sites, and staging areas among others. Crops and trees in gardens and woodlots are also likely to be affected during pole installation.

The vegetation along the lines is categorised as plantation forests, Riverine or streamline vegetation, Open grasslands and fallow vegetation. There area also cultivated areas within the road reserves.

Vegetation likely to be disturbed during site clearance for RoW are:

- Private woodlots, crops, grass and fruit trees along the roads. These are of economic value to the local community;
- Central Forest Reserves of NFA, all of which are plantation forests, including Otrevu, Utumbari and Eria located on Wandi-Yumbe-Moyo transmission line and one (Mt Kei Central Forest Reserve) dominated by *Eucalyptus* sp. and *Tectona grandis*.
- Riverine vegetation dominated by *Echinochloa pyramidalis*, *Cyperus dives*
- Woodlands and thickets dominated by *Acacia hockii*, *Bridelia scleroneura, Combretum adenogonium, Kigelia Africana, Piliostigma thonningii, Borassus aethiopum, Vitellaria paradoxa* and *Azadiranchta indica*
- Fallow lands dominated by ***Chromolaena odorata*, *Imperata cylindrica* and *Lantana camara***

The grassland and fallow areas will have minimal disturbance considering the grass and trees are mainly less than 2m and scattered.

The species of conservation concern observed during the surveys include *Vitellaria paradoxa* and *Tamarindus indica.*

Impact Assessment:

8.2.1.1 Construction/installation

Impacts relating to loss of vegetation through site clearance of the RoW will likely affect woodlots, crops as well as some useful roadside vegetation including mature fruit trees. During consultations the community was concerned about loss of mature fruit trees within the RoW. The design of RoW is restricted to the road reserve to avoid extensive loss of vegetation and crops.

The proposed power lines also cut through sections of 4 Central Forest Reserves, including Otrevu, Utumbari and Eria located on Wandi-Yumbe-Moyo transmission line and Mt Kei Central Forest Reserve) on Midigo-Ludara. Some sections of the lines cut through riverine vegetation, woodlands and thickets.

Other than clearance of trees in the RoW within the road reserve and access to the pole installation and work sites, additional clearance will be required to avoid tall trees falling on the energized lines, that would cut off power supply and put the public at risk. Similarly sections through woodland and thickets have to take into account safety of the lines.

Construction of workers' camps for accommodation, offices and storage of materials will also potentially have significant impacts on vegetation. Uncontrolled disposal of construction waste may also impact upon vegetation. Clearance of vegetation and excavations in riverine or wetland environment may lead to soil erosion and pollution of the water courses.

The clearance and construction activities will result in a moderate negative impact on vegetation and habitats in the project areas.

8.2.1.2 Operation

During the operational phase, natural vegetation such as grass and shrubs will continue to be regularly cut by UNRA, as well as the Concessionaire for the distribution line. Crops above 2m will not be left to grow under the distribution lines. Tall trees in the vicinity of the lines will also be cleared to ensure a safe distance is maintained. The Concessionaire for the power line will also undertake maintainace activities including clearing of trees along the right of way.

8.2.1.3 Decommissioning

If the RoW in all villages in which the distribution line transverses is not adequately restored after decommissioning, the soil and drainage patterns can be inadequate for resuming crop cultivation activities or/and for the re-colonization by natural vegetation, resulting in a moderate negative impact.

Table 8-1: Loss of road side vegetation-Impact Assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Impacts on vegetation **onsite** (Construction)	Moderate Negative	Low	Minor Negative
Impacts on vegetation **offsite** (Construction)	Moderate Negative	Very Low	Minor Negative
Vegetation restoration **onsite** (Operation)	Minor	Low	Minor or moderate
Inadequate restoration (Decommissioning)	Moderate	Medium	Moderate

Mitigation measures

- Ensure the RoW is restricted as much as possible to the road reserve.
- Clearing of trees should be for only those that are more than 2m high withing the RoW, and the tall trees and branches adjacent the power lines that are of safety concern
- Limit clearance for access, installation work and maintainace to the necessary extent, mainly at pole locations
- Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas.
- The wetlands, rivers, streams and areas that have surface water should be protected from earth works and contamination, and poles sited away from wet sections of the lines where possible
- All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses.
- Tree species listed in the IUCN Red list and seen during the surveys will be marked and avoided, wherever possible, by re-alligning the route;
- Where losses of vegetation/crops are inevitable, compensation measures be instituted as per approved District Land Board rates and in line with the REA Resettlement Framework, and the Resettlement Action Plan that has been prepared alongside this Project Brief/Environmental Assessment.

8.2.2 Loss of habitats and wildlife

Sensitive receptors:

There may be potentially small-scale and localized loss of habitats due to the construction works especially while working in sections of forested areas or wetlands. The habitats include bird nesting

areas, wetlands, open waters, rocky outcrops or islets, and woodlands. These host various life forms including birds, invertebrates, amphibians and reptiles. Activities leading to loss of habitats may also lead to loss or displacement of various forms of wildlife.

No species of conservation concern was recorded among the amphibians, birds, invertebrates and mammals. The herpetofauna species encountered during the study are still abundant and widely distributed in Uganda. The population to be affected if at all, by the construction of the distribution line is very minimal and will not affect the survival of the species recorded or lead to their extinction. The Nile Monitor listed under CITES Appendix II of the IUCN Red List Category is still common and widely distributed in Uganda and Africa in general.

Impact Assessment:

8.2.2.1 Construction/installation

The project is not expected to cause significant damage to the habitat given that only a width of 10m in any forest reserve or wetland or river banks will be taken up in case the power line passes through those sensitive areas, and upto 16m^2 at pole spots will be cleared of vegetation, excavated and utilized for temporary storage and works, and where required mixing sand, aggregate and cement, and installation of the poles. Additional land requirements will be for access to the construction sites including poles, stay wires, and staging areas. Some of the areas where amphibians have been breeding and living may be lost, especially in wetlands and river banks.

Herpetofaunal species and small mammals may be directly impacted on through mortality of individuals during movement of equipment, excavation and compaction. Those species that cannot effectively vacate affected project areas during the construction phase e.g burrowing lizards may suffer direct mortality. Some may be victims of harassment especially the snakes.

However, the impact may be minor since the distribution lines are located in the road reserves, which road reserves have been cleared or are maintained by UNRA.

8.2.2.2 Operation

Habitats in forested, woodland or wetland areas will only be disturbed during maintainace works, including clearing the RoW and access to poles and conductors or transformers.

8.2.2.3 Decommissioning

Failure to undertake proper restoration of the RoW and power pole spots after decommissioning will result in loss of habitats for fauna.

Table 8-2: Magnitude and sensitivity

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Clearing of sites, installation of poles	Minor Negative	Medium	Minor Negative

and stringing (Construction)			
Maintainance of RoW (operations)	Minor Negative	Low	Minor Negative
Inadequate restoration (Decommissioning)	Minor	Low	Minor or moderate

Mitigation measures

- At completion of clearance and installation works areas not needed for the distribution process will be restored;
- NFA to be compensated for tree cleared outside the road reserves and within the CFRs
- The holes for poles in wetland areas shall be back filled using suitable gravel material in such quantities that will be just enough to stabilize the hole with no extra soil to silt the wetland.
- Excess soils will be removed and utilized to restore disturbed sites or disposed at approved sites;
- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve;
- Limit clearance for installation work and inspection to the necessary extent.
- Remove as much vegetation as possible by hand held equipment and avoid the use of heavy machinery, especially in sloping areas and sensitive areas.
- Avoid works in wet sections of the lines during the rainy season
- Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited
- Any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord should be relocated. The herptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away
- Construction workers to be sensitized no to cause harm to wildlife

8.2.3 Potential bird kills from grid lines

Sensitive receptors:

Distribution networks are known to be a potential source of bird strikes that get entangled to the lines causing their injury or even instant death. This is especially more significant when large flocks of birds migrate from one point to another and usually get struck by the power distribution lines.

Impact assessment:

8.2.3.1 Construction/installation

During this phase birds are not at risk of getting entangled in distribution lines since it will only be installation of poles and stringing of power lines. Hence the impact magnitude will be negligible or minor.

8.2.3.2 Operation

H-pole arrangement of distribution lines will be adopted in which case, the conductors will run horizontal not in vertical perspective as that will reduce potential collision with the birds, thus reducing the magnitude to moderate negative.

The baselines did not establish daily flyways or migratory routes along the power line routes.

Table 8-3: Potential bird kills- Impact Assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Clearing of sites and installation of poles (Construction)	Negligible	Very Low	Negligible
Collusion of birds along distribution lines (Operation)	Moderate	Medium	Moderate

Mitigation measures

- Conductors along wetlands and in protected areas will run horizontal not vertical.
- Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters.
- Regular corridor maintenance to ensure that tree branches do not reach the lines

8.2.4 Noise from construction and operation crew

Sensitive receptor:

Noise and vibrations will result from construction works, including line clearing, excavations, concrete mixing and compaction at pole spots, and restoration works, and from vehicles transporting materials, equipment and workers. The receptors of the noise and vibrations seen during the baseline surveys include schools, health centers, trading centers, residential areas, in the vicinity of the proposed power transmission line routes. The recorded baseline noise levels were in several cases above the standard for residential and commercial areas. Traffic volumes along the roads were also noted as low. The Maximum level permissible for construction sites is 75dB with no sensitive receptors, and 60dB with sensitive receptors during day, but as low as 40dB in the night, as per the National Environment (Noise Standards and Control) Regulations of 2003.

Impact assessment:

8.2.4.1 Construction/installation

Construction activities typically result in temporary and short term duration increases in the noise levels, particularly during the daytime when construction activities tend to peak. Construction crews are likely to be below 20 per pole site, with one truck, and in some cases, an excavator may be required. This is expected to work upto 8 poles per day or a span of 500m per crew. The noise levels are unlikely to increase substantially, except in rural areas.

Construction noise has the potential to be created and emitted to the surrounding environment via a range of processes, specifically from those activities involved with clearing, excavation, mixing, compaction of sites and uplifting of electricity poles, and from workers on site.

This impact will however be temporal lasting about a week per village. Most of the construction activities will be carried out by manual labor with few trucks delivering labor and materials to the sites, concrete mixing and uplifting poles. The works will be implemented during daytime to minimize impacting on sensitive environment.

8.2.4.2 Operation

Noise is not anticipated to be a significant impact during operations. Low-level noises may result from the transmission of electricity at connection points. Such noises are likely to be insignificant, putting the impact magnitude at negligible negative.

Noise will be generated by vehicles used for the transportation of operational staff who will periodically maintain the transmission lines, however this is also unlikely to be significant due to the small number of vehicles involved, and their temporary use.

8.2.4.3 Decommissioning

The decommissioning and site restoration process will generate noise as heavy machinery will be required and pole and metal structures will be disassembled. However, this will be a temporary impact of minor magnitude.

Table 8-4: Noise from construction and operation crew-Impact assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Noise from crew when clearing sites, excavating and installing poles (Construction)	Minor	Homesteads, trading centers and other social infrastructure-Medium	Moderate negative
Noise from operational crew and transmission lines (Operation)	Negligible	Homesteads, trading centers and other social infrastructure-Medium	Minor
Noise from the decommissioning crew	Minor	Homesteads, trading centers and other social infrastructure Medium	Moderate

<u>Mitigation measures</u>

- No night-time works will be undertaken;
- Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centres

- Delivery vehicles will be prohibited from waiting near sites with their engines running. The movement of heavy vehicles during the night will be avoided;
- Where appropriate, noise barriers /attenuation to be employed to ensure that the maximum noise level at 1 m distance from a single source will not exceed 85 dB(A);
- If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and shop owners) will be informed of the timing and duration of the nuisance.

8.2.5 Impact on traffic flow

Sensitive receptor:
Works along the roads will likely affect traffic flow during project implementation. Increases in traffic during the installation phase may result in increased noise levels along the proposed power lines road. Poor traffic control along the power line routes may also lead to accidents.

All sites are along main roads inclung Wandi – Yumbe – Moyo and Onduparaka – Odramacaku - Abiria with low traffic volumes along the roads.

Impact assessment:

8.2.5.1 Construction

Installation of electricity poles requires usage of few vehicles hence one or two vehicles will be used per site, for delivery of equipment, poles and conductors and where required materials including sand, aggregate, and cement, as well as workers. Given the low number of vehicles in the local roads, it is highly unlikely that it will result in congestion, longer journey times or increased levels of stress for drivers, and accidents. However there will be some localized interference with traffic where truck sor vehicles are parked along the roads. The roads are dirt roads, well maintained by UNRA or DLGs, of width 7m. Secondary impacts of additional vehicles may include impacts on air quality and increased noise, particularly for homesteads and social service centres (schools, health centres) or pressure on road infrastructure in the vicinity of the distribution line sites. However these impacts will be moderate and temporary and the severity will be dependent on the pace of installation. Road safety is a key issue during the construction stage especially around rural growth centres, schools and health centers.

8.2.5.2 Operation

The traffic impacts from the operation of the distribution lines are likely to be negligible, mainly due to the limited number of trips required for periodic maintenance by the concessionaire.

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Traffic interference and noise from vehicles and crew (Construction)	Moderate	Homesteads, trading centers and other social infrastructure such as schools and health centers Medium	Moderate negative
Traffic interference and noise from vehicles and crew (Operation)	Negligible	Homesteads, trading centers and other social infrastructure such as schools and health center Medium	Minor negative
Traffic interference and noise from vehicles and crew when decommissioning	Moderate	Homesteads, trading centers and other social infrastructure such as schools and health centers Medium	Moderate negative

8.2.5.3 Decommissioning

This phase will have slightly similar impacts like the installation phase and the magnitude will also be moderate and temporary. It will involve mainly manual labour to scarify and restore construction sites at pole locations, and to remove or transport the poles and electrical installations.

Table 8-5: Impact on traffic flow-Assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Traffic interference and noise from vehicles and crew (Construction)	Moderate	Homesteads, trading centers and other social infrastructure such as schools and health centers Medium	Moderate negative
Traffic interference and noise from vehicles and crew (Operation)	Negligible	Homesteads, trading centers and other social infrastructure such as schools and health center Medium	Minor negative
Traffic interference and noise from vehicles and crew when decommissioning	Moderate	Homesteads, trading centers and other social infrastructure such as schools and health centers Medium	Moderate negative

Mitigation measures

- Employing traffic guides (flagmen) to control traffic;
- Use of safety signage with labels such as "Men at Work" or "Work in Progress" or "trucks turning"
- Sensitise drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of upto 20 kph near construction sites;

8.2.6 Soil, hydrology, water and ground water

Sensitive receptor:

Surface water is used by domestic and wild animals, and plays a critical role in the agro-ecosystem of the area. The groundwater in the area is abstracted by the local community through wells and boreholes and is used for domestic purposes. Water flows to lower areas where it feeds into wetlands and water bodies making them very highly sensitive receptor to contaminants especially from treated poles. Leakages of transformer oil at lay down areas, construction camps or after installation may pollute soils and water sources.

The works will involve excavations of pole sites and later back filling and if poorly compacted, loose soils may be eroded leading to siltation of natural drainage systems and water courses.

Several wetlands, rivers and stream were seen along the power line routes. The designs should take into consideration local drainage patterns and climate variability, particularly changes in rainfall intensity and the impacts of climate change.

Impact assessment:

8.2.6.1 Construction

The electricity poles will be rammed into the soil a distance of 1.5m and will be held in place, where necessary with concrete. For this reason, impacts will only be limited to the top soils, without significant intrusion to underlying groundwater, bedrock or any geological features.

Soils, surface waters and groundwater will be susceptible to contamination from various sources during the poles installation process. The main source of contamination will be from the treated electricity poles which if poorly handled can lead to soil and water contamination. Hazardous materials and wastes include fuels, lubricants, containers and sanitary waste especially at the staging areas along the RoW. The quantity of hazardous materials onsite will be small so only minor accidental spills could occur, resulting in impacts of minor magnitude. The quantity of hazardous materials onsite will be very small so only minor accidental spills could occur.

Soil erosion could occur as a result of the removal of vegetation and the disturbance of soils by vehicles or equipment in areas where the transmission lines will transverse, particularly the pole sites.

Siting of poles also has to take into consideration local drainage patterns and climate variability, particularly changes in rainfall intensity and the impacts of climate. The poles and distribution networks could be damaged by extreme rainfall events and floods if poorly designed.

8.2.6.2 Operation

Impacts upon soil and groundwater quality are generally not anticipated to occur during operation due to the operational processes having a minimum interaction with theses receptors.

The only hazardous liquids on-site that could cause contamination during the operational phase will be the oils in the transformers and leaks and spills from vehicles. Oils in the transformers are normally contained.

8.2.6.3 Decommissioning

Potential impacts during decommissioning include leaks and spills from vehicles. The quantity of hazardous materials onsite will be small so only minor accidental spills could occur.

Table 8-6: Geology, soil water and ground water - Impact assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Threat of water, soil and ground water pollution (Construction)	Minor	Soil and water Medium	Minor negative
Effects to geology (construction)	Minor	Geological features- Very Low	Negligible or Minor negative
Threat of water, soil and ground water pollution (Operation)	Negligible	Soil and water along the transmission lines- Very Low	Negligible
Effects to soil, water and ground water (Decommissioning)	Minor	Soil and water-Medium	Minor negative

Mitigation measures

- Siting of poles and transformers to avoid permanently and seasonally wet sections and water courses;
- REA to ensure climate proofing of designs, to minimize impacts of extreme hydrology or climate change impacts
- The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion;
- At the staging areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;
- If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground.

The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fuelling tankers other than fuel storage on sites

- The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground;
- No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;
- All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line
- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works;
- Location of staging areas on steep gradients should be avoided to prevent increased erosion.
- All vehicles and equipment to be serviced in designated areas, preferably at garages in urban centres along the lines

8.2.7 Theft of equipment and Vandalism of power distribution infrastructure

Sensitive receptor:

Local community theft of distribution related equipment and transformer oils put the health and safety of the public at risk of fire outbreaks, electrical shocks, injuries and deaths, as well as water and soil contamination. Such vandalism also impacts on the benefits of constant electricity supply, including improved social services and business productivity.

Impact assessment:

8.2.7.1 Construction/installation

Vandalism and theft of electric poles, conductors and transformers, and other associated materials (cement) and installations could occur, and has been reported on other lines under construction or operation. This impact is likely to be at a moderate negative since security personnel will be hired to keep materials safe at the storage camp but not necessarily at all installation sites. Such incidents will delay works and the benefits of rural electrification to the community, and increase costs of construction.

8.2.7.2 Operation

During operation phase vandalism might lead to electrocution but this will be maintained at minor negative if the local community is sensitized on the negative effects of stealing and vandalizing electrical installations. Vandalism will also deny the local community the benefits of constant power supply due to the resulting disruptions.

Table 8-7: Vandalism of power distribution lines-Impact assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Theft of poles, conductors, transformers and associated equipment (Construction)	Moderate	Local community-Medium	Moderate negative

Theft of poles, conductors, transformers and associated equipment (Operation)	Minor	Local community Low	Negligible or Minor negative

Mitigation measures

- Sensitization of the community through radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure
- REA to work closely with local leaders, including the District Security Committee (involving the RDC, DISO, GISO, Uganda Police) and Local Councils, to address security and safety at the sites and the storage camps.
- Workers to be employed on site should be vetted or obtain reference letters by their respective village LC1 chairpersons
- Contractor to engage a reputable security firm to provide security at sites, storage site, camp, staging areas, and during materials transportation;
- The security firms will be screened and references sought, including from the Uganda Police
- Evidence of training on adequate use of force, to be provided by the security firms
- All workers should be provided with identification cards to be used to access the construction sites

8.2.8 Pollution from transformer oil spillages

Sensitive receptor:

There is potential for accidental spillages from transformer oil at any stage of the project cycle that can be a source of concern ie during the preparation, construction stage at the equipment storage yard and during the operation phase when maintaining the transformers. This leakage can pollute soils and water sources.

Impact assessment:

8.2.8.1 Construction

Transformers use oil which if not adequately handled might spill making soils, surface waters and groundwater susceptible to contamination during the installation process. Accidental spills can also be experienced when transporting oil to the sites for purposes of filling transformers that may have leaked their oil during transportation, storage, or installation. The magnitude of the impact is considered moderate considering the extent of pollution given the number of transformers to be used, but the sensitivity of receptors medium.

8.2.8.2 Operation

Sometimes transformers leak which necessitates refilling them with oil/change oil to ensure that they function properly. Transformer oils are also replaced periodically but may spill in the process.

This poses threats of soil and water contamination. The quantity of hazardous materials onsite will be small so only minor accidental spills could occur.

8.2.8.3 Decommissioning

Potential impacts during decommissioning include leaks and spills from vehicles. The quantity of hazardous materials onsite will be small so only minor accidental spills could occur.

Table 8-8: Transformer oil spillages

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Threat of water, soil and ground water pollution (Construction)	Moderate	Soil and water Medium	Moderate or Major negative
Threat of water, soil and ground water pollution (Operation)	Minor	Soil and water along the transmission lines- Medium	Minor
Effects to soil, water and ground water (Decommissioning)	Minor	Soil and water Medium	Minor

Mitigation measures

- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.
- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation.
- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.
- Oil spill kits to be provided for during repair and maintainace of transformers
- Waste creosote or transformer oil to be handled by licenced companies in line with requirements of the National Enviroment (Waste Management) Regulations

8.2.9 Occupational Safety and Health of workers

Sensitive receptor:

The project personnel, including subcontractors and workers could be affected by construction works, line operations and decommissioning.

Impact assessment:

During the construction, operational and decommissioning phases the potential exists for injuries for workers involved, poor working conditions and welfare, as well as effects on public safety and health. Impacts relating to health, safety and welfare of the construction workers may arise as a

result of traffic, noise, air quality, accidents with hand held or mechanized tools, or poor ergonomic practices, or even house keeping etc.

Most occupational health and safety issues arise during the construction, operation, maintenance, and decommissioning of electric power distribution projects include, among others, exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards; exposure to dust and noise; falling objects; exposure to hazardous materials; and exposure to electrical hazards from the use of tools and machinery. Public safety arises if holes dug for poles are not immediately filled, poor traffic management practices leading to accidents, and exposure to energized electric conductors.

In addition, distribution lines will involve handling, storage and use of creosote-treated poles which is a fungicide, insecticide, matricide, and sporicide. Exposure to creosote vapors can irritate the lungs while direct exposure to small amounts of creosote over time by direct skin contact or by contact with creosote vapors can cause: blistering, peeling, or reddening of the skin, damage to the eyes and increased sensitivity to sunlight amongst others.

Workers may be exposed to poor sanitary conditions and associated disease outbreaks such as cholera.

These risks are more significant during the construction and decommissioning phases as there will be more workers onsite and relatively more hazardous materials and wastes. However, it should be noted that the amount of hazardous materials and wastes onsite will be very small throughout project implementation, mostly related to vehicle fuels and lubricants during construction and cooling oils from transformers during construction and operations.

Table 8-9: Issues on occupational health and safety

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Physical hazards (all phases)	Major	Workers and the public-High	Major negative
Poor sanitation (all phases)	Moderate	Workers and the public-Medium	Moderate
Exposure to creosote vapors (installation)	Minor	Workers-Low	Negligible or Minor negative

<u>Mitigation measures</u>

- The contractor should have in place a Health and Safety Policy and Action Plan, addressing workers occupational health and safety issues, workers welfare and working conditions in line with the Occupational Health and Safety Act of 2006, the REA EHS Policy and World Bank Group EHS general Guidelines, and the EHS guidelines for Power transmission
- The Contractor should have HSE induction for all workers, and undertake daily tool box meetings prior to works, including work at heights

- Provision of PPEs (gloves, safety boots, coveralls and goggles), as well as continuous awareness on the need for use of PPEs and enforcement of usage;
- Provision of First Aid Kits on site for the safety of the workers
- Ensure good housekeeping practices on site (have all equipment, materials, containers well stacked or stored) to avoid trips and falls on site;
- For all chemicals used on site and in storage, Matereal Safety Data Sheets should be provided;
- The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground;
- During maintenance, switch off and fully deactivate the main power;
- Use personal monitors in vulnerable areas to detect EMF;
- All workers on sites whould be well trained on their tasks
- The Contractor to use poles that have been well seasoned and dried and not having dripping creosote;
- The poles should not be placed in water-logged areas and neither should they come in contact with public drinking water sources;
- Disposal of off-cuts of poles should not be by burning but be collected and handed to a licensed hazardous waste management agent;
- Wash work clothes stained with creosote separately from other household clothing;
- Workers should regularly be taken through safety drills and emergency preparedness training allowing for quick and efficient responses to accidents that could result in human injury or damage to the environment;
- Fence off equipment storage areas and camp sites to discourage idlers to the sites;
- Keep all equipment and machinery in good working order to limit excessive fumes and noise;
- The contractor to have in place a traffic management plan, and guidelines for drivers to avoid accidents.
- Provide adequate sanitary facilities for workers at the construction camps and work sites

8.2.10 Labour issues

Sensitive receptor:

A number of workers will be engaged by the contractor to ensure completion of works as per schedule. The workers could come from the project area, neighbouring districts or other areas in the country. Upto 20 personnel will be involved in erection of a single pole, with several others in conductor stringing and installation activities. Working conditions including wages, working hours, provision of PPE, use of child labor, provision of medical care, water and food, provision of sanitary facilities, sexual harassment among workers and to the community, and workers grievances may arise.

The sensitive receptors are the workers, women and children, the host communities in the project area.

Impact Assessment:
The impacts of working conditions and welfare and those resulting from interactions with the host community will be temporary, lasting the construction period, but some impacts may be long term or permament. Case of early pregnancies will have long term impact on the girl child welfare. Whre workers grivenavnces are not addressed in a timely manner, works may be delayed and may affect the deliver of project benefits as per schedule. The sensitivity of of receptors is rated high, and magnitude of impact medium.

Mitigation measures

- Contractor to have in place a Labour force Management Plan, in line with the Labour Act and OHS Act. Labour Force Mangement Plan to address issues of workers welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, an a grievance management mechanism. In preparing a Labour Force Management Plan, the Contractor should take into account the World Bank Guidelines on managing the risks of adverse impacts on communities from temporary project induced labor influx
- All workers to have contracts
- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement

8.2.11 Potential disruption of road side businesses

Sensitive receptor:
Community road side businesses likely to be affected are kiosks, shops, furniture/welding workshops, gardens and woodlots. The businesses were seen in all Urban centres or rural growth centres where the line traverses.

Impact assessment:
Possible interference with roadside businesses during construction and decommissioning especially in trading centers as some kiosks and petty traders at the road edges will likely be affected and asked to shortly relocate (say for 1-2 days only). The direct disruptions will be where the poles are located and along the RoW during stringing.

The disruption of roadside businesses will be temporary, with each affected person disturbance not to last more than a week. Crops may as well be affected or damaged at pole sites and during stringing, with trees exceeding 2m high, and those within range to cause damage to the lines once fallen permanently removed.

Table 8-10: Potential disruption of road side businesses

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Disruption of business	Minor	Local community-Medium	Minor negative

(construction and decommissioning)			
.Disruption of businesses during maintainance	Negligible	Local community – Medium	Minor negative

Mitigation measures

- Adequate notification should be given to affected persons, especially road side vendors in urban centres, to enable them adjust their work with minimum interference.
- Ensure that houses and structures are not impacted by passing the line through the Road Reserve;
- In the event permant structures or houses are affected, REA to compensate affected persons at markets rates approved by the CGV
- Sensitize communities on dangers of electricity during construction works and maintainace;
- Poles to be located away from buildings, graves or sites of cultural significance;
- Contractor to ensure timely completion of works where roadside vendors are involved, including excavation, installation of poles and stringing.

8.2.12 Solid waste management

Sensitive receptor:

Solid and hazardous waste can cause a number of impacts on the surrounding environment. The generation and release of waste in the project area may result in secondary impacts on other receptors (adjacent agricultural land, water courses, and local communities including children) through a number of pathways. In rural areas, the practice is to collect and burry the waste, or have it disposed in the backyard. There are no municipal services undertaking waste collection in the project area. Hazardous waste streams have the potential to result in contamination of site soils, surface and groundwater if not stored, handled or managed properly. The environment in the project area is considered to have a medium sensitivity to the release of the types of waste that will be generated in the project areas. Soils, surface waters and groundwater will be susceptible to contamination from various sources during the installation process.

Impact assessment:

8.2.12.1Construction

Potential hazardous materials and wastes include fuels, lubricants and domestic waste at both the workers' camp and along the RoW. The quantity of hazardous materials onsite will be very small so only minor accidental spills could occur, particularly at pole spots.

Except for the hazardous fraction of construction waste, the remaining material is likely to be mainly inert and does not pose a threat to human health or the environment. Proper management of inert wastes is required in order to reduce associated secondary impacts such as resource use, dust emissions and habitat destruction at stockpile areas, or at pole sites where concrete mixing will take

place. Wastes will aslo be generated by workers, considering crews of upto 20 persons will be engaged at each pole site.

The impacts associated with poor waste management will be temporary but may last longer with poor housekeeping at construction sites such as pole sites.

8.2.12.2 Operation

The operation phase doesn't necessitate onsite full time personnel, which means that few wastes will be generated from everyday operations. The equipment used in the operational processes does not generate waste, unless components are specifically replaced during maintenance activities. Small amounts of domestic wastes may be generated during lines or transformer maintenance.

8.2.12.3 Decommissioning

The amount of waste generated during decommissioning will exceed the quantities generated during construction and operation, so careful waste management at this stage is critical. The hazardous fraction of the waste can potentially cause significant adverse impacts on human health and the environment if not managed properly. Any waste left onsite will have an impact on the local communities and the existing agro ecosystem.

Table 8-11: Solid waste management-Impact assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Poor solid waste management (Construction)	Minor	Soils, water, Local community-Medium	Moderate negative
Poor solid waste management (operations)	Minor	Soils, water, Local community - Medium	Minor negative
Poor solid waste management (decommissioning)	Minor	Soils, Water, Local community-Medium	Minor negative

Mitigation measures

- Avoid or minimize the generation of waste materials, as far as practicable;
- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and
- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner.
- Use only waste handlers licenced by NEMA to dispose of hazardous waste.
- Provide adequate sanitary facilities for workers especially at staging areas;
- Provide labelled waste bins at work sites for segregation of waste into biodegradable, non-biodegradable and hazardous streams, and dispose appropriately;

- Decommission the equipment storage after the project is commissioned;
- Work sites, especially temporary material storage at the pole sites (sand, aggregate, cement) and concrete mixing areas to be cleaned up after works. Only required materials to be delivered and areas of works restricted to at most 16m^2.
- REA will adhere to its procurement guidelines ensuring that all their transformers conform to latest editions of appropriate EC specifications and/or other recognized International Standards.

8.2.13 Community and workers' health including HIV/AIDS

Sensitive receptor:

Works on the power line will attract local and an influx of migrant or transient workers, who are predominantly men, during construction. Workers and the local community especially women and girls are the likely victims of illicit sexual behaviors which normally lead to new HIV/AIDS infections and teenage pregnancies.

Impact assessment:

The requirement of skilled and unskilled labour may attract a number of workers from other districts during the construction. The presence of a crew per village is estimated at about one week, with work in one particular district with various crews likely to take less than a month. The magnitude of this impact during the construction and decommissioning phases is considered moderate. During operations, the concessionaire will have a small dedicated crew hence negligible interaction with communities in the 345km stretch of power line.

Table 8-12: Community and worker's health- Impact assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Teenage pregnancies, spread of HIV/AIDS (Construction)	Moderate	Local community- Medium	Major negative
Teenage preganicies, spread of HIV/AIDS (operation)	Negligible	Local community – Medium	Minor negative
Teenage pregnancies, spread of HIV/AIDS (Decommissioning)	Minor	Local community- Medium	Moderate negative

<u>Mitigation measures</u>

- Contractor to have in place an HIV/AIDS Prevention and Management Policy, and to ensure on workers are sensitized;
- Contractor to liase with District Authorities (Directorate of Medical Services) and other HIV/AIDS institutions for related services, including provision of condoms, sensitization, conselling
- Sensitize community and schools about construction hazards as well as HIV/AIDS;
- Provide workers with condoms

- Communities will be encouraged to report cases of illicit sexual behavior by contractor workers to REA and local authorities
- All workers to have access to medical care

8.2.14 Potential of risks due to damage to power lines

Sensitive receptors:

Failure to ensure proper maintenance of the distribution lines and transformers can lead to line breakages and damages to cables, hence putting the public at risk, interfering with traffic flow along the roads and loss of businesses. Clearance of trees in the of RoW especially in the forested areas, and for tall trees adjacent the lines has to be undertaken to avoid trees or tree branches falling on the lines.

The areas potentially affected are the line routes through forests, and the entire network of 345km and communities adjacent the line or utilizing the power. The affected persons include the general public, children and businesses. There will be losses to businesses associated with power outages.

Impact assessment:

Once constructed there will be need for routine maintenance of the power lines in terms of tree trimming in the RoW. If this exercise is not well coordinated, it will generate impacts relating to power outages, electrocutions and potential conflicts with the communities on issues regarding crop loss and road side businesses. It may also lead to interference with road traffic flow, where power lines fall along the roads.

The impact will be negligible or minor during construction and decommissioning considering most of the network will not be energized, but major during operations once the lines are energised.

Table 8-13: Potential risks to damage to power lines - Impact assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Risks due to damage to power lined(construction)	Negligible	Public, businesses – low	Minor
Risks due to damage to power lines (operations)	Moderate	Public, businesses - Medium	Major
Risks due to damage to power lined (Decomissioning)	Minor	Public, businesses - Medium	Minor or Moderate negative

8.2.15 Exposure to electromagnetic fields

Sensitive receptors

During consulttions with local communities, fears were raised related to impacts of electromagnetic fields from power distribution lines. The lines are aligned mainly along road reserves, and traverse concentrated settlements in urban centres. There are also isolated cases where the lines pass near schools and health centres.

Impact assessment

The magnitude of impact is considered negligle during construction since the lines are not enregised. During operations, the exposure is along the power lines right of way and sensitity is also negligigable since these are distribution lines that have minimal electromagnetic radiations.

Table 8.14: Exposure to electromagnetic fields impact assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Exposure to electromagnetic waves (construction)	Negligible	Minor	Minor
Exposure to electromagnetic waves (operations)	Moderate	Minor	Minor

Impact mitigation

- Sensitisation of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation

8.2.16 Impacts on Physico-Cultural Resources

Sensitive receptors

The Department of Meseums and Monuments was consulted as part of the preparation of this Project Brief. DMM indicated PCRs in Uganda are not adequately surveyed, and the possibility of presence of archaeological or cultural resources cannot not be ruled out. DMM pointed out the presence of archeological sites along the Wandi - Yumbe route, and none reported for Odramachaku-Abiria line and the Midigo-Ludara line.

From literature review and field surveys, the following PCRs have been identified

- Major historical sites in the project area is Dufuly Fort located in Alikua village, Aliapi parish Maracha County in Arua district built in memory of the Belgians who died in the area in 1911 when the West-Nile region was still under the Belgian protectorate.

- A number of iron smelting sites belonging probably to Early Iron Working which were noted on the terrain mostly exposed by human activities and animals as evidenced by scatters of pieces of iron slag. The project may also encounter pottery sites characterised by both decorated and plain shards, most of which are in poor state of conservation
- Burrial grounds – these are quite commeon in the region and out to be avoided, considering the respect or attachment to them by the local community.

During the consultations with the local community and local leaders, and from high spot surveys, no PCRs or sites of cultural or religious importance were identified to fall within the road reserves. However PCRs above may be encountered in the region or as the distribution line route is surveyed and constructed.

Impact assessment

Impacts on physic-cultural resourses are likely to occur during clearance of right of way and excavations and access to pole sites, and during pole installations and conductor stringing. Maintainace works may have limited impact if any, and will result from clearing of the right of way. These activities may lead to exposure and destruction of cultural artifacts such as pottery, lithic, bones and iron slag among others.

The magnitude of impact is considered minor since excavations will be limited to the pole sites but sensitivity high considering the sacred nature and attachment of communities to PCRs. Impacts on historical sites is unlikely if the sites are identified in consultation with the communities and Lead Agencies and avoided.

Table 8.15: Potential damage to PCRs - Impact assessment summary

Impact	Impact Magnitude	Receptor sensitivity	Impact significance
Damage to PCRs (construction)	Minor	High	Moderate
Damage to PCRs (operations)	Negligible	High	Minor to Moderate
Damage to PCRs (Decomissioning)	Minor	High	Minor or Moderate

Impact mitigation

- At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly on sites of cultural importance along the RoW.
- Where cultural resources are encountered, compensatioin will be provided including support for relocation, such as graves, where applicable in a culturally acceptable manner.

- Excavation of sites of known achaelogical importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards or sites of historical or spiritual importance;
- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artifacts before commencement of work. Such training should be administered in liason with DMM
- In the event of any chance finds of significance by the contractor, following the discovery of possible PCR, the Contractor will be required to follow a "chance finds procecure" in Appendix 6:
  - The Contractor will be required to stop works and contact REA/MEMD to inform the Department of Meseums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access.
  - DMM will then undertake investigations, and works will only resume once authorization is provided.

8.3 Grievance redress mechanism

Considering the nature and extent of works on the power distribution line, grievances are expected to arise from the following:

- Land requirements for the power line, including locations of poles and transformer sites, access to construction sites and staging areas and material storage areas
- Changes in designs, including power line alignment, and locations of support infrastructure
- Clearance of right of way which may affect crops and trees
- Temporary displacement of road side activities in urban centers, including vendors
- Complaints related to noise, dust, traffic incidents
- Complaints on workers behavior or conduct, specially towards women, youg girls and children
- Disruption of social set up and security
- Disputes on compensation values
- Increased pressure on social services and infrastructure, including water supply

REA will establish a Grievance Management Mechanism, with Grievance Committees at Village, Subcouncty and District Level. REA will participate in these committees or be represented by the Supervising Consultant, together with LC1 Chairpersons, a representative from Project Affected Persons, Area Land Committee Representative, a Women Representative and an Elder, at Village levels. At Subcounty Level, the committee will include a Subcountuy Chief, Area Councillor including a Woman Representative, and Area Land Committee Chairperson. At District Level, the District Lands Officer, Subcounty Chief, Community Development Officer, District Councilllor and Women Representative. The idea is to ensure grievances not resolved at village level are handled at subcounty, and if not resolved, will be addressed at District Level, or by the District Land Tribunal.

There is also the opportunity to have the grievances resolved by top management at REA or MEMD, or by the Electricity Tribunal, before court redress is sought as the final option. At village level, timely response to grievances should be emphasized, of about 1 week, and 2 weeks for the subcounty and district GMC.

Local leaders and the GMC in general will be trained in grievance management. The grievance will be received by the LC1 Office and recorded in the grievance log book. The grivances will then be screened, validated and compiled by the Supervising Consultant or REA for review by the GMC. REA will acknowledge receipt of the grievances by communicating to the PAPs. The grievances will be assessed and resolutions agreed upon communicated to the PAPs. Actions to be taken taken will be agreed upon by the GMC, and progress in implementation reported by REA to the GMC. Other interested parties in the GMC actions will be the local communities.

REA will also proactively engage the PAPs through its Stakeholder and Public Disclosure Plan, keeping the communities informed of developments on the project, including planned activities, project impacts and mitigation measures, and about the GMC and if functioning. Capacity of field staff, including Community Liason Officers will be built, to ensure they can inform and engage the communities, resolve conflicts and address their needs.

There will be periodic reporting of progress with GRM implementation on a weekly and monthly basis, and reports shared with District Authorities and Project Financiers.

A proposed grievance redress mechanisim is presented in Appendix 7.

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

An Environmental and Social Management Plan (ESMP) is the key tool to ensure that environmental aspects are appropriately managed and that the recommendations of the ESIA are complied with during the construction and operation of the project.

The ESMP comprises a set of management, mitigation and monitoring measures to be taken in different stages (construction, operation and decommissioning) to eliminate, offset or reduce adverse environmental impacts to acceptable levels.

9.1 Purpose of the ESMP

The ESMP specifies the actions required to mitigate and manage environmental and social impacts and guides the implementation of these actions. The ESMP also details the monitoring and record keeping required to ensure that mitigation measures are effective and, that where they are not effective, the necessary corrective actions are promptly put in place. Finally, the ESMP provides a tool for auditing the implementation of the mitigation and monitoring commitments of the project and communicating the results to stakeholders.

9.2 Standards and Guidelines

In preparing this ESMP, compliance with National Policy, Laws and Regulations, standards and guidelines, has been emphasised, as well as with the Safeguard policies of the World Bank that have been twiggered.

Supplemental environment and social management plans have been proposed and include Gievance Management Mechanism, Resettlement Framework for the ERT III Project, and Livelihood Restoration Plan.

The Contractor to be engaged by REA will have this ESMP integrated into their contract specifications, contractor environment and social action plans. REA will provide for continuous supervision of contractor for compliance with ESMP requirments. The Supervising Consultant will be required to have an Environmental Specialist on his team.

The specific action plans for the contractor will include a Waste Management Plan, Oil spills Contingency Plan, Hazardous Waste Management Plan, Labour Force Management Plan including a Code of Conduct for Workers, Occupational Health and Safety Management Plan, Emergency Response and Preparedness Plan.

9.3 Implementation of the ESMP

9.3.1 Responsible parties

Key players in the implementation of this ESMP include the Project Coordination Unit at MEMD; REA; the Contractor and the Supervising Consultant. Others not directly involved (in contract obligations) have been discussed in Chapter 4 under the Institutional Framework, including NEMA, ERA, and MoLG among others.

9.3.2 Capacity building for ESMP implementation

All staff involved in ESMP implementation will be required to undergo training to be familiar with implementation requirements of the ERT III ESMF, and particularly the ESMP for this project. This training will be organized by REA in liason with the PCU at MEMD.

9.3.3 Training and Awareness Raising for workers

All contractor workers will undergo induction in environmental, social, health and safety prior to start of construction works, and periodically during the project implementation phase. Attendance at project briefing and tool box talks will also be an opportunity to learn project HSE requirements.

9.3.4 Communication

A Public Consultation and Disclosure Plan, and Grievance Management Mechanism are means through which REA will maintain a formal procedure for communication with the project affected communities.

REA will be responsible for communication with the public and local stakeholders and will maintain a written register of stakeholder interactions so that commitments made can be tracked and addressed.

9.3.5 Documentation

REA will have a staff responsible for documentation, including management plans, associated procedures, and checklists, forms and reports, through a formal procedure. The document control procedure will describe the processes that the project will employ for official communication of document deliverables, as well as document tracking.

REAs Consultant will be responsible for maintaining a master list of applicable HSE documents and making sure that this list is communicated to the appropriate parties. He/she will be responsible for providing notice to the affected parties of changes or revisions to documents, for issuing revised copies and for checking that the information is communicated within that party's organisation appropriately.

9.3.5 Operational Control Procedures

Each potentially significant impact identified in the ESIA has been addressed in the project ESMP, and specifies the appropriate procedures, work instructions, management practices, roles,

responsibilities, authorities, monitoring, measurement and record keeping required for avoiding or reducing the impact. Compliance and effectiveness of the project ESMP will be checked on a regular basis through a monitoring and auditing procedure described in the ESMP.

Project ESMP sections will be reviewed on a bi-annual or quarterly basis and, where appropriate, amended to include instructions for planning and minimising impacts, or to reference to relevant documents that address impact avoidance and mitigation. The updates of the ESMP before start of construction should include conditions in the NEMA Certificate of approval, and other permits issued by regulatory authorities.

9.3.6 Emergency Preparedness and Response

An emergency response plan has been proposed as one of the supplementary management plans. Emergency situations may arise due to traffic accidents or accidents on sites, security situations, floods etc., and there is need to prevent and mitigate potentially adverse environmental and social impacts that may be associated with them.

Emergency response drills will be undertaken on a regular basis to test for readiness of workers to unpredicted events and identify gaps that need to be addressed. The project area communities will be informed of possible emergencies and required actions on their part in case of such eventualities.

9.3.7 ESMP budget and resource allocation

Financial and personnel resources must be allocated to the implementation of the project ESMP, including provisions for induction, training and environmental awareness, contingencies to deal with environmental emergencies, monitoring and auditing. Such resources must be available during all stages of the project implementation.

9.3.8 Checking and Corrective Action

Checking includes inspections, monitoring and audits to confirm proper implementation of ESMP as well as effectiveness of mitigation measures. Corrective actions include response to out-of-control situations, non-compliances, and non-conformances. Actions also include those intended to improve performance.

The identification, reporting and rectification of of non-compliances will be encouraged at inductions and tool box meetings.

9.3.9 Reporting

Reporting on environmental performance will be undertaken as per Ugandan National Environmental laws. This ESMP provides for regular reporting to stakeholders throughout the project. REA will keep relevant regulatory authorities and other stakeholders informed of the project performance with respect to HSE and Social-economic matters by way of written status reports and meetings. The following will be reported to NEMA and lead agencies on a quarterly basis:

- Significant modifications to the project ESMP;

- Significant design, routing or implementation changes;
- Results of implementation of mitigation measures proposed in the ESMP and environmental monitoring;
- Environmental pollution incidents that required corrective action;
- Progress on compensation for damaged crops and properties;
- Grievance handling;
- Community incidents;
- Safety incidents or accidents;
- Progress on project construction.

An environmental audit will be undertaken by an Independent Consultant midway during construction works and on completion of works or prior to handovr of the power line to the operator, to review progress and compliance with environmental and social requirements for the project.

9.4 Monitoring

Key monitoring requirements have been identified through the ESIA process to monitor the environmental and social performance of the project.

The overall objectives of monitoring are to:

- Ensure regulatory requirements are met;
- Verify predictions made in the ESIA by obtaining real time measurements, including noise and vibrations, water and air quality;
- Verify that mitigation measures are effective; and
- Provide early warning of potential unplanned for or unmitigated impacts.

9.4.1 Monitoring Approach

Monitoring will be carried out by the relevant lead agencies. The following four types of inspections and monitoring will be employed:

- **Inspections** planned and conducted on a regular basis to ensure that mitigation measures and commitments are properly maintained and implemented, and that specific management procedures are being followed (e.g. practices on temporary waste storage and transport).
- **Receptor monitoring** undertaken to verify predictions made in the ESIA and to confirm that the activities at the site are not resulting in unacceptable impacts on receptor systems, including forests, wetlands, water courses or sources, communities or infrastructure (e.g. monitoring air quality, water quality, noise and vibration emissions, and grievances from project affected communities).
- **Compliance monitoring** involving periodic sampling or continuous recording of specific environmental quality indicators to ensure compliance with project standards or regulatory requirements.

- **Auditing** to assess compliance of the project activities with both regulatory and site management system requirements.

9.4.2 Penalties for non-conformance with ESMP requirements

REA will ensure enforcement of compliance of the contractor with the Environmental requirements. The ESMP will be updated upon issuance of the NEMA certificate of approval, permits and licences from lead agencies. Non compliance to the ESMP shall attract penalties, including non-approval of payment Certificates. ESMP shall be incorporated in the Contract so that it is a contractual obligbations and failure by the Contractor to comply with it shall attract penalities as shall be detailed out in the Contract and in accordance with the laws of Uganda.

9.5 ESMP Structure

The ESMP is divided into the construction and operation phases and the structure of the ESMP is as presented below;

- Likely impacts/issues;
- A description of the mitigation measures (actions) that the developer will implement;
- Monitoring indicators/tools to be checked during the construction and operation phases;
- Timing for implementation of the proposed mitigation measures;
- The responsible party for ensuring full implementation of the mitigation measures and also monitoring compliance with the ESMP.

9.6 ESMP implementation costs

The cost of ESMP implementation listed cover mainly costs of monitoring, sensitisation, compensation, waste management, Grievance management, stakeholder engagement, security of equipment, management of Labour and OHS issues, and additional studies (PCRs) estimated at USD 230, 400. Other costs will include capacity building of stakeholders to implement the ESMP estimated at USD 15,000 and the costs of environmental audit prior to line commissioning or handover estimated at USD. 30,000.

Many of actions will require REA, contractor or employee compliance or vigilance, such as for works in sensitive environments. Others are addressed in designs. With this ESMP the contractor should be aware of require compliance standards and associated costs.

Table 9-1: Environmental and Social Management plan

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
Positive Impacts								
1	A boost to operations of public utilities	• Telecommunication masts • Lighting at air-fields • Water pumps	• Timely maintenance of power lines • Payment of bills	Coverage by telecoms Operating hours for airfield Water shortages	Operations	REA, ERA,	Monthly	
2	Increased investment in the region	Major towns and rural growth centres	•	No of new businesses in operation	Operations	REA	Annual	
3	Reduced carbon, GHG emissions	Major towns and rural growth centres	• Last mile connections incentives	• No of homes, industries connected to the grid • Fossil fuels consumption per homestead	Operations	REA	Annual	
4	Improved security	Major towns	• Provide street	Reported	Operations	REA; Local	Quarterly	

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
		and rural growth centres; Public institutions	lighting in liason with the urban authorities	incidents		Authorities		
5	SME growth, employment	Major Towns, rural growth centres	• Incentives for last mile connections	Number of new SMEs operational at rural growth centres	Operations	REA; Local Authorities	Annual	
7	Improved social services	Major Towns, rural growth centres, institutions	• Incentives for last mile connections	Number of health centres, schools, etc connected	Operations	REA; Local Authorities	Annual	
Negative impacts								
1	Clearance of vegetation and crops	Along the RoW Acces roads to pole sites At pole sites Staging areas Gardens and woodlots	• Ensure that the RoW is restricted as much as possible to the road reserve; • Restrict clearing of trees to only those more than 2m high within the RoW, and the	Area cleared of vegetation; Complaints registered and resolved; Compensation records	During construction and O/M	District Environment Officers REA Supervising Consultant Contractor	Continuous	15,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			tall trees and branches adjacent the power lines that are of safety concern; • Limit clearance for access, installation work and maintainace to the necessary extent, mainly at pole locations;` • Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas; • The wetlands, rivers, streams					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			and areas that have surface water should be protected from earth works and contamination, and poles sited away from wet sections of the lines where possible; • All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses; • Tree species listed in the IUCN Red list					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			and seen during the surveys will be marked and avoided, wherever possible, by re-alligning the route; • Where losses of vegetation/crops are inevitable, compensation measures be instituted as per approved District Land Board rates and in line with the REA Resettlement Framework, and the Resettlement Action Plan that has been prepared					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			alongside this Project Brief.					
2.	Habitats and wildlife	Wetlands and forested areas River banks	• At completion of clearance and installation works areas not needed for the distribution process will be restored; • NFA to be compensated for trees cleared outside the road reserves and within the CFRs; • The holes for poles in wetland areas shall be back filled using suitable gravel material in such quantities that will be just enough to stabilize the	Restored sites; Compensation record; Record of workers sensitization; Wildlife relocated	After construction and during construction	District Environment Officers REA Supervising Consultant Contractor	Throughout the construction phase	30,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			hole with no extra soil to silt the wetland; • Excess soils will be removed and utilized to restore disturbed sites or disposed at approved sites; • Ensure that the habitats are not disturbed by limiting the RoW within the road reserve; • Limit clearance for installation work and inspection to the necessary extent; • Remove as much vegetation as possible by hand held					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			equipment and avoid the use of heavy machinery, especially in sloping areas and sensitive areas; • Avoid works in wet sections of the lines during the rainy season; • Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited; • Any amphibian and reptiles encountered during the construction phase that					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			cannot flee on its own accord should be relocated. The herptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away; • Construction workers to be sensitized no to cause harm to wildlife.					
3.	Bird kills from grid lines	Along the distribution line and in bird sensitive areas	• Conductors along wetlands and in protected areas will run horizontal not vertical.	Power line designs implemented	During construction	District Environment Officers REA	Throughout construction	Cost incorporated in design

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
4.	Noise from construction and operation crew	Receptors in the vicinity of the proposed power transmission line routes e.g. Schools, health centers, trading centers, and residential areas.	• No night-time works will be undertaken; • Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centres; • Delivery vehicles will be prohibited from waiting near sites with their engines running; • Where appropriate, noise barriers /attenuation to be employed to ensure that the maximum noise level at 1 m distance from a single	Noise measurements; Complaints recorded	During construction	District Environment Officers REA Contractor	Daily during construction	5,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			source will not exceed 85 dB(A); • If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and shop owners) will be informed of the timing and duration of the nuisance.					
5.	Traffic	Along the roads	• Employ traffic guides (flagmen) to control traffic; • Use of safety signage with labels such as "Men at Work" or "Work in Progress" or		During construction	REA Traffic Police Contractor	Throughout the construction phase	35,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			"trucks turning"; • Sensitise drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of upto 20 kph near construction sites; • Apply dust suppression techniques e.g water sprinkling					
6.	Soil, water and ground water	Soils, surface waters and groundwater along distribution lines. Staging areas	• Siting of poles and transformers to avoid permanently and seasonally wet sections and water	Restored sites; Waste management plan; Waste transfer notes Hazardous	During construction	District Environment Officers REA Contractor	Throughout the construction phase	15,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			courses; • REA to ensure climate proofing of designs, to minimize impacts of extreme hydrology or climate change impacts; • The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion; • At the staging areas clearance of vegetation will be limited	waste containment facilities				

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			to only those areas where it is absolutely necessary; • If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			however should consider use of mobile fuelling tankers other than fuel storage on sites; • The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground; • No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site; • All vehicles to be checked for potential of oil leakages prior to works in wet sections of the					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			line; • Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works; • Location of staging areas on steep gradients should be avoided to prevent increased erosion; • All vehicles and equipment to be serviced in designated areas, preferably at garages in urban centres					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			along the lines.					
7.	Theft and Vandalism	Equipment at storage sites/staging areas Conductors, transformers, poles along the distribution line Staging areas	• Sensitization of the community through radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure; • REA to work closely with local leaders, including the District Security Committee (involving the RDC, DISO, GISO, Uganda Police) and Local Councils,	Reported incidents; Stakeholder engagement plan	During construction/installation and O/M	REA Contractor	Monthly during construction phase	35,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			to address security and safety at the sites and the storage camps; • Workers to be employed on site should be vetted or obtain reference letters by their respective village LC1 chairpersons; • Contractor to engage a reputable security firm to provide security at sites, storage site, camp, staging areas, and during materials transportation; • All workers should be					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			provided with identification cards to be used to access the construction sites.					
8	Pollution from transformer oil spillages	Transformer sites along distribution lines	• All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage; • The Contractors shall also be required to develop and implement Standard	Oil spill containment/handling facilities and procedures; Waste transfer notes and destruction certificates	During construction and O/M	Contractor	Continously	10,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation; • Oil spill kits to be provided for during repair and maintainace of transformers; • Waste creosote or transformer oil to be handled by licenced companies in line with requirements of the National Enviroment (Waste Management) Regulations.					
9	Occupa	Staging areas;	• The contractor	OHS plan	During	District	Daily during	10,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
	tional safety and health	along the distribution line routes	should have in place a Health and Safety Policy and Action Plan, addressing workers occupational health and safety issues, workers welfare and working conditions in line with the Occupational Health and Safety Act of 2006, and the REA EHS Policy; • The Contractor should have HSE induction for all workers, and undertake daily tool box meetings prior to works;	OHS incidents Record of PPE issuance OHS report Induction and training records	construction and O/M	Environmentofficers Health Officers REA Contractor	construction and operartion phase	

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			• Provision of PPEs (gloves, safety boots, coveralls and goggles), as well as continuous awareness on the need for use of PPEs and enforcement of usage; • Provision of First Aid Kits on site for the safety of the workers; • Ensure good housekeeping practices on site (have all equipment, materials, containers well stacked or stored) to avoid trips and falls on site;					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			• For all chemicals used on site and in storage, Matereal Safety Data Sheets should be provided; • During maintenance, switch off and fully deactivate the main power; • Use personal monitors in vulnerable areas to detect EMF; • All workers on sites should be well trained on their tasks; • The Contractor to use poles that have been well seasoned and dried and not having					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			dripping creosote; • The poles should not be placed in water-logged areas and neither should they come in contact with public drinking water sources; • Disposal of off-cuts of poles should not be by burning but be collected and handed to a licensed hazardous waste management agent; • Wash work clothes stained with creosote separately from other					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			household clothing; • Workers should regularly be taken through safety drills and emergency preparedness training allowing for quick and efficient responses to accidents that could result in human injury or damage to the environment; • Fence off equipment storage areas and storage sites to discourage idlers to the sites; • Keep all					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			equipment and machinery in good working order to limit excessive fumes and noise; • The contractor to put in place a traffic management plan, and guidelines for drivers to avoid accidents; • Provide adequate sanitary facilities for workers at the staging areas and work sites.					
10	Labour issues	Workers, women and children, the host communities in the project area	• Contractor to have in place a Labour force Management Plan, in line with the Labour Act	Labour Force Management Plan; Workers code of conduct; Contracts for	During construction phase	REA/Contractor/ Operator	Continous	3,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			and OHS Act. Labour Force Mangement Plan to address issues of workers welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, an a grievance management mechanism; • All workers to have contracts; • Persons seeking employment will have to be screened, including	workers				

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			references from the local Council Chairpersons of their villages of origin before engagement.					
11	Road side businesses affected	Community road side businesses such as kiosks, shops, furniture/welding workshops, gardens and woodlots All Urban centres or rural growth centres where the line traverses.	• Adequate notification should be given to affected persons, especially road side vendors in urban centres, to enable them adjust their work with minimum interference; • Ensure that houses and structures are not impacted by passing the line through the Road	Record of notice to relocate businesses temporarily; Record of compensation for damages and permanent structures Sensitisation record	During preparation, construction/installation and O/M	REA Contractor Community development officers	Continous	10,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			Reserve; • In the event permanent structures or houses are affected, REA to compensate affected persons at markets rates approved by the CGV • Sensitize communities on dangers of electricity during construction works and maintainace; • Poles to be located away from buildings, graves or sites of cultural significance; • Contractor to ensure timely completion of					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			works where roadside vendors are involved, including excavation, installation of poles and stringing.					
12	Solid waste management	At the staging areas	• Avoid or minimize the generation of waste materials, as far as practicable; • Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and • Where waste	Waste management plan; Waste transfer notes; Labelled waste bins	During construction/installation and O/M	REA District Environment Officers Contractor	Daily during construction	5,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner; • Use only waste handlers licenced by NEMA to dispose off hazardous waste. • Provide adequate sanitary facilities for workers especially at staging areas; • Provide labelled waste bins at work sites for					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			segregation of waste into biodegradable, non-biodegradable and hazardous streams, and dispose appropriately; • Decommission the equipment storage after the project is commissioned; • Work sites, especially temporary material storage at the pole sites (sand, aggregate, cement) and concrete mixing areas to be cleaned up after works. Only required materials to be					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			delivered and areas of works restricted to at most 16m²; • REA will adhere to its procurement guidelines ensuring that all their transformers conform to latest editions of appropriate EC specifications and/or other recognized International Standards.					
13	Community and workers' health including HIV/A	Staging areas for workers and all Urban centres or rural growth centres where the line traverses.	• Contractor to have in place an HIV/AIDS Prevention and Management Policy, and to ensure on workers are sensitized;	HIV/AIDS prevention and management policy Community outreach reports	During construction/ installation	REA District Health Officers Sub County health inpectors and community development	Continous	7,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
	IDS		• Contractor to liase with District Authorities (Directorate of Medical Services) and other HIV/AIDS institutions for related services, including provision of condoms, sensitization, conselling; • Sensitize community and schools about construction hazards as well as HIV/AIDS; • Provide workers with condoms • Communities will be encouraged to report cases of			officers.		

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			illicit sexual behavior by contractor workers to REA and local authorities; • All workers to have access to medical care.					
14	Power lines damage	At the transformers and along the distribution lines.	• Ensure adequate protection measures for the lines and compliance of contractor with REA design guidelines; • Coordinating with switch control units to ensure power supply is turned off before start of line maintenance; • The public shall be	Design reports, with protection measures Safety signage Emmergency response plan Community sensitization Maintenance of RoW	During construction/installation and O/M.	REA Traffic Police Contractor	Daily during construction/installation and O/M	Adressed in design and by perator budget. Limited budget to sensitisation activities as above.

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			protected against hazards of tree trimming along the roads by placing warning signs & signals; • Where there is danger that the tree may strike and damage property, the trimmers should employ block and tackle system to control the direction of fall; • All tree trimmings and branches should be cleared off the road by the crew; • Sensitize communities					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			about the dangers of exposed high voltage live wires; • Provide prominent warning signs at all installations to warn the intending intruders from touching the lines or fixtures; • Sensitize Communities to report a sagging wire or one that has fallen to the ground; • Maintenance personnel should be vigilant during maintenance routines;					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			• Surge arrestors installed at each end of the power line; • Cable sizing done with a big factor of redundancy so as to operate within rating; • Watch and Monitor construction activities at cable sites; • Ensure use of conductor with larger cross sectional area which has energy loss reduction capability by design. • Routine maintainace of the RoW to be undertaken by the					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			consessionnaire, including clearance of trees within the RoW and tall trees adjacent the lines.					
15	Exposure to EMF	Along RoW	• Sensitisation of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation •	Consultations with communities and Local Authorities; Local complaints	Operations	REA Operator	Monthly	
16	Physico-Cultural Resources	Along the RoW	• At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly on sites of cultural importance along the RoW;	PCRs record; Community consultations on PCRs Chance Finds Procedure implemented by Contractor	During construction	REA Contractor Department of Antiquities	Daily during construction	50,000

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			• Where cultural resources are encountered, compensation will be provided including support for relocation where applicable in a culturally acceptable manner; • Excavation of sites of known archaeological importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards; • In the event of any chance finds of					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			significance by the contractor, following the discovery of possible PCRs, the contractor to follow REA Chance Finds Procedure in Appendix 6; • The Contractor will be required to stop works and contact REA/MEMD to inform the Department of Meseums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access; • DMM will then undertake investigations,					

No	Impact issue	Location	Mitigation/Enhancement measures	Monitoring indicators	Project phase Timing	Responsible entity	Monitoring frequency	Cost in USD
			and works will only resume once authorization is provided.					
16	Grievance management	In all villages affected by the distribution line	• Set up grievance management committees at Village, Subcounty and District Levels • Inform affected communities on the functioning of the Grievance management committee • Develop and implement a Public Consultation and Disclosure Plan	Functional GMC and reports; Public Consultation and disclosure plan;	Construction phase	REA Contractor District Local Governments	Village - Bi weekly Sub-county - monthly District - Quarterly	5,000

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

Increasing electricity access in the West Nile Region through construction of power lines and grid extension will have the following benefits

- Reduced carbon emissions, improved health and the reduced threat of climate change
- Improved delivery of social services, including health, education, telecommunication, and reduced costs of public administration
- Creation of employment during construction, and resulting from increased access to electricity, including development of agribusiness, hospitality and other industries in the region

In preparing this Project brief, baseline studies were carried out to identify sensitives along the power line route likely to be affected, including wetland systems, water courses, protected areas including CFRs, social infrastructure including roads, schools and health centres, settlements and businesses. Electricity demand and load centres have also been highlighted. Stakeholder consultations and engagements have been carried out with Government Lead Agencies, and in all Districts and sub counties, and rural growth centres, and with project affected persons alsong the power line route.

Key concerns raised loss of vegetation along power line route including crops, private woodlots and trees; the need for sensitisation of affected communities on land acquisition, compensation, public safety and benefits from power line construction and operations; impacts on sensitive environments including wetlands, rivers, CFRs, wildlife and habitats; Workers occupational health, safety and welfare; Gender issues, particularly benefits to women; environmental and social impacts management during construction and operations; and management of grievances during construction and operatiosn.

The Environmental and social management plan has been proposed to be implemented by REA. Supplemental environment and social management plans have been proposed and include Gievance Management Mechanism, public Consultation and Disclosure, Resettlement Framework for the ERT III Project, and Livelihood Restoration Plan.

The Contractor to be engaged by REA will have this ESMP integrated into their contract specifications, contractor environment and social action plans and provide for continual supervision of contractor for compliance with ESMP provisions.

The specific action plans for the contractor will include Waste Management Plan, Oil spills Contingency Plan, Hazardous Waste Management Plan, Labour Force Management Plan including

code of Conduct for Workers, Occupational Health and Safety Management Plan, Emergency Response and Preparedness Plan.

Contractor monitoring for compliance with ESMP will be undertaken by REA and reports submitted to relevant lead agencies on a monthly or quarterly, as appropriate.

10.2 Recommendations

Details of the power line alignment, including actual locations of poles, transformmers, staging areas, accesss roads, and material source points or suppliers, or even of the contractor were not available. Changes in some aspects of designs may as well occur, including routing of power powerlines away from forested areas. Such changes and additional risks should be addressed in monitoring reports and the relevant stakeholders updated.

There should as well be vigilance on the part of the REA to monitor works compliance with the ESMP and regulatory requirements. The Supervising Consultant should demonstrate competence to handle environmental, social, health and safety aspects of the power line construction works, including handling of emergencies. For operations and maintainance, public safety aspects protection meaures and emmerency preparedness should be prioritized.

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APPENDICES

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Appendix 1 – Biological survey report

BASELINE STUDY OF THE BIOLOGICAL ENVIRONMENT FOR WEST NILE RURAL ELECTRIFICATION PROJECT ROUTES UGANDA

James Kalema, Ahmad Bukenya, Stephen Kigoolo & Herbert Kasozi

May 2016

BIOLOGICAL ENVIRONMENT SURVEY

INTRODUCTION

The biological surveys focused on the ecologically fragile areas traversed by the power line route, including wetlands, forest reserves, sensitive ecology and other protected areas. For all the taxonomic groups surveyed a literature review was conducted to compile all available secondary data that can be accessed. This was to direct the planning of the field surveys to focus on key impact issues. The Biological environment surveys covered five broad taxa (Plants, mammals, birds, invertebrates, Fish, Herpertiles – (Reptiles & Amphibians)). These taxa were covered considering they are easy to study, assess and record and a good amount of information on the conservation status can be easily found.

The biological stuidies thus aimed at:

i. Collection of baseline data on the flora and fauna of the area, providing a species occurrence list, spatial occurrence and an indication of relative abundance of different species in the different taxa

ii. Identification and description of sensitive habitats and species, including conservation status as per IUCN listing and national protection status

iii. Identification and description of all species including those of commercial importance, as well as invasive species

iv. Indicator species for future monitoring, and frequency of monitoring

v. For birds, to list any migratory species and any concerns related to the line that could be a barrier to migration.

1. VEGETATION AND FLORA – By James Kalema & Ahmad Bukenya

1.1 Introduction

The uncountable goods and services that we obtain from natural ecosystems is a strong justification for the conservation of biological diversity. However, infrastructural developments, industrialization as well as generation and distribution of electricity are significant drivers of change of quantity and quality of this diversity (Tisdel, 2005). Conservation of environment and biological resources is frequently required so as to maximise human welfare and to avoid adverse outcomes due to their loss. The decrease in biodiversity particularly natural habitats and vegetation cover leads to reduction in ecosystem functioning which is in turn accompanied by loss of goods and services (Dobson *et al.* 2006). Therefore management and protection of habitats and vegetation should be put ahead of any developmental programme. Habitat management and protection begins with examination of plant community physical structure, general vegetation cover and habitats then determination of priority land uses can follow (Midgley, 2002). This is particularly necessary in generating viable prescriptions that are specific to any major development. It is worth noting that much as habitat restoration is always possible but where an opportunity manifests protection of natural habitats should be of high regard.

Electric power lines that carry electricity from power plants to customers and the associated distribution infrastructure have footprints (Wheater 1999). This is because transmission lines above ground on large towers alter the visual landscape, especially when they pass through natural tree areas. Trees near the wires may be disturbed and may have to be continually managed to prevent the branches from touching the wires, activities that affect native trees (De-Beenhauver & Mertens, 2015). When Power lines are placed underground, they usually results in a greater landscape disturbance due to the heavy earth work. It is worth noting that whether lines pass above ground or on ground disturbances will affect vegetation and key habitats.

This report therefore presents the results of a rapid biodiversity assessment of the proposed electricity distribution lines Onduparaka-Odramachaku-Abiria, Wandi-Yumbe-Moyo and Midigo-Ludara T-Kei in four districts Arua, Yumbe, Moyo and Koboko. Suggestions put forward will enable protection of habitats and the vegetation in the project area.

1.2 Objectives

The objectives of this survey were to:

iv) rapidly characterize the vegetation types in the project area and identify key habitats
v) assess the current status of the vegetation and key habitats
vi) provide a preliminary indication of habitats and species that are likely to be affected by the project

1.3 Methods

1.3.1 Time of survey

The survey of vegetation and flora along the proposed distribution lines was carried out in May 2016, towards end of the wet season.

1.3.2 Selection of sample sites along the route

The study was conducted in four districts of Arua, Yumbe, Moyo and Koboko along major roads since it is through their reserves that the proposed electricity distribution lines will pass. Vegetation, flora and key habitats were assessed within established rectangular survey plots of 50x100 m area established at irregular intervals along each section of the road where the transmission line is proposed to pass. At each survey plot we carefully observed the vegetation and dominant plant species present. Records of the features of the landscape, land use were made. Photos of habitats and common species of herbs, shrubs and trees as well as signs of disturbances within the survey area were made. Areas that appeared pristine including rivers, swamps, streams, woodlands and forests were given more attention as compared to areas that were already under cultivation or fallows. Reference was made to Langdale-Brown *et al.* (1964) classification for comparison. Geographical coordinates were taken for survey locations and features of interest using a GPS. The conservation status of species was obtained from IUCN Red List and Kalema & Beentje 2012.

A total of 26 plots were surveyed for Onduparaka-Odramachaku-Abiria line of which seven were within rivers or streams. Another 82 plots were surveyed for Wandi-Yumbe-Moyo line out of which 14 were within rivers, streams or swamps and three within forest reserves. Along the Midigo-Ludara T-Kei line 15 plots were surveyed and one of these was in a stream and one in a forest reserve. The same locations were surveyed for fauna (butterflies, herpetiles, birds and mammals). GPS coordinates for each survey plot are given in Table 1. Habitat or ecosystem sensitivity was assessed on account of presence of taxa that are IUCN Red listed as Critically Endangered (CR), Endangered (EN) or Vulnerable (VU); endemic and near-endemic taxa; as well as rare taxa (MUIENR, 1998; WCS, 2016).

1.4 Results

1.4.1 Onduparaka-Odramachaku-Abiria line

The vegetation along this line was categorised as Plantation (mainly of *Eucalyptus* sp, and *Tectona grandis*), Riverine or streamline vegetation, Open grasslands and Fallows (Figure 1.1). Common woody species are presented in Table 1.1. The line traverses through four rivers Ega, Kawa, Olika and Seva and three streams Esia, Krukrue and another which had no name according to the inhabitants. There is no Forest Reserve along this line. Each of the *Eucalyptus* and *Tectona* plantations keeps alternating between the two sides of the road along the route. The trees are in a range of 10-25 m, with an average of 15 m high. These plantations are in the right of way/road reserve. Both sides of the road reserve look more or less the same in terms of vegetation and are nearly similar. However, the left side of the road appears to have a higher stocking density of trees (especially of Eucalyptus) than the right. So we would recommend that the line be put on the right side of the road towards Abiria.

- The floral communities on the rivers and streams were dominated by *Echinochloa pyramidalis*, *Cyperus dives*, *Leersia hexandra*, *Kyllinga bulbosa*, *Fimbristylis* sp, *Mimosa pigra* and *Setaria sphacelata* wetlands. The banks for majority streams were either under cultivation with food crops or plantations (mainly *Pinus* sp.)

- Grass lands were dominated by *Sporobolus pyramidalis, Setaria sphacelata and Eragrostis* sp.
- Thickets were dominated by *Chromolaena odorata, Lantana camara, Hyptis suaveolens* and *Imperata cylindrica*. Along this line majority bush lands, thickets and bushed thickets were in fallows. Only two riverine bush lands were encountered one on river Ega and the other on river Esia.

Sensitive habitats and species

From a conservation point of view, the habitats along the Onduparaka-Odramachaku-Abiria line are of little ecological sensitivity. Most of the natural habitats were of Grassland vegetation type with few large trees that may be affected by the transmission line. However, from a commercial point of view, the Eucalyptus plantations (Fig. 1.1a) that will have to be cut for passage of the transmission line have some sensitivity. Owners of the trees that will be cut down for creation of the passage will have to be compensated for this financial loss. Appendix I shows the geographical location of the commercial *Eucalyptus* and *Senna* plantations.

Invasive species

The floral communities on the rivers and streams had the invasive

Mimosa pigra (36N 0264196E 0332046N ;) while the Thicket communities were dominated by

Lantana camara (36N 0250356E 0341349N; 36N 0260349E 0332986N; 36N 0260349E 0332986N; 36N 0263725E 0331693N). *Lantana camara* is a notorious invasive shrub capable of densely covering areas, suppressing natural vegetation and changing the landscape considerably. Appendix I provides the geographical coordinates where the species was encountered. These are only indicative and there is a high chance that there are many others already invaded. The species abundance is likely to increase with disturbance arising from putting in place of the transmission line. There was also invasive *Chromolaena odorata* (36N 0250356E 0341349N; 36N 0260349E 0332986N; 36N 0263725E 0331693N; 36N 0265700E 0333606N; 36N 0265526E 0333224N) and *Senna siamea* (36N 0256579E 0342862N); 36N 0265998E 0333558N) in lower abundance.

a: Eucalyptus sp. Plantation

b: Fallow dominated by *Chromolaena odorata*, *Imperata cylindrica* and *Lantana camara*

c: Riverine bush land on river Ega dominated by *Echinochloa pyramidalis* and *Cyperus dives*

d: Open grassland dominated by *Setaria sphacelata* and *Sporobolus pyramidalis*

Figure 1.1 Vegetation types along Onduparaka-Odramachaku-Abiria line

Table 1.0-1 A list of common trees and shrubs along the section of the road from Arua through Abiriachi to Onduparaka town that is traversed by **Onduparaka-Odramachaku-Abiria line**

Family	Species	Species Author	IUCN Category
Fabaceae	*Acacia sieberiana*	DC.	NA
Arecaceae	*Borassus aethiopum*	Mart.	NA
Combretaceae	*Combretum adenogonium*	Steud. ex A. Rich	NA
Combretaceae	*Combretum molle*	R.Br. ex G.Don	NA
Fabaceae	*Tamarindus indica*	L.	Vulnerable Ug & Int
Sapotaceae	*Vitellaria paradoxa*	C.F.Gaertn.	Vulnerable Ug & Int

Key: NA Not Evaluated

1.4.2 Wandi-Yumbe-Moyo Line

The vegetation along Wandi-Yumbe-Moyo line was categorised as Woodlands, Open grass lands, thickets (dense and light), plantations, fallows, riverine and stream line vegetation types (Figure 1.2). A summary of the vegetation is provided in Table 1.2 and Appendix I. In general the vegetation is described as:

- Woodlands were dominated by *Acacia sieberiana, Acacia hockii, Philenoptera laxiflora, Combretum adenogonium, Grewia mollis, Bridelia scleroneura, Balanites aegyptiaca, Tamarindus indica, Grewia trichocarpa, Piliostigma thonningii* and *Terminalia glaucescens*.
- Thickets were dominated by *Maytenus senegalensis, Harrisonia abyssinica, Flueggea virosa, Acacia senegal, Tylosema fassoglensis, Acacia hockii, Bridelia scleroneura* and *Chromolaena odorata*.

Woodlands and thickets dominate sections of the Wandi-Yumbe-Moyo line from Noko to Ariwa, Barakala to Lyete and Locongo, Kochi to Gobolo and Kochi to Eria forest reserve.

- Open grasslands were dominated by *Setaria sphacelata, Sporobolus pyramidalis, Imperata cylindrica, Hypertheria dissoluta, Eragrostis sp and Cynodon dactylon*.
- Riverine and streamline vegetation types were dominated by *Echinochloa pyramidalis, Cyperus dives, Hyperthelia dissoluta, Phragmitis mauritianum, Mimosa pigra* and *Cynodon dactylon*.
- Fallows were dominated by *Chromolaena odorata, Lantana camara, Imperata cylindrica, Hyptis suaveolens*, *Acalypha* sp. and *Solanum incanum*.
- Plantations were dominated by *Eucalyptus* sp. and *Tectona grandis*.

Sensitive habitats and species

This line traverses natural vegetation types of Bushland, Thicket and Woodland as well as the Eria Forest Reserve. This reserve is presently dominated by *Tectona* and *Grevillea* and *Eucalyptus* plantations. The natural habitats are predominantly *Combretum-Terminalia Acacia* woodland (Fig. 1.2a). These natural and exotic plantation habitats have large trees that may be affected by the transmission line. Besides, from a commercial point of view, the exotic *Eucalyptus* plantations will have to be cut for passage of the transmission line and this will attract compensation issues for the owners. An estimated 1 km length of sections with large trees were observed. Of these, c.400 m are under *Eucalyptus*, *Grevillea*, *Tectona* while another c.600 m are under natural woodland of *Combretum-Terminalia-Vitellaria-Acacia*. Appendix I shows the geographical location of the commercial *Eucalyptus* plantations.

Two globally threatened species were recorded, i.e. *Tamarindus indica* (36N 0308971E 0385684N; 36N 0320644E 0359356N; 36N 0317680E 0362677N; 36N 0317503E 0361661N; 36N 0318443E 0359690N) and *Vitellaria paradoxa* (36N 0350653E 0401283N; 36N 0328845E 0401767N; 36N 0329129E 0396892N; 36N 0320644E 0359356N; 36N 0301222E 0366039N; 36N 0318443E 0359690N; 36N 0317503E 0361661N; 36N 0317680E 0362677N), both of which are assessed as Vulnerable by IUCN (Table 1.2). These species are some of the common species along the Wandi-Yumbe-Moyo transmission line. *Vitellaria paradoxa* occurs in Eria CFR.

Invasive species

The riverine and streamline vegetation types were already invaded by *Mimosa pigra* (36N 0337295E 0399051N; 36N 0326617E 0393609N; 36N 0308651E 0373936N; 36N 0291549E 0359669N; 36N 0292838E 0361172N; 36N 0295970E 0363608N; 36N 0300408E 0365679N; 36N 0294488E

0362539N; 36N 0303825E 0366008N; 36N 0300447E 0369034N) while fallows were dominated by the invasive *Chromolaena odorata* (36N 0321549E 0380364N; 36N 0321549E 0380364N; 36N 0300447E 0369034N; 36N 0323626E 0356923N) and *Lantana camara* (36N 0275670E 0343099N; 36N 0324744E 0356665N). *Mimosa pigra* is a common invasive plant in wetland envrionments in Uganda. It has the potential to degrade habitats as it tends to cover large areas, making them unsuitable for grazing by wildlife and livestock. The areas of its location are indicated in Appendix I.

Eria Central Forest reserve

This forest reserve is on both sides of the road. Visually, the forest reserve has about three sections, one with natural tree stands of *Vitellaria paradoxa*, *Combretum adenogonium*, *Combretum molle*, *Albizia grandibracteata* and *Albizia coriaria*. The second section is a mixture of these trees and *Tectona grandis*, *Grevillea robusta* and some *Eucalyptus* sp. The third section is one with *Grevillea-Eucalyptus* plantation. These trees and others of lower abundance are 8-11 m high and are within the the road reserve on both sides of the road, over a stretch of nearly 1 km. This reserve cannot be avoided and both sides appear to have the same stoking density of trees.

Otrevu Central Forest Reserve

Is in otrevu village, left of the road towards Yumbe from Arua. It is mainly Eucalyptus plantation of about 200 long and the trees are an average of 4 m high and sparse. The section of this reserve that is in the road reserve has no Eucalyptus sp but rather gardens. This reserve can be avoided by passing the line on the right hand side of the road (from Arua to Moyo).

Utumbari Central Forest Reserve

Is on the left side of the road from Arua to Yumbe. The part of this CFR in the road reserve has no tree stands but about 10 m away from the road reserve is a Eucalyptus plantation of this CFR with about 150m stretch along the road. The average height of the Eucalyptus trees is 11m. Minimal impact on trees would be registered if the line is on the right side of the road which only has gardens. This reserve can be avoided by passing the line on the right hand side of the road.

a: Woodland dominated by *Combretum* spp, *Terminalia glaucescens* and *Acacia hockii*

b: Thickets dominated by *Acacia Spp*, *Harrisonia abyssinica* and *Grewia mollis*

c: River Kochi dominated by *Phragmites mauritianum, Mimosa pigra* and *Cyperus dives*

d: Homesteads-Gardens-Fallows

Figure 1.2 Vegetation types along Wandi-Yumbe-Moyo transmission lines

a: Woodland dominated by *Terminalia glaucescens* in Eria CFR

b: *Terminalia-Acacia* Woodland in Eria CFR

c: Cultivation in Otrevu CFR

d: Settlement within Otrevu CFR

e: Eucalyptus plantation in Otumbari CFR

f: Eucalyptus plantation in Otumbari CFR

Figure 1.3 Vegetation types in Eria CFR (a & b); Otrevu CFR (c & d) and Otumbari CFR (e & f) along Wandi-Yumbe-Moyo transmission lines

Table 1.0-2 A list of common Trees and Shrubs along the section of the road from Wandi in Arua to Moyo that is traversed by Wandi-Yumbe-Moyo transmission line. Also includes branch offs to Okubani, Lyete, Locongo as well as to Gobolo.

Family	Species	Author	IUCN Category
Fabaceae	*Acacia sieberiana*	DC.	NA
Fabaceae	*Albizia coriaria*	Aubréville, A.	NA
Fabaceae	*Albizia grandibracteata*	Taub	NA
Maliaceae	*Azadirachta indica*	A Juss.	NA
Arecaceae	*Borassus aethiopum*	Mart.	NA
Euphorbiaceae	*Bridelia scleroneura*	Müll.-Arg.	NA
Combretaceae	*Combretum adenogonium*	Steud. ex A. Rich	NA
Combretaceae	*Combretum molle*	R.Br. ex G.Don	NA
Moraceae	*Ficus ingens*	(Miq.) Miq.	NA
Tiliaceae	*Grewia mollis*	Hochst. ex A.Rich	NA
Bignoniaceae	*Jacaranda mimosifolia*	D. Don	Vulnerable
Bignoniaceae	*Kigelia africana*	(Lam.) Benth.	NA
Fabaceae	*Tamarindus indica*	L.	Vulnerable Ug & Int
Combretaceae	*Terminalia glauscecens*	Planch. ex Benth.	NA
Sapotaceae	*Vitellaria paradoxa*	C.F.Gaertn.	Vulnerable Ug & Int

Key: NA-Not Evaluated, Ug- Uganda and Int- International

1.4.3 Midigo-Ludara T-Kei

The vegetation along Midigo-Ludara T-Kei line was categorised as open grassland, plantations, fallows and woodlands which dominate the largest section of this line (Figre 1.3). Common woody species are shown in Table 1.3.

- Open grasslands were dominated by *Imperata cylindrica*, *Pennisetum polystachion* and *Setaria sphacelata*.
- Plantations were dominated by *Eucalyptus sp* and *Tectonia grandis*.
- Fallows were dominated by *Panicum maximum, Echinochloa colona, Sorghum arundinacium*, *Chromolaena odorata*, *Lantana camara* and *Hyptis suaveolens*.
- Woodlands were dominated by *Acacia hockii*, *Bridelia scleroneura, Combretum adenogonium, Kigelia Africana, Piliostigma thonningii, Borassus aethiopum, Vitellaria paradoxa* and *Azadiranchta indica.*

Sensitive habitats and species

This line traverses natural vegetation types dominated by woddland as well as the Mt. Kei Forest Reserve. This reserve is presently dominated by *Tectona* and *Eucalyptus* plantations. The natural habitats are predominantly *Combretum-Vitellaria w*oodland (Fig. 1.2a). Both the natural and exotic plantation habitats have large trees that are likely to be affected by the transmission line. Besides, from a commercial point of view, the exotic *Tectona* and *Eucalyptus* plantations will have to be cut for passage

of the transmission line and this will attract compensation issues for the owners. The length that may be traversed by the transmission line is estimated at 200 m and this is mainly under trees of *Tectoca* and *Eucalyptus*. Another c.500 m is under natural woodland of *Combretum, Vitellaria*, *Acacia* and *Albizia*. Appendix I shows the geographical location of the commercial *Tectona* and *Eucalyptus* plantations. Just like along the earlier lines,, two globally threatened species were recorded, i.e. *Vitellaria paradoxa* (36N 0281355E 0391303N; 36N 0288357E 0395065N; 36N 0291652E 0394257N; 36N 0292134E 0396581N; 36N 0292497E 0395648N; 36N 0292674E 0394596N; 36N 0294698E 0395712N; 36N 0297846E 0395624N; 36N 0297846E 0395624N; 36N 0297846E 0395624N; 36N 0300008E 0395878N; 36N 0303102E 0398183N), which is assessed as Vulnerable by IUCN (Table 1.3). This species is one of the dominant species along the Midigo-Ludara T-Kei line.

Invasive species

In the fallow lands, there was already invasion by
Chromolaena odorata (36N 0292497E 0395648N; 36N 0292497E 0395648N; 36N 0301735 E 0396833N)
This species spreads very fast, especially with disturbance. It is an opportunistic species that flourishes with disturbance and grows very fast. Opening of the natural areas may open the way for its invasion of such areas. Appendix I shows the geographical location of the areas affected by this invasive species.

Mt. Kei CFR

Is on both sides of the road but a larger section of it which has tree stocking (Natural and exotic plantation) is on the right side from Yumbe to Koboko. We would therefore recommend that the line follows the left hand side of the road to minimize impact on biodiversity and compensation costs. Trees to be affected are roughly 8-10 m high and include *Combretum adenogonium, Combretum collinum, Vitellaria paradoxa, Sclerocarya birrea, Piliostigma thonningii*. Those in plantation are *Senna sp, Tectona grandis* and *Eucalyptus* sp. About 500 m of this forest reserve is under natural vegetation and is within the road reserve but the section that has plantation is about 10-30 m away from the road reserve

a: Section of Mt Kei forest reserve dominated by *Tectona grandis*

b: Section of Mt Kei forest reserve dominated by *Eucalyptus* sp.

Figure 1.3 Mt Kei Forest Reserve

Table 1.0-3 A list of common Trees and Shrubs along the section of the road from Modigo in Arua to Umbechi in Koboko that is traversed by Midigo-Ludara T-off Kei transmission line

Family	Species	Author	IUCN Category
Fabaceae	*Albizia grandibracteata*	Taub	NA
Arecaceae	*Borassus aethiopum*	Mart.	NA
Fabaceae	*Erythrina abyssinica*	Lam. ex DC.	NA
Moraceae	*Ficus sychomorus*	L.	NA
Bignoniaceae	*Kigelia africana*	(Lam.) Benth.	NA
Fabaceae	*Senna siamea*	(Lam.) Irwin et Barneby	NA
Fabaceae	*Tamarindus indica*	L.	Vulnerable Ug & Int
Sapotaceae	*Vitellaria paradoxa*	C.F.Gaertn.	Vulnerable Ug & Int
Rhamnaceae	*Ziziphus pubescens*	R. Drummond	DD-Int

1.5 Discussion and conclusions

The sections of the roads in whose reserves transmission line are proposed for installation are rugged and covered with marrum and often erosion prone in case of wind and rain. In addition the installation activities will probably involve moving machinery, substantial earth works and opening of access ways. In the right-of-way for transmission lines vegetation, wetlands and flora will be affected which may escalate the stress already prevailing from dust, agriculture and charcoal burning to habitats. There are many rivers, streams, woodlands and bushed thickets that form natural habitats particularly for Onduparaka-Odramachaku-Abiria and Wandi-Yumbe-Moyo transmission lines. Along these roads are also protected areas of which three Otrevu, Utumbari and Eria are located on Wandi-Yumbe-Moyo transmission line and one (Mt Kei Central forest reserve) on Midigo-Ludara T-off Kei transmission line. Much as the forest reserves exist as plantations of *Eucalyptus sp* and *Tectona grandis* together with other sensitive habitats they are worth protecting

during installation. It is worth noting that however much the impact on vegetation, habitats and flora may seem limited and insignificant on big sections along the roads because lines will traverse through already degraded road reserves. It is common for heavy machinery and earth works to pollute the habitats with noise and electromagnetic waves (Ausden, 2007). Where necessary, these should be prevented as much as possible.

1.6 Recommendations

i) The wetlands and areas that have surface water should be protected from earth works and contamination since these form important habitats for many organisms.
ii) No pollutants of which ever kind should be released into the environment most especially rivers, swamps and streams.
iii) Men at work should be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and staffing swamps.
iv) Comprehensive study of flora and vegetation to define ultimate environmental issues and presence or absence of threatened species of plants should be carried out.

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2. BUTERFLIES

2.1 Introduction

Inconsiderate human activities have caused declines in diversity, abundance and thus pushed many taxonomic groups to near or complete extinction (Fox *et al.* 2010). These anthropogenic activities to natural ecosystems through agriculture, grazing, brick making and infrastructural developments alter ecosystem structural properties leading to partial or total destruction of individuals or group of individuals (Bobbink, 2008). In addition, Urbanization and Industrialization together with their associated power supply systems have of recent been strongly linked to the loss of millions of invertebrates (Frankham & Kingsolver, 2004). By virtue of the size of their home range, Invertebrates usually suffer local extinction due to total habitat destruction or even modification driven by these anthropogenic activities.

Wheater (1999) pointed out that electric power lines that carry electricity from power plants to customers and the associated distribution infrastructure have footprints. The transmission lines above ground on large towers alter the visual landscape, especially when they pass through natural areas. Trees near the wires may be disturbed and may have to be continually managed to prevent the branches from touching the wires, activities that affect native plant populations (De-Beenhauver & Mertens 2015). When Power lines are placed underground, they usually results in a greater landscape disturbance due to the heavy earth work. Alteration of the vegetation in turn affects butterflies for they derive to a great extent most of their nutritional resources such as nectar and fruit juices from plants.

The concept of using certain animal groups as bio-indicators for assessing environmental response to human induced disturbance is established for a variety of taxa including plants (Lwanga, 1996), mammals (Dickson, 1996), birds (Fleishman 2002) and invertebrates (De vries, 1997). Invertebrates have numerical dominance with groups such as Lepidopterans that are extremely sensitive even to a very slight perturbation (Begon *et al.*, 2006). Lepidopterans are among the most visually accessible representatives of the invertebrate world with an estimated 56,793 species worldwide (Foottit & Adler, 2009). They therefore have a prominent place in conservation programmes and biodiversity assessments (Midgley, 2002). This report therefore presents the findings of invertebrates' studies for the proposed electricity transmission lines Onduparaka-Odramachaku-Abiria, Wandi-Yumbe-Moyo and Midigo-Ludara T-Kei.

2.2 Objectives

iii. Assess the diversity of butterflies
iv. Provide recommendations with regard to impacts likely to emanate from the installation activities of the electricity transmission systems.

2.3 Methods

2.3.1 Study area

The study was conducted in four districts of Arua, Yumbe, Moyo and Koboko along major roads. The roads were Onduparaka-Odramachaku-Abiria within Arua, Wandi-Yumbe-Moyo and Midigo-Ludara T-Kei from Yumbe to Koboko districts. Butterflies were studied within established rectangular survey plots of 50x100m area at irregular intervals along each section of the road where the transmission line is proposed to pass. Sampling was done by walking through the survey plots at a slow and even pace of (~1km/h) for 10 minutes. Each Butterfly seen within a virtual 5 m observation cube projected ahead of the observer was counted and representative species collected (Pellet, 2007). Butterflies were identified and recorded from the field and those that couldn't be easily identified were carried in paper envelopes to Makerere University Museum for identification. A total of 26 plots were surveyed for Onduparaka-Odramachaku-Abiria line of which seven were within rivers or streams. 82 plots were surveyed for Wandi-Yumbe-Moyo line of which 14 were within rivers, streams or swamps and three within forest reserves. 15 plots were surveyed for Midigo-Ludara T-Kei line with one in a stream and one in a forest reserve.

2.3.2 Ecotype characterization

All species of butterflies that were encountered were assigned to ecotypes. The criterion used to distribute butterflies into ecotypes was obtained from Davenport et al (1996) and Kronstad (2009). In this criterion species were given letters ("F"), ("f"), ("O"), ("W"), ("M"), ("S") and ("U") according to whether they are forest specialists, forest edge, open habitat, wide spread, migratory, swamp specialist and butterflies of unknown habitat preference respectively. The red list category was indicated for each species. The categories were obtained from most recent IUCN red lists' data and WCS (2016) list of threatened species in Uganda.

2.4 Results

2.4.1 Richness and conservation status

A total of 28 butterfly species from 89 individuals encountered were recorded for all the transmission lines. The summary of ecotype distribution, conservation status and the project line on which the butterfly was encountered are presented in the Table 2.1.

Table 2.1 Butterfly species found in the project area for the proposed electricity transmission system in Arua, Yumbe, Moyo and Koboko districts.

Species	**Common name**	**Ecotype**	**Conservation status**	Line of Location
NYMPHALIDAE				
Acraea ancedana	Pierre's acraea	S	NA	ND-MY
Acraea ancerata		O	LC	MY
Acraea eponina	Orange Acraea	W	NA	ND-MY
Amauris niavius	Friar	W	NA	MD
Danaus chrysippus	African Queen	M	NA	ND-MY-MD

Eurytela dryope	Golden Piper	W	NA	ND
Hamanumida daedalus	Guineafowl	O	NA	MY
Hypolimnas misippus	Diadem	M	NA	ND-MY
Junonia chorimene	Brown Pansy	O	LC	ND-MY-MD
Junonia oenone		W	LC	MY-MD
Junonia sophia	Little Commodore	W	NA	ND-MY-MD
Junonia styga	Brown Pansy	f	NA	MY
Junonia terea	Soldier Commodore	W	NA	ND-MY-MD
Neptis saclava	Small Spotted Sailer	W	NA	MY
Neptis serena	River Sailor	O	NA	MY
Phalanta eurytis	African Leopard Fritillary	M	NA	ND-MY-MD
PAPILIONIDAE				
Papilio demodocus	Citrus Swallowtail	M	NA	ND-MY-MD
Papilio nireus	Narrow G-Banded Swallowtail	f	NA	ND-MY-MD
PIERIDAE				
Eurema desjardinsi	Angled Grass Yellow	U	LC CD	MY-MD
Eurema hecabe	Common Grass Yellow	M	LC	ND-MY-MD
Eurema hepale	Marsh Grass Yellow	O		ND-MY-MD
Catopsilia florella	African Emigrant	M	LC CD	MY-MD
Colotis hetaera	America pink	O	NI	MY-MD
Nepheronia argia	Large Vagrant	F	LC	ND-MY-MD
Nepheronia thalassina	Cambridge Vagrant	f	LC	ND-MY-MD
Mylothris continua		F	LC	ND-MY-MD
LYCAENIDAE				
Anthene larydas	Spotted Ciliate Blue	O	NA	ND-MY
Pentila tachyroides		f	NA	ND-MY
Zizina antanossa	Clover blue	O	LC CD	ND-MY-MD

Key: NA-Not Evaluated, LC-Least concern, CD-Conservation dependent, ND-Onduparaka-Odramachaku-Abiria line, MY-Wandi-Yumbe-Moyo line and MD-midigo-Ludara T-Kei line

2.4.2 Ecological characterization

Six ecological types (Table 2.2) were represented in the data set that was dominated by butterflies that prefer open habitats, followed by the wide spread species and then migratory while swamp and forest specialist had the least number of species.

Table 2.2 Number of species and percentage composition of each ecotype of butterflies along Onduparaka-Odramachaku-Abiria road within Arua, Wandi-Yumbe-Moyo road and Midigo-Ludara T-Kei from Yumbe to Koboko districts

Ecotype	No of species	Percentage composition

S	1	3.5
O	8	28.6
W	7	25
M	6	21
F	4	14.3
F	2	7.6

2.5 Discussion and conclusions

The low species richness could imply that very few butterflies accessed the roads a situation associated with disturbances on vegetation structure following human activities that has caused loss of many natural ecosystem. Still the type of vegetation of the area (Savannah) attracts very few butterfly species (De Vries, 1997). However, three species are labelled least concern but their survival depends on conservation of suitable habitats. It could as well be true that many of the species that are not yet assessed for inclusion of the IUCN red list are endangered and thus in need of conservation. This demands serious precautions for protection of this little biodiversity within the area. Since construction of the transmission system involves massive earth works through excavations and installation of electric power lines which usually involves vegetation clearance. Ecosystem degradation especially to the surviving pristine habitats may result escalates. Conservation in the area is of high necessity to all ecotypes. In addition, disturbances usually induce invasions that affect the physical environment which eventually influence the success of many species in vegetation (Bobbink, 2008). Majority of butterflies obtain their nourishment from plants as fruit and nectar feeders while others puddle in the mad (De Vries, 1997). A reduction in quality of vital resources from plants and mad for the invertebrates will definitely catalyse local extinction for invertebrates.

2.6 Recommendations

Invasions in the plant communities should be monitored and when cited must be halted since such invasions drastically reduce food resources for invertebrates.

Prevent as much as possible the stuffing of construction materials in the reserve and the swamp. If not controlled construction materials can change the environment and encourage invasions. Invasions will alter plant community structure and hence invertebrates' communities will be disrupted.

It will be good practice to have flowering plants inside and on the fence of the infrastructure if the expanse taken up is to remain useful to invertebrates especially butterflies

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3 HERPETILES - By Stephen Kigoolo

3.1 Introduction

Rural electrification is an integral component of Uganda Government's overall policy and program to promote national economic and social development and integration. The government developed the Rural Electrification Strategy and Plan for the ten-year period 2013-2022 specifically to increase the national electricity geographical coverage and also increase rural population access to electricity from the current 5% to 22% by 2022. The Rural Electrification Strategy and Plan design has also taken cognizance of the UN initiative on modern energy access for all which obligates all governments to ensure the availability of clean and affordable modern energy in all homes by 2030. This includes the provision of cleaner, more efficient technologies for cooking and lighting in households.

The West Nile Rural service territory is proposing to extend electricity distribution grids in the Districts of Arua, Koboko, Moyo and Yumbe, namely; 1) the REA-ERT III Proposed Distribution Line-ONDUPARAKA, 2) REA-ERT III Proposed Distribution Line-WANDI-YUMBE-MOYO, and 3) Midigo-Ludara-ToffKei distribution grids.

The proposed grids will traverse wetlands, woodlands, tree plantations, and forest reserves. Under the Uganda National Environmental Statute No.4 of 1995, it is a legal requirement for development projects to conduct Environmental Impact Assessments. Environment Impact Assessment is a process of analyzing the positive and negative effects of a proposed project, plan, or activity on the environment. This may include studies on the weather, flora and fauna, soil, human health including physical, social, biological, economic and cultural impacts. The studies are conducted to determine the possible environmental impacts of a proposed policy, project or activity and measures to mitigate any such impacts. It is one of those measures taken to ensure that development is sustainable.

The EIA study was therefore designed to establish a baseline for flora and fauna, as well as establish whether the proposed distribution grids will have significant effects on their habitats and the species themselves. This particular study focuses on herpetofauna.

Herpetofauna consists of Amphibians and Reptiles. Amphibians are a class of vertebrates, comprising of frogs, toads, caecilians, newts and salamanders (Young, 1981). Reptiles are a class of vertebrates, comprising of turtles and tortoises, lizards, chameleons, skinks including limb-less skinks, geckoes, crocodiles, monitors and all types of serpents commonly known as snakes (Foster, 1994; Young, 1981).

Ecologically, amphibians are predators, acting as primary and secondary carnivores. Their prey consists mostly of insects, some of which are pests of crops or disease vectors. Amphibians are therefore important ecological components of both wetlands and dry land. Among vertebrates they are distinctive in many ways. A thin, moist, highly permeable skin; jellied, unshelled eggs; possession

of aquatic and terrestrial life histories; restricted home range; and limited dispersal abilities of many species make amphibian's effective biomonitors. For biological assessments, they are especially promising because of their capability of linking wetlands with surrounding landscapes (upland habitats) (U.S. EPA. 2002). They are also interlinked in food chains, often acting as food for other vertebrates, such as pigs, birds, snakes and sometimes man. Because of their ectothermic physiology, the life history and ecology of amphibians often differ markedly from that of birds or mammals (McCollough *et al.*, 1992). Reptiles are also ecologically important. They feed on a number of animals and this predation involves reptiles in ecosystem food webs.

3.2 Objectives

The overall objective of the study was to conduct a study on the herpetofauna (amphibians and reptiles) in the project areas where the proposed distribution lines will pass. It also involved evaluating the potential impacts of erecting the proposed distribution networks on the herpetofauna. Specifically, the work involved and focused on:

i) Collection of baseline data on the herpetofauna of the area, provide a species occurrence list, spatial occurrence and an indication of relative abundance of different species
ii) Identification and description of sensitive habitats and species, including conservation status as per IUCN listing and national protection status
iii) Identification and description of all species including those of commercial importance, as well as invasive species
iv) Indicator species for future monitoring, and frequency of monitoring

3.3 Rationale

Some of the factors that have made amphibians to be recognized, nowadays, as good indicators of habitat change than other vertebrates are that: 1) changes in habitat are reflected in changes in their numbers and species diversity within a short time, and 2) The geographical ranges of amphibians are smaller than those of other vertebrates (Bibby, 1992).

Most reptiles on the other hand are highly mobile and are diversified in habitats and can be encountered in aquatic habitats, shorelines, rock outcrops, trees and bushes and on any slopes of the terrain. The more specialized in habitat use such as crocodiles, monitor lizards and water snakes are good indicators for monitoring changes in a habitat due to human activity.

3.4 Study Area

The study was conducted in 89 sampling sites established along the three proposed distribution transmission lines (Appendix I). The sampling sites included 19 sites on REA-ERT III-ONDUPARAKA distribution line, 57 sites on REA-ERT III-WANDI-YUMBE-MOYO distribution line, and 13 sites on Midigo-Ludara-ToffKei distribution line. The sites were also used for the study of other fauna namely Birds, Mammals and Plants.

To maximize results the sampling sites were chosen and located in different habitats. The habitats include seasonal wetlands, Rivers, ponds along the roads, savanna/woodlands and Forest Reserves.

3.5 Methods

3.5.1 Data collection

Several methods are available for studying Amphibians and Reptiles (Heyer *et al*, 1994). The methods include visual encounters, egg surveys, and call surveys, terrestrial cover boards; dip nets, seines, aquatic funnel traps, and terrestrial pitfall traps. Because of time constraints, Four sampling methods were employed, namely; 1) visual encounter surveys (VES), 2) dip-netting, 3) acoustic /call Surveys, as well as 4) local consultations and literature review.

Apart from those heard calling, specimens encountered were picked by hand, identified and released at the point of capture. Where possible a picture was taken.

Visual Encounter Surveys

Visual encounter survey method is commonly used to determine the species richness of an area, to compile a species list and to estimate relative abundances of species within an assemblage. This involved walking through the sampling areas or habitat for a prescribed time period systematically searching for amphibians and reptiles. This mostly focused on surface-dwelling amphibians and reptiles.

Dip-netting

This involved scooping through pond and river water to trap any amphibians hiding in the waters.

Call / Acoustic surveys

This method involved listening to the calls made by aquatic dwelling amphibians. The researcher has accumulated considerable experience of the calls made by common amphibians.

Local Consultations and Literature Review

The local people are in constant touch with their environment and can be valuable source of information. Talking to the locals can yield records to family level. Rarely does it yield to species level. The records can be confirmed by reviewing literature of studies carried by other researchers.

3.5.2 Data Analysis

The reptiles and amphibians were identified using standard reference books available namely; Schiotz (1972), Schiotz (1972b), De Witte (1937), Drewes (1984), Drewes and Vindum (1994), Loveridge, (1957). Welch (1982), Stewart (1967), and Wager (1965). Species categorization using the IUCN Red Data List categories was adopted for this report.

3.6 Results

3.6.1 Habitat types represented in the project area

The habitat in the project area may be generally described as savanna woodland vegetation. The habitat has been heavily settled and altered for agricultural activities. The dominant tree species include *Combretum* species, *Tamarindus* species, Sheanut Butter, as well as the *Boras* palm. Detailed vegetation description is presented in the plant section. Five main habitat types were identified and are represented in the project area. The habitats include the following:

Settlements and Trading Centers

The project area has been heavily settled and built with households, schools, local government administrative units and trading centres Figure 3.1). These places are important for the reptiles especially the lizards and skinks to which they are adapted.

Midigo Trading Centre in Yumbe District

Keyi Trading center, Yumbe District

Figure 3.1 Some of the trading centres the line traverses

Rocky habitat

Many reptiles and amphibians are adapted to a rocky habitat (Figure 3.2). Several rocky outcrops occur throughout the project area as natural islands. The fact that amphibians and reptiles have low dispersal ability, this habitat type tends to give rise to geographical isolates. Rock habitat islets may thus house unique forms and for this reason, this habitat is of high conservation importance. Minimal disturbance is needed in such project area.

Rocky areas are common in the project area. They are good habitats for lizards and skinks

Rocky areas are common in the project area. They are good habitats for lizards and skinks

Figure 3.2 Rocky habitats in the project area

Seasonal Wetlands and River / streams

Seasonal wetlands and water bodies such as rivers/streams, and pools/ponds occur in the project area and support a wide range of animal species, including many endemic species and /or species of conservation importance. Three of the amphibian species recorded as occurring in the project area depends on permanent water bodies for survival specifically rivers/streams, as well as pools / ponds. Such species include the crowned bull frog, the common reed frogs, and the draft puddle frogs. Such areas are therefore important for the continued survival of the above species and should be protected and managed during the distribution lines constructed phase.

Some of the rivers/streams identified in the project area include: Olika River/stream, River Ega, River Seva, River Esi, Kawa River, along Onduparaka distribution line; Inawa River, Oru River, Inventre River, Ibia River, Onvastia stream, River Ora, River Racha, Enventre River system, River Ono (Enaw), Jure River, Kochi River, Nyawa River, along Wandi-Yumbe-Moyo distribution line; and Turu River on Midigo-Ludara-ToffKei distribution line. These rivers are associated with wetlands some of which may be seasonal (Figure 3.3). The vegetation types in the wetlands include *Phragmites* sp. *and Cyperus* sp.

One of the rivers found in the project area

A pond in the project area

Figure 3.3 River environments in the project area

Woodlands

There exist extensive woodlands dominated by *Acacia* species (Figure 3.3), intersparsed with *Combretum* species, *Tamarindus* species, Sheanut Butter, as well as the *Borassus* palm. The woodland is generally flat area and they seasonally become flooded with rain water and work as communal grazing area. The woodland may be important for the survival of the Mascarene Frogs since they are dominated by short grass and dotted with pools of water during wet seasons. The pools of water facilitate breeding of certain Amphibian's e.g. those that belong to genus *Ptychadena*, *Bufo*, and *Kasina*. Such habitats are important for the survival of amphibians especially of the above mentioned genus.

Acacia dominated woodland

Woodland

Figure 3.4 Woodland habitats along the line

Tree Plantations

Several private tree plantations at household level occur in the project area. One Eucalyptus tree plantation (Lugara Tree plantation) belongs to Uganda American Tobacco Corporation. The majority of the private tree plantations are planted with Eucalyptus and Teak trees (Figure 3.4). Sampling sites were established at some of the private plantations e.g. Lugara Tree plantation which belonging to Uganda American Tobacco Corporation and some belonging to schools.

Teak tree plantation at Wolo village by Yumbe District Local government

A private Eucalyptus tree plantation

Figure 3.4 Exotic plantations in the project area

3.6.2 Conservation Areas/Protected Areas

Four forest reserves under the jurisdiction of Uganda's National Forest Authority occur in the vicinity of the proposed distribution lines. The forest reserves include: 1) Otrevu Forest Reserve which according to local community is approximately 100 hectares located on Arua Yumbe Road, 2) Otumbai Forest Reserve which is 83 hectares according to the Forest Guard Mr. Andama Alfred also located on Arua Yumbe Road, 3) Eria Forest Reserve whose actual size we couldn't establish located on Yumbe Moyo road, 4) Mt. Kei Forest Reserve which is 40 hectares located in Koboko District on Midigo-Ludara-ToffKei road (Figure 3.5). Some sampling sites were established in the forest reserves.

Otumbari Forest Reserve - Eucalyptus Tree plantation planted by local people with permission from NFA

Mt. Kei Forest Reserve under NFA

Figure 3.5 Mt. Kei Forest reserve environment

3.6.3 Species Richness

3.6.3.1 Amphibians

Four amphibian species were recorded during the study areas (Table 3.1). Three of the species recorded are wetland specialists namely; Common reed frog, Eastern groove crowned bullfrog, and the Draft puddle frog (Figure 3.6). No forest specialists were encountered.

Table 3.1 Amphibian Fauna Encountered in the Project Area

Family Name	**Common Name**	**Scientific Name**	**IUCN Conservation Status**	**Total Number of Individuals Encountered**
Hyperoliidae	Common Reed Frog	*Hyperolius viridiflavus viridiflavus*	Least Concern (LC)	1
Ranidae	Mascarene Rocket Frog	*Ptychadena mascareniensis*	Least Concern (LC)	43
	Eastern Groove - Crowned bullfrog	*Hoplobatrachus occipitalis*	Least Concern (LC)	16
	Draft Puddle Frog	Phrynobatrachus mababiensis	Least Concern (LC)	4

Common Reed Frog encountered in the project area

Crowned Bull Frog encountered at one of the rivers

Figure 3.6 some of the amphibians encountered

3.6.3.2 Reptiles

Four reptilian species were recorded present in study area (Table 3.2, Figure 3.7). Of special interest is the Nile Monitor recorded along Wandi-Yumbe-Moyo distribution line. The species is of social economic importance in most parts of the Country.

Table 3.2 Reptilian Fauna Encountered in the Project Area

Family Name	**Common Name**	**Scientific Name**	**IUCN Conservation Status**	**Total Number of Individuals Encountered**
Scincidae	Speckle-lipped skink	*Mabuya maculilabris*	Least Concern (LC)	23
Scincidae	Rainbow Skink	Mabuya margaritifer	Least Concern (LC)	36
Agamidae	Red-headed agama	*Agama agama*	Least Concern (LC)	55
Varanidae	Nile Monitor	*Varanus niloticus*	Widespread and common; Listed under CITES Appendix II	1

Red Headed Agama basking; it is common sight in the project area

Rainbow Skink basking; it is common sight in the project area

Figure 3.7 Some of the reptiles encountered in the project area

3.6.4 Spatial occurrence

The Mascarene Rocket Frog has the ability to resist temporary and regular drying up of their habitats (Loveridge, 1976 & Dudley, 1978). Members of genera *Hoplobatrachus* are associated with permanent water sources. They are therefore commonly found near permanent water sources, more so for the crown bull frog which only gets out of water to feed. The Common Reed Frog *Hyperolius viridiflavus*

viridiflavus also prefer hanging over vegetation around permanent water sources. Being so small, the draft puddle frog also prefer wet substrates around permanent water sources to avoid desiccation. These species were encountered and are distributed in and around rivers / streams.

Reptiles, like amphibians are cold blooded vertebrates. They utilize the sun's energy to raise their body temperatures in order to be more active. Therefore, the best sampling time for reptiles are the early hours of the day when they come out of hiding to bask. The reptiles' basic requirements therefore are a hiding place and a substrate on which to bask. These places and substrates are abundant in the project area, found in tree plantations, in woodlands, forests, around river bridges, in rocky out crops and settlements, be it home, school or local government administrative units. The above reptiles species recorded are therefore a common sight in the project area. They can be seen around rocky outcrops, around buildings in settlement areas, Trading centers, tree plantations, and around river bridges.

3.6.5 Relative abundance of different species

The commonest amphibian species were members of family Ranidae (genera *Ptychadena* and *Hoplobatrachus*). The most encountered amphibian species is the Mascarene Rocket Frog *Ptychadena mascareniensis* with 43 individuals encountered, and Eastern groove crowned bullfrog *Hoplobatrachus occipitalis* with 16 individuals encountered. The Mascarene Rocket Frog is relatively more abundant because the frog has the ability to resist temporary and regular drying up of their habitats.

Three species of reptiles are relatively abundant and these are common in the project area. The commonest reptilian species recorded was the Red headed Agama *Agama agama*, with fifty five (55) individuals encountered, the Rainbow Skink Mabuya *margaritifer* with Thirty Six (36) individuals encountered and the Speckle-lipped skink *Mabuya maculilabris* with Twenty Three individuals encountered. The three species were common sight in the project area. They occur in and around settlements as well as the rocky outcrops, and the tree plantations. They are quiet adaptable to their environment. As long as they can afford a hiding place and basking substrate, they would occur.

3.6.6 Sensitive Habitats and species

The river / stream systems are important habitats for the survival of the amphibian species. These habitats should be avoided during the construction phase. The three amphibian species recorded require permanent water sources for their survival and impacting such project areas should be avoided. The reptiles recorded have a varied niche and can occur any were in the project area as long as there is a hiding place and basking substrate. No sensitive habitat was recorded in the project area. However, as already mentioned, reptiles have low dispersal ability. The rocky outcrops in the project area tend to give rise to geographical isolates. Rock habitat islets may thus house unique reptile forms and for this reason, this habitat is of high conservation importance especially in providing varied gene pools for the lizards and skinks.

3.6.7 Species of Conservation Concern

Like in many other developing countries of the world, amphibians of Uganda are less known than reptiles, birds and mammals. The conservation status of amphibians in Uganda is generally unknown because of data deficiency. No species of conservation concern under IUCN Red List Category were recorded.

Among the reptiles recorded, the Nile Monitor *Varanus niloticus* is listed under CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) Appendix II of the IUCN Red List category. During the study, time was a limiting factor. Amphibians and reptiles are elusive creatures some of which require a lot of time to find. More time was therefore needed for an exhaustive inventory especially in the wetland, savanna/woodland, and Forest ecosystems.

3.7 Impact statement

Human intervention in the natural environment has been shown to affect amphibian fauna in two ways: adversely, by destroying natural habitat, and favorably, by creating new habitats (Khan, 1990). No new habitat favorable for amphibians will be created. The erected poles may create new basking grounds / substrate for some lizards.

Herpetofaunal species may be directly impacted on through mortality of individuals during construction of the proposed distribution line. Those species that cannot effectively vacate affected project areas during the construction phase of the proposed distribution lines e.g burrowing lizards may suffer direct mortality during construction phase. Some may be victims of harassment especially the snakes caused by the people's negative attitudes towards them.

Vegetation will be cleared to give way for the wires to be erected and poles for the distribution lines in which case basking sites may be lost for the reptiles. However, the impact may be very minimal since the distribution lines are located in the road reserves, which road reserves have been already encroached upon by the local population. Some of the areas where amphibians have been breeding and living may be lost, especially in wetlands.

3.8 Overall Impact Assessment

Most of the species recorded are data deficiency and are widely distributed in Uganda. The Nile Monitor though listed under CITES Appendix II, remains common and widely distributed in Uganda and other countries. No species of conservation concern were encountered or recorded. Also, only a stretch of the habitats surveyed will be used for the distribution line erection and this will be mainly along the road reserves. The negative impacts will therefore be minimal. On that basis, the construction of the distribution lines will have minimal or no impact at all on the amphibians and reptilian populations.

3.9 Mitigation measures

From humanitarian point of view, every effect should be made to save and relocate any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord. The herptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away.

Initiative at the local level should be developed to reduce the degradation of the water catchments round rivers / stream systems and their associated wetlands. Such initiatives could include development or promotion of apiary activity which is compatible with protection of vegetation as it does not require vegetation clearance but rather depends on its presence.

Amphibians and reptiles are shy groups of animals always eager to escape if given chance. To minimize death, attempts to scare away the herpetofauna before undertaking vegetation clearance and soil filling or dumping in wetlands should be done.

3.10 Future Monitoring

The draft puddle frogs and the crowned bull frog are important indicator species. This is because they require permanent water sources for their survival. Their presence /absence should be monitored at least once a year during the first rains.
No indicator species for reptiles was recorded.

3.11 Conclusion

The herpetofauna species encountered during the study are still abundant and widely distributed in Uganda. The population to be affected if at all, by the construction of the distribution line is very minimal and will not affect the survival of the species recorded. No species of conservation concern were recorded in the areas where the distribution lines will pass. The Nile Monitor listed under CITES Appendix II of the IUCN Red List Category is still common and widely distributed in Uganda and Africa in general. The construction of the proposed three distribution lines would therefore have no negative impact on the herpetofauna in the project area.

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4 BIRDS – By Herbert Kasozi

4.1 Introduction

Birds are useful ecological indicators of ecological disturbance and ecosystem health and often incorporated in ecological assessment projects. This is because they are highly diverse and inhabit a range of habitats and conditions, widely studied with a fairly settled taxonomy, sensitive to environmental change and economically important (e.g. as pests and tourist attractions, Bird Life International, 2013a). Some species have great charisma as flagship species and attract public attention. Ad hoc conservation campaigns focused on them benefit mainstream conservation in that they act as proxies for securing conservation rights for other biota with which they either directly or indirectly interact. For example efforts to save the Shoebill (*Balaeniceps rex*) habitats benefit other species of flora and fauna that share the same habitats.

There is no perfect indicator taxon, but some are much better than others. The kind of indicator taxon that works best depends on whether the purpose is to track environmental changes, or clarify biodiversity patterns; on the scale involved; and on the kind of habitat being looked at (Bird Life International, 2013a). Birds are chosen as a key indicator taxon to assess environmental impact of the proposed construction of rural electrification project in West Nile. In effect, surveys were conducted as part of the general environmental impact assessment for the proposed project. The surveys were intended to document bird species present in the area in the context of conservation importance, identify potential adverse impacts to the species and their habitats and propose mitigation and monitoring strategies. Results obtained are presented herein.

4.2 Methods

Line transects

The birds were surveyed through line transect counts. This involves moving along a predetermined route and recording birds on either side of the observer. A line transect count is a highly adaptable method in terrestrial systems and important in surveying groups of species (Gibbons and Gregory 2006). Surveys were focused in ecologically sensitive and protected areas (see Appendix 2 for survey locations). Most terrestrial ecosystems were heavily degraded, and thus areas of focus included the interface between wet (riparian and marsh areas) and the dry terrestrial systems. This interface is perceived to support more species than the different separate habitats. Species identifications were based on Stevenson and Fanshawe (2002).

Habitat Classification

Birds recorded were classified into categories where possible basing on the standard habitat classification by Bennun and Njoroge (1996). The categories include;

- A - Afro tropical migrant (a species migrating with in Africa)
- P - Palearctic migrant (a species which breeds in Europe or Asia)
- p - Species with at least some Palearctic populations
- FF - forest specialists (species of typical forests interiors)
- F - Forest generalists (species less specialized also occur in small patches of forests)
- G – Grassland species
- f - Forests visitors

- W - Water bird specialists (normally restricted to wetlands or open waters)
- w - Water bird non specialists (often found near water)

A species can be both Afro-tropical and water specialist; or water non specialist at the same time forest visitor, etc.

Data quality and quantity

Avifauna survey campaigns require long time investment to fully understand the dynamics of species assemblages of any one given area. Within the scope of the current surveys, we could not conduct extended and comprehensive surveys, and are therefore constrained to stretch the results obtained to make wide ranging conclusions about the avifauna community assemblages of the area. Data presented herein is incidence data only showing species encountered in different places/habitats, with an indication of their habitat associations. Emphasis was majorly placed on conservation status, indicator species and the habitat change impacts especially in critical areas. Though most of the natural habitat in different places was altered by human action, it is likely that extended periods of field surveys spanning the different seasons might turn up several more species than have been recorded in the current surveys.

4.3 Results

4.3.1 Richness

In the overall survey across all the sections of the proposed project area 70 species were recorded (Appendix III). Of these 36 were recorded along the Odramachaku – Onduparaka – Abiria (O-O-A) line, 57 along the Midigo – Ludara – T off Kei (M-L-T) line and 70 along the Wandi – Yumbe – Moyo (W-Y-M) line (Table 4.1, Appendix III). Seven of the species were Afro tropical migrants, with *Milvus migrans* having at least some Palearctic populations (Table 4.2).

Table 4.1 Summary of species records across different habitat specialisations, migratory and conservation status along the different sections of the project area. (O – O – A - Onduparaka – Odramachaku – Abiria, W – Y – M - Wande – Yumbe – Moyo and M – L – T - Midigo – Ludara – T off Kei).

Line		O-O-A	W-Y-M	M-L-T
Habitat Specialization	FF - Forest specialist	0	1	3
	F - Forest generalist	2	9	4
	f - Forest Visitor	14	18	16
	W - Wetland specialist	0	6	2
	w - Wetland associate	9	10	6
	G - Grassland specialist	6	11	6
	Ae - Aerial feeder	1	2	2

Migratory status	P - Palearctic migrant	0	0	0
	p - Species with at least some Palearctic populations	1	1	0
	A – Afro tropical Migrant	4	7	3
Conservation status	LC - Least Concern			
	EN - Endangered			

Table 4.2 Migratory species, their conservation status and project area sections of encounter (O – O – A - Onduparaka – Odramachaku – Abiria, W – Y – M - Wande – Yumbe – Moyo and M – L – T - Midigo – Ludara – T off Kei, LC- Least Concern, p - Species with at least some Palearctic populations and A – Afro tropical Migrant).

Atlas No.	Species	Conservation status	Migratory Status	O-O-A	W-Y-M	M-L-T
30	AFRICAN OPEN-BILLED STORK *Anastomus lamelligerus*	LC	A	x	x	
75	BLACK KITE *Milvus migrans*	LC	p,A	x	x	
309	RED-CHESTED CUCKOO *Cuculus solitarius*	LC	A		x	x
373	GREY-HEADED KINGFISHER *Halcyon leucocephala*	LC	A	x	x	
375	WOODLAND KINGFISHER *Halcyon senegalensis*	LC	A		x	
395	NORTHERN CARMINE BEE-EATER *Merops nubicus*	LC	A		**x**	x
401	BROAD-BILLED ROLLER *Eurystomus glaucurus*	LC	A	x	x	x

4.3.2 Conservation Issues

Of the recorded species, only one (i.e. *Balearica regulorum*) is listed as Endangered (EN) on the IUCN Red List of Threatened Species. The rest are recorded as Least Concern (LC). This species adopts a generalist feeding strategy which makes it highly adaptable and has allowed it to persist in human modified habitats. The most significant threat to its survival is habitat loss and fragmentation with destruction of nesting sites which occur in wetlands. This has been largely ascribed to intensification of agricultural activities (with associated adverse impacts such as encroachment, increased fertilizer run off etc.), high rates of wetland sedimentation, altered flooding regimes etc. (Bird Life International, 2013b). The species makes local seasonal movements dictated by abundance and distribution of food and nesting sites and rainfall (Bird Life International, 2013b). In the study area,

individuals were recorded feeding in a cultivated area in Midigo village along the Midigo – Ludara – T off Kei (M-L-T) line. None of the wet areas in the project area qualifies as good breeding sites for the species, therefore it can be suggested that the observed individuals were only wandering through the area in their quest for food.

The habitats in the area are represented by disclimax successional vegetation types which develop in areas of relatively high human influence. Such disclimax communities result when human modified systems supplant natural ecosystems and undergo continuous cycles of burning, clearing, cultivation, grazing followed by regrowth. Such vegetation types do not provide stable and suitable habitats for avifauna. The riparian habitats are dominated by smallholder agricultural farms majorly dominated by cassava, tobacco and eucalyptus. The large stretches of natural woodlands are under pressure from charcoal burning.

The cultivated areas provide food sources for birds; here they are often perceived as pests, whereas eucalyptus plantations are poor habitats for birds and vertebrate wildlife in general. The several rivers flowing through the project area provide refuge to bird communities as a natural habitat surrounded by highly disturbed terrestrial ecosystems. Most of the birds recorded in the area were encountered close to the riparian areas. The rivers have three major impacts on the avifauna, i.e.

- They provide the only readily accessible source of water in rather unfavourable surroundings. Without them, the general area would otherwise support fewer species at low densities
- They attract several species found only in areas with reliable supply of water such as the Pigmy and Pied Kingfishers, Grey Crowned Crane, Grey Heron etc.
- They create a moist microenvironment which supports production of food (in such forms as plant, invertebrates, fish etc.) not available in surrounding eucalyptus plantations. This gives them great importance as food hubs

4.4 Impacts and mitigation

Most of the natural habitats are already supplanted by cultivated areas, settlements and towns, and the others being cleared for charcoal. Impacts from proposed project activities will only exacerbate what is already being imposed by human activities. Project activities that will adversely affect the biological environment include;

- Erection of medium voltage line support structures, accessories and conductors
- Clearing of the right of way for medium voltage and low voltage lines
- Erection of the low voltage reticulation lines
- Construction of temporary workers' camps and storage facilities for project materials

Likely adverse impact to avifauna from those activities include among others the following;

- Further disturbance of natural habitat caused by vegetation clearing, trampling and increased human and mechanical presence in the area. This may cause direct damage to wildlife when nest and foraging sites are destroyed, or when individuals are injured and in extreme cases killed. Clearance of natural vegetation ultimately deprives avifauna of their habitats and therefore may lead to local species extinctions when individuals immigrate to more suitable areas. Mitigation proposals that may be adopted to abate these impacts include;
    - Minimise traffic operations in the project area
    - Set speed limits for all vehicles and automobiles
    - Designate central areas for intense engineering works, such areas should avoid critical/ sensitive areas. Such areas should be established in already developed or disturbed areas
    - Minimise vegetation clearing
- Environmental pollution is another key impact to point out. This may stem from different sources including; exhaust gas emissions from engines and discharge of objectionable odours, dust generated from excavation activities, locomotives and auto mobiles, oil spills (lubricants) from locomotives/ auto mobiles, waste water, waste fuels, improper fuel storage, poor handling of facilities and solid wastes, noise and vibrations. Impacts from pollution will adversely affect the atmosphere and both terrestrial and aquatic habitats. Pollution may create unfavourable conditions for wildlife and may interfere with physiological or behavioural functionality of individuals. For example, it may make forage unpalatable, cause disease or shift communication thresholds (noise and vibrations). The resulting ecological distortions and imbalances may lead to eventual displacement of fauna to unpolluted areas. Mitigation proposals that may be adopted to abate these impacts include;
    - Designate central areas for intense engineering works, such areas should avoid critical/ sensitive areas
    - Machinery should be well serviced and in good working order
    - Minimise discharge of chemicals into the environment
    - Educate onsite project workers on appropriate behaviour as regards pollution and ecological welfare of work sites and species
    - Proper storage facilities especially for fuel and other chemicals
    - Clean waste water before discharge e.g. by use of simple oil separators
    - Develop proper and approved waste disposal plans
    - Central locations for fuel transfer
- Electrocution and collision with power lines is highly likely especially before birds get used to presence of power line equipment in the atmosphere. This may lead to injury and/or death of individuals, distort natural flyways and may interrupt movement patterns especially of migratory species.

4.5 Conclusion

As far as avifaunal elements are concerned, the project does not raise any threatening conservation issues. The area is largely human settlements, cultivated and disturbed areas with no critical habitats.

Environmentally sound implementation should reduce environmental impact of the project by adhering to proposed mitigation measures. This can be best achieved when these measures are included in the developer's implementation strategy.

4.6 Recommendation

Monitoring of avifaunal communities' response to project impact is important to track the success of the mitigation measures. Improved species richness and abundance of these communities is a good index for measuring success. Monitoring should be done periodically to track response of the faunal communities to the impacts that affect them. It may follow weather seasons, or depending on the intensity of project activity can be more frequent, say after every three months. This helps make project impacts and mitigation measures easily tractable. Monitoring should also be done using standard protocols to ensure meaningful comparison of results over time.

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5 MAMMALS – By Stephen Kigoolo & Herbert Kasozi

5.1 Introduction

Uganda Electricity Regulation Authority developed a ten year Rural Electrification Strategy and Action Plan for the period 2013-2022. The objective of the strategy and Action Plan is to increase the national electricity geographical coverage with a view to increase the rural population access to electricity from the current 5% to 22% by 2022. This was in a bid to provide cleaner, more efficient technologies for cooking and lighting in households. Subsequently, different rural service centres were established and have been working around the clock to implement the Strategy and Action Plan.

The West Nile Rural service territory has proposed extending electricity distribution grids in the districts of Arua, Koboko, Moyo and Yumbe. According to the National Environmental Statute No.4 of 1995, all development projects deemed to have significant impact on the environment are mandated to conduct an Environment Impact Assessment (EIA). The object of this is to establish the extent of impact the proposed development will have on the environment of the area of implementation and beyond.

This report presents results of a baseline mammal study as part of biodiversity assessments for the EIA of the impending project. Mammals are regarded as some of the principal biodiversity components of great importance in environmental assessment and conservation planning. They are often used as indicators of environmental health and continue to be of great value in conservation decision making. This is largely due to their ecological importance (as key contributors to the food web and regulators of communities of plants and other animals with which they interact) and economic importance as food sources, tourist attractions, disease vectors etc.
The surveys were essentially aimed at;

- Identifying and documenting mammals and critical habitats in the project area
- Identifying and assessing potential impacts of the project on the mammal community assemblages and their habitats
- Proposing mitigation/management measures and a monitoring protocol necessary to minimize negative impact on the species and habitats

5.2 Methods

Survey design

The study sites were established in different habitats along the area traversed by the proposed distribution lines. The sampling sites were established in areas that were perceived to still hold relevance as mammal habitat (see Appendix). These majorly included areas of fairly intact natural vegetation and emphasized protected areas. The respondents for the consultations were chosen at random in the different villages.

Data collection

Village transects and local people consultations. For this project, a quick sampling protocol was developed to cover the different project sites and villages within the allowed time limits. The protocol essentially involved a combined survey involving reconnaissance, identification of critical habitats and local people consultations. Where possible, short transects of between 200-500m were moved through (semi)natural areas in the villages to identify any prospects of mammal presence (especially through foot prints, dung deposition and actual sightings). The local people consultations basically involved asking local people of the animals they encounter in their day to day activities. Respondents were picked randomly and responses from all were collated to generate one species list for the area.

Opportunistic encounters

These involve opportunistic sightings while moving through the project area. These records are ideally not from designated sampling areas but within the larger project area. They are essential in enriching the species list of the project area.

5.3 Results

Six mammal species were recorded in the project area (Table 1). All the encountered species are listed as Least Concern (LC) on the IUCN Red List of Threatened Species (Version 2015.4). The habitats where these species currently thrive are represented by disclimax succession vegetation types (see plant section). They are heavily influenced by human action i.e., undergo continuous cycles of clearing, burning and regrowth. The clearing is especially for agriculture and charcoal burning. This is mostly evident in extensive natural woodlands in Yumbe and Moyo, along the Wandi-Yumbe-Moyo line. The areas do not provide stable habitats for fauna and therefore cannot support stable communities. Additional impact from the proposed project activities will only exacerbate the current state of affairs in the ecological realms of the project area. Since no species of conservation concern is reported, no area can be pointed out as a critical mammal habitat, and given the extent of the area to be affected by the impending project, no major conservation issues can be pointed out to be carried along by the project as far as mammals are concerned.

Table 5.1 Mammal species recorded in the project area and their conservation status. (O – O – A - Onduparaka – Odramachaku – Abiria, W – Y – M - Wandi – Yumbe – Moyo and M – L – T - Midigo – Ludara – T off Kei, x signifies section where recorded).

Species	Family	Conservation Status	Where recorded		
			O-O-A	W-Y-M	M-L-T
AFRICAN GRASS RAT *Arvicanthis niloticus*	Muridae	LC		E291541, N359621	
STRIPED GRASS MOUSE *Lemniscomys striatus*	Muridae	LC	E262949, N332480	E296102, N363519	E297648, N396386
SIDE STRIPED SQUIRREL *Euxerus erythropus*	Sciuridae	LC		E321547, N3803364	E303316, N398415
BANDED MANGOOSE	Herpestidae	LC			E303316,

Mungos mungo					N398415
COMMON JACKAL *Canis aureus*	Canidae	LC		E321466, N380273	
BUSHBUCK *Tragelaphus scriptus*	Bovidae	LC		E321466, N380273	

5.4 Impacts and mitigation

Most of the natural habitats are already supplanted by cultivated areas, settlements and towns, and the others being cleared for charcoal. Impacts from proposed project activities will only exacerbate what is already being imposed by human activities. Likely adverse impact to mammals include among others the following;

Further disturbance of natural habitat caused by vegetation clearing, trampling and increased human and mechanical presence in the area. This may cause direct damage to wildlife when nest and foraging sites are destroyed, or when individuals are injured and in extreme cases killed. Clearance of natural vegetation ultimately deprives mammals of their habitats and therefore may lead to species outburst into local human community areas. These areas do not provide the required niches for many species and only those species that can quickly adapt in these conditions can survive.

Mitigation proposals that may be adopted to abate these impacts include;

i) Minimise traffic operations in the project area
ii) Set speed limits for all vehicles and automobiles
iii) Designate central areas for intense engineering works, such areas should avoid critical/ sensitive areas
iv) Minimise vegetation clearing

Environmental pollution is another key impact to point out. This may stem from different sources including; exhaust gas emissions from engines and discharge of objectionable odours, dust generated from excavation activities, locomotives and auto mobiles, oil spills (lubricants) from locomotives/ auto mobiles, waste water, waste fuels, improper fuel storage, poor handling of facilities and solid wastes, noise and vibrations. Impacts from pollution will adversely affect the atmosphere and both terrestrial and aquatic habitats. Pollution may create unfavourable conditions for wildlife and may lead to physiological or behavioural interference. This may make forage unpalatable, cause disease or shift communication thresholds (noise and vibrations). The resulting ecological distortions and imbalances may lead to eventual displacement of fauna to unpolluted areas.

Mitigation proposals that may be adopted to abate these impacts include;

v) Designate areas for intense engineering works avoiding critical/ sensitive areas
vi) Machinery should be well serviced and in good working order
vii) Minimise discharge of chemicals into the environment

viii) Educate project workers on appropriate behaviour on pollution and ecological welfare of work sites and species
ix) Proper storage facilities especially for fuel and other chemicals
x) Clean waste water before discharge e.g. by use of simple oil separators
xi) Develop proper and approved waste disposal plans
xii) Central locations for fuel transfer

5.5 Conclusion

The project does not raise any threatening conservation issues to mammals. The area is largely human settlements, cultivated and disturbed areas with no critical habitats. Environmentally sound implementation should reduce environmental impact of the project by adhering to proposed mitigation measures. This can be best achieved when these measures are included in the developer's implementation strategy.

5.6 Recommendation

Monitoring of faunal communities' response to project impact is important to track the success of the mitigation measures. Improved species richness and abundance of these communities is a good index for measuring success. Monitoring should be done periodically to track response of the faunal communities to the impacts that affect them. It may follow weather seasons, or depending on the intensity of project activity can be more frequent, say after every three months. This helps make project impacts and mitigation measures easily tractable. Monitoring should also be done using standard protocols to ensure meaningful comparison of results over time.

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APPENDIX I Plant survey locations and the description of their vegetation for all transmission lines

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
Onduparaka-Odramachaku-Abiria transmission line					
E1	36N 0265998E 0333558N	Leisure Gardens	*Senna simea, Ficus sp, Tectona grandis*	*Tectona -Senna-Ficus* gardens	Leisure gardens (Left) and buildings on the right
E2	36N 0265700E 0333606N	Eucalyptus plantation	*Eucalyptus grandis, Chromolaena odorata, Sida rhombifolia*	*Eucalyptus-Chromolaena* plantation	
E3	36N 0265714E 0333457N				Trading centre
E4 (Ediofe stream)	36N 0265526E 0333224N	Stream line grassland	*Echinochloa pyramidalis, Cyperus dives, Bulbostylis dichitoma, Kylinga bulbosa, Chromolaena odorata, Sporobolus pyramidalis*	*Echinochloa- Cyperus-Chromolaena* grassland	Human use is through cultivation, brick laying and *Eucalyptus sp* tree plantations

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
E5 (Krukrue Stream)	36N 0265462E 0333153N	Streamline grassland	*Cyperus dives, Sida rhombifolia, Urena lobata, Cynodon dactylon*	*Cyperus-Cynodon-Urena* streamline grassland	Banks have cultivation fields and tree plantations of Eucalyptus and Pine
E6	36N 0265260E 0332945N				cultivation fields and community with *Tectona grandis* stands on the road
E7	36N 0264762E 0332554N	Bushed *Eucalyptus sp* plantation on the right			Trading centre with gardens on left
E8 (River Alika)	36N 0264196E 0332046N	Riverine grassland	*Echinochloa pyramidalis, Setaria sphacelata, Mimosa pigra*	*Echinochloa-Setaria* riverine grassland	Banks are cultivated and Eucalyptus plantations
E9	36N 0263980E 0331885N	Fallows	*Imperata cylindrica, Sida rhombifolia*	*Imperata-Sida* fallow	Fallows within community
E10	36N 0263725E 0331693N	Fallows	*Lantana camara, Imperata cylindrica, Chromolaena odorata*	*Chromolaena-Lantana-Imperata* bush land	

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
E11	36N 0263101E 0332237N				*Eucalyptus sp* plantation and Fields of cultivation
E12 (River Ega)	36N 0262960E 0332237N	Riverinebushland	*Echinochloa pyramidalis, Penissetum polystachion*	*Echinochloa-Penissetum* riverine bushland	
E13	36N 0260349E 0332986N	Bushed grassland fallows	*Lantana camara, Imperata cylindrica, Chromolaena odorata, Sporobolus pyramidalis, Digitaria abyssinica*	*Chromolaena-Lantana-Imperata* bushland	
E14 (River seva)	36N 0258874E 0337891N	Riverine vegetation	*Cyperus dives, Leearsia hexandra, Echinochloa pyramidalis*	*Echinochloa-Cyperus-Leearsia* swamp	Banks are cultivated
E15 (Esia Stream)	36N 0258539E 0337861N	Streamline grassland	*Cyperus rotundus, Leearsia hexandra, Loudentia phrgmitoides, Echinochloa pyramidalis, Osmunda clytoniana*	*Cyperus-Echinochloa-Loudentia* grassland	Some sections of the river banks are cultivated
E16	36N 0254980E 0339426N	Eucalyptus plantation			

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
E17	36N 0255664E 0344048N				Community area along Ug-Congo border
E18	36N 0256579E 0342862N	Young *Eucalyptus sp* and *Senna siamea* plantations	*Eucalyptus grandis and Senna siamea*		Open Fields of cultivation and homesteads
E19	36N 0255896E 0340369N				Fields of cultivation and homesteads
E20	36N 0257347E 0340577N				Fields of cultivation and homesteads
E21 (River Kawa)	36N 0258110E 0340744N	Riverine swamp	*Cyperus papyrus, Echinochloa pyramidalis, Leearsia hexandra, Cyperus dives*	*Cyperus-Echinochloa-Leearsia* riverine swamp	Banks are cultivated and with fallow lands along some sections
E22	36N 0258286E 0342412N	Open grassland	*Sporobolus pyramidalis, Setaria sphacelata, Eragrostis sp*	*Sporobolus-Eragrostis-Setaria* open grassland	Located within community near Ayivu health centre
E23	36N 0259466E 0341457N				Community area with fields of cultivation

Survey Point	Coordinates (UTM Arc 1960)	Vegetation Type	*Dominant species*	Phytosociology	Other remarks
E24	36N 0250356E 0341349N	Bushed thickets	*Combretum collinum, Ziziphus pubescens, Chromolaena odorata, Lantana camara, Annona senegalensis, Eragrostis sp*	*Combretum-Chromolaena-*Lantana bushed thickets	Other abundant species were *Setaria sphacelata* and *Vitex doniana*
E25	36N 0250815E 0341181N	Alternate Fallows and Eucalyptus plantations			Lie on either sides of the road with homes steads within them
E26	36N 0265234E 0336246N				Trading centre
Wandi-Yumbe-Moyo line					
W1	36N 0275188E 0342903N				Trading centre
W2	36N 0275670E 0343099N	Bushland	*Lantana camara, Acacia polyacantha, Panicum maximum, Sporobolus pyramidalis, Borassus aethiopum*	*Lantana-Acacia-Panicum* bush land	Bush lands of abandoned cultivation
W3	36N 0276478E 0343770N	Open grassland	*Brachiaria brizantha, Cynodon dactylon*	*Brachiaria-Cynodon* open grassland	
W4	36N 0277567E 0346313N	Eucalyptus plantations with gardens			community area

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
W5 (Urukuru hill)	36N 0279647E 0349410N	Bushed thickets	*Combretum adenogonium, Combretum molle, Acacia hockii, Bridelia scleroneura, Hyperthelia dissoluta*	*Combretum-Acacia-Hyperthelia* bushed thickets	Natural savannah vegetation on top of a bouldery hill, hill bottom along the road is cultivated
W6	36N 0285861E 0352134N				Gardens and Eucalyptus Plantations
Otrevu Forest reserve	36N 0286887E 0351527N	Eucalyptus woodland	*Eucalyptus sp*		
W7 (Aripea hill)	36N 0287870E 0352402N	Bushed thickets	*Acacia hockii, Bridelia scleroneura, Combretum molle, Cobretum adenogonium, Asparagas flagelaris, Brachiaria brizantha*	*Acacia-Combretum-Bridelia* bushed thickets	Other abundant species; *Capparis erythrocarpos, Tylosema fassoglensis, Azima tetracantha, Cadaba farinosa*
W8 (River Inawa)	36N 0291549E 0359669N	Riverine grassland	*Phragmitis mauritianum, Echinochloa pyramidalis, Mimosa pigra, Echinochloa corona*	*Echinochloa-Phragmitis-Mimosa* riverine grassland	Bouldery river

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
W9	36N 0290495E 0361812N				Community with *Eucalyptus sp* on the right and an open grassland on left
W10 (River Oru)	36N 0292838E 0361172N	Riverine grassland	*Echinochloa pyramidalis, Mimosa pigra, Sesbania seban, Penissetum popureum*	*Echinochloa-Mimosa-Sesbania* riverine grassland	Bouldery river on both sides of the bridge
Utumbari Forest reserve	36N 0293946E 0361839N	Eucalyptus woodland	*Eucalyptus sp*		
W11 (River Invetre)	36N 0294488E 0362539N	Seasonally flooded Riverine grassland	*Echinochloa pyramidalis, Mimosa pigra, Cyperus dives*	*Echinochloa-Cyperus-Mimosa* seasonally flooded riverine grassland	
W12 (River Ozurugo)	36N 0295970E 0363608N	Riverine grassland	*Echinochloa pyramidalis, Echinochloa colona, Cyperus dives, Mimosa pigra, Leearsia hexandra, Nyphia lotus*	*Cyperus-Echinochloa-Mimosa* riverine grassland	Cultivated along both banks
W13	36N 0297608E 0366265N				Fallows and open grasslands

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
W14	36N 0298114E 0365475N	*Eucalyptus sp-Tectonia grandis* plantations			
W15	36N 0301636E 0363050N	Bushland	*Acacia hockii, Imperata cylindrica, Azadiranchta indica*	*Acacia-Imperata* bush land	
W16	36N 0298954E 0365909N				Gardens and homesteads
W17	36N 0300408E 0365679N	Stream line grassland	*Cyperus dives, Leearsia hexandra, Mimosa pigra, Cyperus rotundus*	*Cyperus-Leearsia* streamline grassland	seasonally flooded
W18	36N 0301222E 0366039N	Bush land	*Hyptis suaveolens, Solanum incanum, Vitellaria paradoxa*	*Hyptis-Solanum* bush land	on some sections are *Eucalyptus sp* plantations and gardens
W19	36N 0302606E 0365908N				Homesteads-surrounded by fallows
W20 (River Dodonga)	36N 0303825E 0366008N	Riverine woodland	*Acacia sieberiana, Acacia hockii, Acacia senegal, Fluggea virosa, Acalypha neptunica*	*Acacia-Acalypha-Mimosa* woodland	River is bouldery on both sides of the bridge

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
W21	36N 0298170E 0368123N	Bush land	*Acacia hockii, Imperata cylindrica-Chloris gayana*	Acacia bush land	
W23 (River Ora)	36N 0300447E 0369034N	Riverine bushed thickets	*Mimosa pigra, Acacia hockii, Chromolaena odorata, Harissonia abyssinica*	*Mimosa-Harissonia-Vernonia riverine* bushed thickets	Fringed by dense community of *Hyptis suaveolens*
W24	36N 0300618E 0369141N	Dense bushed thickets on both sides of the road	*Acacia hockii, Acacia senegal, Grewia mollis, Piliostigma thonningii, Bridelia scleroneura*	*Acacia-Grewia bushed-Harissonia* dense bushed thickets	Other species are *Combretum collinum, Vitellaria paradoxa and Tamarindus indica*
W26	36N 0300970E 0369341N	Dense bushed thickets	*Acacia hockii, Acacia senegal, Grewia sp, Piliostigma thonningii, Bridelia scleroneura, Hyptis suaveolens, Harrisonia abyssinica*	*Acacia-Harissonia* dense bushed thickets	fields of cultivation on some sections
W27	36N 0302297E 0369142N	Mosaic of thickets and fields of cultivation	*Setaria sphacelata, Melicia excelsa*		
V3 (NOKO)	36N 0305561E 0370053N				Trading centre

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
W29	36N 0303712E 0368993N	Plantations of *Tectona grandis*			The left has fallow lands-right plantations
W30	36N 0305964E 0370436N	Lightly wooded grasslands	*Tectona grandis, Borassus aethiopum*		
W31 (River Lacha)		Riverine bushed thickets	*Sclerocarya birrea, Cyprus dives, Echinochloa pyramidalis, Sporobolus pyramidalis, Hyptis suaveolens*	*Mahogany-Hyptis-Echinochloa* wetland	Fringed by bushed thickets and plantations on both banks
A1	36N 0306348E 0369961N				Gardens-Homes-tree stands
A2	36N 0307544E 0370333N				Gardens-Homes-tree stands
A3	36N 0308560E 0369905N	Fallows of Lightly wooded grasslands	*Hypertheria dissoluta,Hyptis suaveolens, Imperata cylindrica, Acalypha bipartita*	*Hyperthelia-Imperata-Hyptis* lightly wooded grassland	

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
A4	36N 0309273E 0369491N	Woodland	*Acacia sieberiana, Acacia hockii, Tylosema fassoglensis, Philenoptera laxiflora, Albizia coriara*	*Acacia-Tylosema-Chloris* woodland	Degradation is through charcoal burning
A5	36N 0310184E 0369252N	Woodland	*Philenoptera laxiflora, Acacia sieberiana, Acacia hockii*	*Philenoptera-Acacia* woodland	
A6	36N 0311631E 0369231N	Woodland	*Philenoptera laxiflora, Acacia sieberiana, Acacia hockii*	*Philenoptera-Acacia* woodland	
A7	36N 0312482E 0368670N	Woodland (short stature)	*Acacia sieberiana, Acacia hockii, Combretum adenogonium, Grewia mollis, Bridelia scleroneura*	*Acacia-Combretum-Bridelia* woodland	Others abundant species were *Maytenus senegalensis, Asparagas flagelaris, Hyperrhenia filipendula*

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
A10	36N 0314257E 0365906N				Community area with fields of cultivation and stands young *Tectona grandis*
A11	36N 0314977E 0365822N				Trading centre
A13	36N 0316835E 0363843N				Homesteads with fallows
A14	36N 0317680E 0362677N				Community with tree stands of *Acacia sieberiana, Balanitis aegyptiaca, Tamarindus indica, Vitellaria paradoxa*
A15	36N 0317503E 0361661N				Community with tree stands of *Acacia sieberiana, Balanitis aegyptiaca, Tamarindus indica, Vitellaria paradoxa*
A16	36N 0318443E 0359690N				Community with tree stands of *Acacia sieberiana, Balanitis aegyptiaca, Tamarindus indica, Vitellaria paradoxa*

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
A17	36N 0320644E 0359356N				Community with tree stands of *Acacia sieberiana, Balanitis aegyptiaca, Tamarindus indica, Vitellaria paradoxa*
A19	36N 0323626E 0356923N	Bushed thickets	*Acacia hockii, Grewia trichocarpa, Piliostigma thonningii, Tylosema fassoglensis, Harrisonia abyssinica, Chromolaena odorata*	*Acacia-Harrisonia-Chromolaena* bushed thickets	Mosaic of bushed thickets and gardens
A20	36N 0324744E 0356665N	Bushed thickets	*Acacia hockii, Grewia trichocarpa, Piliostigma thonningii, Tylosema fassoglensis, Harrisonia abyssinica, Chromolaena odorata*		Mosaic of bushed thickets and gardens
A21	36N 0306952E 0372683N				Gardens and communities

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
A22	36N 0308651E 0373936N	Riverine bush lands fringed by open grassland	*Mimosa pigra, Echinochloa pyramidalis, Cynodon dactylon*	*Mimosa-Echinochloa-Cynodon* riverine bush land fringed by open grass land	A big part near the bridge is bare thus the river is almost seasonally flooded
A23	36N 0309301E 0374704N				Gardens and communities
A24	36N 0309431E 0375921N				Gardens and communities
A25	36N 0311646E 0376243N				Gardens and communities
A26	36N 0313574E 0375171N	Open woodland (short stature)	*Acacia hockii, Combretum adenogonium, Combretum molle, Piliostigma thonningii*	*Acacia-Combretum-Balanitis* Open woodland	Major activities are charcoal burning and cattle grazing
A27	36N 0315414E 0375038N	Lightly bushed grasslands	*Imperata cylindrica-Panicum maximum-Fluggea virosa bushed grassland*		

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
A28	36N 0318601E 0374541N	Bushed thickets	*Combretum adenogonium, Maytenus senegalensis, Harrisonia abyssinica, Fluggea virosa*	*Acacia-Harrisonia-Maytenus* bushed thickets	Some patches were under clearance for cultivation
A29	36N 0308466E 0378044N				Gardens and communities
B1	36N 0307316E 0385454N	Streamline grassland	*Hyperthelia dissoluta, Setaria sphacelata, Borassus aethiopum, Hyptis suaveolens*	*Hyperthelia-Setaria-Borassus* lightly wooded grassland	The general area has grasslands with few *borassus aethiopum* tree stands
B2	36N 0307868E 0386499N				Trading centre
B3	36N 0309920E 0387391N	Bushed thickets	*Acacia senegal, Acacia hockii, Sporobolus pyramidalis, Flueggea virosa*	*Acacia-Setaria-Flueggea* bushed thickets	This patch lies in the middle of cultivation area and on gravelly soils
B4	36N 0313648E 0390424N	Bushed thickets	*Philenoptera laxiflora, Piliostigma thonningii, Acacia hockii, Harrisonia abyssinica*	*Philenoptera-Acacia-Piliostigma* woodland	The left side of the road is more bushy

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
B5	36N 0308971E 0385684N	Lightly Wooded bushland (short stature)	*Acacia hockii, Grewia trichocarpa, Piliostigma thonningii, Tylosema fassoglensis*	*Acacia-Grewia-Tylosema* Bushed thickets	Other abundant species included *Philenoptera laxiflora, Fluggea virosa, Harrisonia abyssinica, Tamarindus indica*
B6	36N 0316753E 0383432N	Woodland	*Acacia hockii, Combretum adenogonium, Combretum molle, Piliostigma thonningii*	*Acacia-Grewia-Combretum-Philenoptera* Woodland	
B7	36N 0320659E 0381426N	Woodland	*Acacia hockii, Combretum adenogonium, Combretum molle, Piliostigma thonningii*	*Acacia-Grewia-Combretum-Philenoptera* Woodland	
B8	36N 0321549E 0380364N	Open grassland with bushed thickets	*Setaria sphacelata, Sporobolus pyramidalis, Chromolaena odorata*	*Setaria-sporobolus-Vernonia* open grassland with thickets	
B9 (Kochi river)	36N 0326617E 0393609N	Riverine grassland	*Phragmitis mauritianum, Mimosa pigra, Acacia sieberiana, Cyperus dives*	*Phragmitis-Mimosa-Cyperus* grassland	The right side of the bridge is a riverine bushed woodland

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
B10	36N 0327900E 0395034N				Gardens with scattered trees
B11	36N 0328629E 0395666N	Bushed thickets	*Acacia hockii, Bridelia scleroneura, Grewia trichocarpa, Harrisonia abyssinica*	*Acacia-Bridelia-Grewia* bushed thickets	Other abundant species included *Piliostigma thonningii, Fluggea virosa* and *Combretum adenogonium*
B12	36N 0329129E 0396892N	Woodland	*Acacia hockii, Terminaria glauscecens, Vitellaria paradoxa, Combretum adenogonium*	*Combretum-Terminalia-Vitellaria* woodland	
B13	36N 0328845E 0401767N	Woodland	*Acacia hockii, Bridelia scleroneura, Vitellaria paradoxa*	*Acacia hockii-Bridelia-Vitellaria* woodland	
B14	36N 0330628E 0395360N	Bushed thickets	*Acacia hockii, Bridelia scleroneura, Harrisonia abyssinica*	*Acacia-Bridelia-Harrisonia* bushed thickets	

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
B15	36N 0331235E 0395338N	Lightly bushed riverine grassland with open water	*Cyperus dives, Sporobolus pyramidalis, Hyperthelia dissoluta*	*Cyperus- Sporobolus-Hyperthelia* lightly bushed riverine grassland	
B16	36N 0333367E 0395247 N	Seasonally flooded grassland	*Hyperthelia dissoluta, Setaria sphacelata, sporobolus pyramidalis*	*Hyperthelia-Sporobolus* seasonally flooded grassland	
B17	36N 0337295E 0399051N	Riverine bushed woodland	*Acacia sieberiana, Acacia hockii, Mimosa pigra*	*Acacia-Mimosa* riverine bushed woodland	The bridge on this river is under construction with large amounts of piled marrum and sand
B18	36N 0340935E 0395961N	Seasonally flooded grassland	*Setaria sphacelata, Sporobolus pyramidalis, Cyperus sp*	*Setaria-sporobolus-* seasonally flooded grassland with thickets	

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
B19 (Eria Forest reserve)	36N 0350653E 0401283N	*Griveria robusta, Tectonia grandis* plantation			Other abundant species include *Combretum adenogonium, Combretum molle, Terminaria glaucescens and Vitellaria paradoxa*
B20 (Eria FR)	36N 0348379E 0400001N	Eucalyptus woodland			Other abundant species include *Combretum adenogonium, Combretum molle, Terminaria glaucescens and Vitellaria paradoxa*
B21	36N 0341258E 0395864N	Riverine bushed woodland	*Acacia sieberiana, Acacia hockii, Mimosa pigra*	*Acacia-Mimosa* riverine bushed woodland	
Midigo-Ludara T-Kei Line					
MD1	36N 0303728E 0398712N				Midigo trading centre
MD2	36N 0303102E 0398183N	Woodland	*Vitellaria paradoxa, Bridelia scleroneura, Acacia hockii*	*Vitellaria-Bridelia-Acacia* woodland	Within are sporadic home steads

Survey Point	Coordinates (UTM Arc 1960)	Vegetation Type	*Dominant species*	Phytosociology	Other remarks
MD3	36N 0301735 E 0396833N	Open grasslands with scattered thickets	*Imperata cylindrica, Setaria sphacelata, Pennisetum polystachion*	*Imperata-Setaria-Pennisetum* open grassland with scattered thickets	Other abundant species include *Chromolaena odorata, Acacia senegal*
MD4	36N 0300008E 0395878N	Woodland	*Vitellaria paradoxa, Acacia hockii, Combretum adenogonium, Azadiranchta indica*	*Vitellaria-Combretum-Acacia* bushed thickets	
MD5	36N 0297846E 0395624N	Woodland	*Vitellaria paradoxa, Albizia coriaria, Ficus sychomorus, Kigeria africana*	*Vitellaria-Albizia-Ficus-Kigeria* woodland	
MD6	36N 0294698E 0395712N	Woodland	*Vitellaria paradoxa, Albizia coriaria, Ficus sychomorus, Kigeria africana*	*Vitellaria-Albizia-Ficus-Kigeria* woodland	
MD7	36N 0292674E 0394596N	Woodland	*Vitellaria paradoxa, Albizia coriaria, Ficus sychomorus, Kigeria africana*	*Vitellaria-Albizia-Ficus-Kigeria* woodland	
MD8 (River Turu)	36N 0292497E 0395648N	Riverine grassland	*Panicum maximum, Echinochloa colona, Sorghum arundinacium*	*Panicum-Echinochloa-Sorghum* riverine grassland	Other abundant species were *Borassus aethiupum, Vitellaria paradoxa*, Chromolaena odorata

Survey Point	Coordinates (UTM Arc 1960)	Vegetation Type	*Dominant species*	Phytosociology	Other remarks
MD9	36N 0292134E 0396581N	Woodland	*Vitellaria paradoxa, Grewia trichocarpa, Combretum adenogonium, Annona senegalensis*	*Vitellaria-Grewia-Bridelia* woodland	Other abundant species were *Piliostigma thonningii* and *Kigeria africana*
MD10	36N 0291652E 0394257N	Woodland	*Vitellaria paradoxa, Grewia trichocarpa, Combretum adenogonium, Annona senegalensis*	*Vitellaria-Grewia-Bridelia* woodland	Woodland is on the road just after the junction and homesteads
MD11	36N 0290268E 0394268N	Woodland	*Kigeria africana, Khaya sp, Albizia grandibracteata, Combretum adenogonium*	*Kigeria-Combretum-Albizia* woodland	
MD12 (Forest reserve)	36N 0288357E 0395065N	Woodland	*Combretum adenogonium, Combretum collinum, Vitellaria paradoxa, Sclerocarya birrea, Piliostigma thonningii*	*Combretum-Khaya-Piliostigma* woodland	This is mixed with *Eucalyptus sp* and *Tectonia grandis* plantations
MD13	36N 0281355E 0391303N	Woodland	*Vitellaria paradoxa, Albizia coriaria, Ficus sychomorus, Kigeria africana*	*Vitellaria-Albizia-Ficus-Kigeria* woodland	

Survey Point	**Coordinates (UTM Arc 1960)**	**Vegetation Type**	***Dominant species***	**Phytosociology**	**Other remarks**
MD14	36N 0279801E 0390146N	*Eucalyptus sp* woodland			Initiative of British American Tobacco (BAT) at Ludara
MD15	36N 0274084E 0386968N	Fallow lands and *Eucalyptus sp* plantations	*Vernonia sp, Borassus aethiopum*		

6.2 Appendix II Location of data collection points for fauna

Section	Project Area / Village	Coordinates	
		Eastings	Northings
Arua-Onduparaka	Radio Pacis	265984	333550
Arua-Onduparaka	St. Mary's School	265832	333844
Arua-Onduparaka		265657	333880
Arua-Onduparaka	Arua Diocease	266137	333598
Arua-Onduparaka		265475	333467
Arua-Onduparaka		264622	332954
Arua-Onduparaka	Olika River Stream	264135	332329
Arua-Onduparaka	Pajulu	263375	331859
Arua-Onduparaka	River Ega, Anjuveti Village	262878	332798
Arua-Onduparaka		260270	333299
Arua-Onduparaka	River Seva system	258796	338176
Arua-Onduparaka	River Esi, Anyaramite Village	258456	338159
Arua-Onduparaka	odramachaku	255593	344348
Arua-Onduparaka		256500	343168
Arua-Onduparaka	River Kawa, Mbalaka village	258046	341061
Arua-Onduparaka	Aiivuni Village	258058	341059
Arua-Onduparaka		260307	341615
Arua-Onduparaka	Ayivuni subcounty	260733	341470
Arua-Onduparaka	Onduparaka	265154	336544
Wandi-Yumbe-Moyo	Wandi village	275143	343208
Wandi-Yumbe-Moyo		275577	343392
Wandi-Yumbe-Moyo	Owiniye	276427	344079
Wandi-Yumbe-Moyo		279549	349712
Wandi-Yumbe-Moyo	Lechu / Leju	285759	352464
Wandi-Yumbe-Moyo	Olivu B Village	287802	352689
Wandi-Yumbe-Moyo	Inawa River, Ilepi/Gango village	291467	359926
Wandi-Yumbe-Moyo	Omugo village	290424	362151
Wandi-Yumbe-Moyo	River Oru, Azapi village	292648	361432
Wandi-Yumbe-Moyo	Otumbari village	293784	362035
Wandi-Yumbe-Moyo	Inventre River Bridge	294414	362838
Wandi-Yumbe-Moyo	River Ibia, Ibia village	295884	363905
Wandi-Yumbe-Moyo	Bidi village	299499	364340
Wandi-Yumbe-Moyo	Lugbari	302176	362249
Wandi-Yumbe-Moyo		298102	365162
Wandi-Yumbe-Moyo		299588	366000
Wandi-Yumbe-Moyo	Onvastia stream, Obua	300328	365975

Section	Project Area / Village	Coordinates	
	village		
Wandi-Yumbe-Moyo	Dodonga River, Druven Village	303820	366399
Wandi-Yumbe-Moyo		299545	369101
Wandi-Yumbe-Moyo	River Ora, Luluwere village	300369	369337
Wandi-Yumbe-Moyo		303907	369539
Wandi-Yumbe-Moyo	Nyoko village	304519	369948
Wandi-Yumbe-Moyo	Odravu village	305373	370220
Wandi-Yumbe-Moyo	River Racha, Agi village	306848	372113
Wandi-Yumbe-Moyo	Otumbari Forest Reserve	293862	362143
Wandi-Yumbe-Moyo	Otrevu Foret Reserve	286804	351820
Wandi-Yumbe-Moyo		308489	370210
Wandi-Yumbe-Moyo		309190	369782
Wandi-Yumbe-Moyo	Odranga village	312403	368967
Wandi-Yumbe-Moyo	Okuyo village	314901	366118
Wandi-Yumbe-Moyo	Ombechi village	316909	363786
Wandi-Yumbe-Moyo		321033	359573
Wandi-Yumbe-Moyo	Ariwa village	322222	357986
Wandi-Yumbe-Moyo	Okubani	324666	356968
Wandi-Yumbe-Moyo	Wolo village	306913	373495
Wandi-Yumbe-Moyo	River Jure	308571	374232
Wandi-Yumbe-Moyo	Lomunga	309499	377252
Wandi-Yumbe-Moyo		315324	375329
Wandi-Yumbe-Moyo	Yoyo	318507	374947
Wandi-Yumbe-Moyo		307472	379691
Wandi-Yumbe-Moyo	Geya	305954	381551
Wandi-Yumbe-Moyo	Yumbe	307236	385770
Wandi-Yumbe-Moyo		309857	387690
Wandi-Yumbe-Moyo	Lokopio	313877	391209
Wandi-Yumbe-Moyo	Anguira	308892	385984
Wandi-Yumbe-Moyo	Barakala	315297	386178
Wandi-Yumbe-Moyo		316670	383732
Wandi-Yumbe-Moyo		320572	381726
Wandi-Yumbe-Moyo	Eyete	321470	380664
Wandi-Yumbe-Moyo	Obero	322202	386545
Wandi-Yumbe-Moyo	River Kochi, Nabara village	326536	393909
Wandi-Yumbe-Moyo		328840	396889
Wandi-Yumbe-Moyo	Gobolo	328768	402052

Section	Project Area / Village	Coordinates	
Wandi-Yumbe-Moyo		331152	395632
Wandi-Yumbe-Moyo	Eria Forest Reserve, Eria village	349848	401016
Wandi-Yumbe-Moyo	River Yii	341193	396174
Wandi-Yumbe-Moyo	River Nyawa Bridge, Gborogborochu village	341193	396174
Midigo-Ludara-Toff Kei	Midigo village	303648	399012
Midigo-Ludara-Toff Kei		303026	398483
Midigo-Ludara-Toff Kei	Oyawa village	299914	396173
Midigo-Ludara-Toff Kei	Keyi	292551	394889
Midigo-Ludara-Toff Kei	Turu River Bridge	292412	395933
Midigo-Ludara-Toff Kei		292057	396878
Midigo-Ludara-Toff Kei		290203	394559
Midigo-Ludara-Toff Kei	Urungu village	289554	395086
Midigo-Ludara-Toff Kei	Mt. Kei Forest Reseve, Lire village	288279	395351
Midigo-Ludara-Toff Kei	Ujipaku village	281544	392010
Midigo-Ludara-Toff Kei	Lugara Tree Plantation, American Tobacco Company	279729	390442
Midigo-Ludara-Toff Kei	Nyoka village	274011	387263
Midigo-Ludara-Toff Kei	Keri Central village	271321	388012

APPENDIX III Species encounters in different sections of the project area, their conservation status and habitat specialization

Atlas No.	Species	Conservation status	Habitat	O-O-A	W-Y-M	M-L-T
17	CATTLE EGRET *Bubulcus ibis*	LC	G	x	x	x
25	GREY HERON *Ardea cinerea*	LC	W		x	x
30	AFRICAN OPEN-BILLED STORK *Anastomus lamelligerus*	LC	A,w,G	x	x	
39	HADADA IBIS *Bostrychia hagedash*	LC	w		x	
42	SACRED IBIS *Threskiornis aethiopicus*	LC	W		x	x
75	BLACK KITE *Milvus migrans*	LC	p,A	x	x	
109	LIZARD BUZZARD *Kaupifalco monogrammicus*	LC	f		x	
142	HELMETED GUINEAFOWL *Numida meleagris*	LC	G		x	
185	GREY CROWNED CRANE *Balearica regulorum*	EN	W,G		x	
273	EMERALD-SPOTTED WOOD DOVE *Turtur chalcospilos*	LC	F		x	x
281	SPECKLED PIGEON *Columba guinea*	LC		x	x	x
283	RED-EYED DOVE *Streptopelia semitorquata*	LC	f	x	x	x
286	RING-NECKED DOVE *Streptopelia capicola*	LC	f	x	x	x
289	LAUGHING DOVE *Streptopelia senegalensis*	LC			x	x
296	GREAT BLUE TURACO *Corythaeola cristata*	LC	F		x	x
302	ROSS'S TURACO *Musophaga rossae*	LC	F		x	
309	RED-CHESTED CUCKOO *Cuculus solitarius*	LC	A,F		x	x
326	BLUE-HEADED COUCAL *Centropus monachus*	LC	w	x	x	x
358	AFRICAN PALM SWIFT *Cypsiurus parvus*	LC	Ae	x	x	x
368	BLUE-NAPED MOUSEBIRD *Urocolius macrourus*	LC			x	
369	SPECKLED MOUSEBIRD *Colius striatus*	LC		x	x	x
373	GREY-HEADED KINGFISHER *Halcyon leucocephala*	LC	A,f,w	x	x	
375	WOODLAND KINGFISHER *Halcyon senegalensis*	LC	A		x	
378	AFRICAN PYGMY KINGFISHER *Ispidina picta*	LC	f,w	x	x	x
380	MALACHITE KINGFISHER *Corythornis cristata*	LC	W		x	

Atlas No.	Species	Conservation status	Habitat	O-O-A	W-Y-M	M-L-T
383	PIED KINGFISHER *Ceryle rudis*	LC	W		x	
385	LITTLE BEE-EATER *Merops pusillus*	LC	G	x	x	
395	NORTHERN CARMINE BEE-EATER *Merops nubicus*	LC	A,G, Ae		**x**	x
401	BROAD-BILLED ROLLER *Eurystomus glaucurus*	LC	A,f,w	x	x	x
432	RED-FRONTED TINKERBIRD *Pogoniulus pusillus*	LC			x	
443	DOUBLE-TOOTHED BARBET *Lybius bidentatus*	LC	f		x	
520	AFRICAN PIED WAGTAIL *Motacilla aguimp*	LC	w	x	x	x
562	COMMON BULBUL *Pycnonotus barbatus*	LC	f	x	x	x
576	WHITE-BROWED ROBIN-CHAT *Cossypha heuglini*	LC	f		x	x
601	SOOTY CHAT *Myrmecocichla nigra*	LC		x	x	x
612	AFRICAN THRUSH *Turdus pelios*	LC	f	x	x	x
658	TAWNY-FLANKED PRINIA *Prinia subflava*	LC	f,w	x	x	x
677	GREY-BACKED CAMAROPTERA *Camaroptera brachyura*	LC	f	x	x	x
713	NORTHERN BLACK FLYCATCHER *Melaenornis edoliodides*	LC		x	x	x
716	SILVERBIRD *Empidornis semipartitus*	LC			x	
739	AFRICAN PARADISE FLYCATCHER *Terpsiphone viridis*	LC	f		x	x
781	GREEN-HEADED SUNBIRD *Cyanomitra verticalis*	LC	F		x	
784	OLIVE SUNBIRD *Cyanomitra olivacea*	LC	FF		x	x
787	SCARLET-CHESTED SUNBIRD *Chalcomitra senegalensis*	LC	f	x	x	x
796	OLIVE-BELLIED SUNBIRD *Cinnyris chloropygia*	LC	F		x	
812	COMMON FISCAL *Lanius collaris*	LC	G	x	x	x
824	GREY-HEADED BUSH-SHRIKE *Malaconotus blanchoti*	LC			x	
833	BLACK-CROWNED TCHAGRA *Tchagra senegala*	LC		x	x	x
843	BLACK-HEADED GONOLEK *Laniarius erythrogaster*	LC	f		x	x
853	FORK-TAILED DRONGO *Dicrurus adsimilis*	LC	f,F	x	x	x

Atlas No.	Species	Conservation status	Habitat	O-O-A	W-Y-M	M-L-T
855	PIED CROW *Corvus albus*	LC		x	x	x
858	PIAPIAC Ptilostomus afer 659	LC			x	x
872	RUPPELL'S LONG-TAILED STARLING *Lamprotornis purpuropter*	LC	F	x	x	x
879	RED-BILLED OXPECKER *Buphagus erythrorhynchus*	LC			x	x
880	RUFOUS SPARROW *Passer motitensis*	LC		x	x	x
881	GREY-HEADED SPARROW *Passer griseus*	LC		x	x	x
897	SPECTACLED WEAVER *Ploceus ocularis*	LC	f	x	x	x
908	BLACK-HEADED WEAVER *Ploceus cucullatus*	LC	f	x	x	x
928	BLACK-WINGED RED BISHOP *Euplectes hordeaceus*	LC	w		x	
930	NORTHERN RED BISHOP *Euplectes franciscanus*	LC	G		x	
963	AFRICAN FIREFINCH *Lagonosticta rubricata*	LC	G	x	x	x
966	FAWN-BREASTED WAXBILL *Estrilda paludicola*	LC	f	x	x	x
967	CRIMSON-RUMPED WAXBILL *Estrilda rhodopyga*	LC			x	x
969	COMMON WAXBILL *Estrilda astrild*	LC	w	x	x	x
974	RED-CHEEKED CORDON-BLEU *Uraeginthus bengalus*	LC		x	x	x
980	BRONZE MANNIKIN *Lonchura cucullata*	LC	G	x	x	x
981	BLACK-AND-WHITE MANNIKIN *Lonchura bicolor*	LC		x	x	x
985	PIN-TAILED WHYDAH *Vidua macroura*	LC			x	x
991	AFRICAN CITRIL *Serinus citrinelloides*	LC	F		x	x
1007	CABANIS'S BUNTING *Emberiza cabanisi*	LC	G		x	

A - Afro tropical migrant (a species migrating with in Africa), P - Palearctic migrant (a species which breeds in Europe or Asia), p - Species with at least some Palearctic populations, FF - forest specialists (species of typical forests interiors), F - Forest generalists (species less specialized also occur in small patches of forests), G – Grassland species, f - Forests visitors, W - Water bird specialists (normally restricted to wetlands or open waters), w - Water bird non specialists (often found near water). LC-Least Concern, EN-Endangered, O-O-A – Onduparaka-Odramachaku-Abiria, W-Y-M – Wandi-Yumbe-Moyo and M-L-T – Midigo-Ludara-T off Kei

APPENDIX IV Bird survey locations (O-O-A – Onduparaka-Odramachaku-Abiria, W-Y-M – Wandi-Yumbe-Moyo and M-L-T – Midigo-Ludara-T off Kei).

Section	Area/Village	Coordinate	
		Easting	Northing
0-0-A	Ediofe wetland	265988	333127
0-0-A	Alika	264216	332028
0-0-A	Pajulu	263413	331338
0-0-A	Anjuveti	262962	332482
0-0-A	Anyaramite	258531	337863
0-0-A	Ceva	258865	337877
0-0-A	Odramachaku	256603	342859
0-0-A	Mbaraka	258126	340764
0-0-A	Aiivuni	258272	342425
0-0-A	Aiivuni	260213	341366
0-0-A	Aiivuni	260812	341184
W-Y-M	Wandi	275668	343097
W-Y-M	Owaffa	279656	349375
W-Y-M	Leju	285837	352172
W-Y-M	Aripea hill, Orivu B	287906	352373
W-Y-M	R.Inawa, Illepi/Gango village	291549	359621
W-Y-M	R.Oru, Azapi village	292785	361172
W-Y-M	R.Ivetre	294499	362540
W-Y-M	Ibia	295988	363633
W-Y-M	Bidi p/s	299619	364037
W-Y-M	Lugbari	302254	361952
W-Y-M	Onvastia stream, Obua village	300536	365738
W-Y-M	R.Dodonga, Truven village	303890	366100
W-Y-M	R.Ora, Luluwili village	300469	369024
W-Y-M	R.Racha, Aji Village	306927	371821
W-Y-M	Utumbari CFR	293943	361845
W-Y-M	Otrevu CFR	286887	351527
W-Y-M	Okuyo 1	308567	369912
W-Y-M	Okuyo 2 (Odranga village)	309107	369666
W-Y-M	Umbechi	316989	363488
W-Y-M	Otubani	323747	356668
W-Y-M	R.Jure, Wolo, Odravu s/c	308647	373957
W-Y-M	Yoyo	315485	375040
W-Y-M	Kobbo villlage, Kochi p/s	309955	387404
W-Y-M	Lokopio village	313955	390908

Section	Area/Village	Coordinate	
W-Y-M	Anguira village	309260	385724
W-Y-M	Barakala	316752	383430
W-Y-M	Iyete	321547	380364
W-Y-M	Nabara village	326597	393608
W-Y-M	Kochi s/c	327221	394000
W-Y-M	Gobolo	328928	396615
W-Y-M	Gwere	337211	399045
W-Y-M	Lefori	346586	399715
W-Y-M	Eria	349475	400404
M-L-T	Umbechi	274113	386965
M-L-T	Midigo s/c	303725	398715
M-L-T	Midigo	303070	398163
M-L-T	Lobe	294673	395708
M-L-T	Kei town s/c	292495	395658
M-L-T	T-off Kei	292127	396589
M-L-T	To Lima	290277	394265
M-L-T	Mt Kei CFR	288353	395051
M-L-T	Ujipaku-Koboko	281242	391173
M-L-T	Ludara	279803	390145

Appendix 2: REA HSE Policy

RURAL ELECTRIFICATION AGENCY

ENVIRONMENT, HEALTH AND SAFETY POLICY

We are committed to:

- ✓ environmental sustainability of our projects
- ✓ prevention of injury and ill health at the workplaces for employees, contractors and visitors
- ✓ prevention of pollution and un-necessary disturbance of fragile ecosystems; and
- ✓ Continual improvement of our overall health, safety and environmental performance.

Every individual working for or on behalf of REA shares a responsibility towards achieving these commitments. REA will meet its commitments through the following:

- ✓ Integration of all EHS aspects in the design and implementation of rural electrification projects
- ✓ Avoiding/Minimizing impact on the environment through non/minimal-disturbance of fragile eco-systems, pollution prevention, reduction of our carbon footprint, and the reduction and recycling of waste
- ✓ Elimination of EHS accidents to guarantee a safe, injury-free workplace by integrating safety into daily activities.
- ✓ Striving to meet and exceed all applicable EHS regulations and standards. Everyone, at all levels of our organization, is accountable and responsible for environmental, health and safety compliance.
- ✓ Requiring Contractors to comply with relevant laws, regulations and standards that provide safeguards for the general public, the workplace, and the environment.
- ✓ Equipping employees with required skills through trainings
- ✓ Open communication with stakeholders and ensure an understanding of REA's EHS policies, standards, and performance.

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Appendix 3: Minutes of Stakeholder engagement meetings

Meeting with the officials of Electricity Reguratory Authority (ERA)

Stakeholders Engaged	**ESIA team**
Peter Kityo – Environment Specialist, 0782448041 Andrew Aloka – Envionment Officer, 0788 586880	Otim Moses Olivia Nantaba Nambuusi Suzan
Date: 7th June 2016	

* Provide drawings and line characteristics, showing how the power line traveses the landscape
* The lines should be within the road reserve. There are cases of encroachment of Forest Reserves on the road reserves, these require no compensation. Take note of UNRA marlstones.
* Consider options for layout to avoid sensitive ecosystems
* Safety aspects – take not of tree heights and safe distance in clearance way leaves, trees could fall on the line
* In the baseline, take not of characteristic growth heights of the forests
* Provide an overlay of power line route on the landscape
* Adequate sensitization of affected persons on way leaves acquisition be provided. Otherwise the Operations and Maintainace contractor will be at risk
* Contractors should be certified by ERA, and should follow construction standards set by ERA
* Consult with key licencees, concessionaires in the region including UEDL, WENRECO
* ERA to be notified of licensee by REA
* There should be a willing agreement executed with the power suppliers
* REA to submit a commissioning test to ERA, including transformers tests, line protection grading and settings
* The transformers should be PCB free

Meeeting with the department of Occupational Health and Safety under the MGLSD

Stakeholder consulted **Eva Katusabe- Principal Safety Inspector- 0702482420**	**ESIA Team** Namubuusi Suzan Nantaba Olivia
Date: 11th 07 2016	

Comments:

- Consider gender aspects when offering employment to the local community.
- The Employment Act should be adhered to, i.e. pay fairly and on time
- Children should be protected during erection of poles.
- Avoid child labor and disruption of access for those going to school.
- Avoid using vulgar words or abusive language when talking to women and children.
- When reviewing laws and policies consider Children and Employment Act.
- Consideration of PWDs and vulnerable people should be done, avoid disrupting their activities and access.
- On the issue of creosote, poles should not be treated on site.
- Avoid inconveniencing the community by abandoning poles in their gardens for long periods generally avoid disrupting community activities and lives.
- OSH standards should be observed for instance if there are to be workers' camps, provision of adequate segregated sanitary facilities, drinking water etc.
- Avoid disturbing the community socially.
- Where there is need for compensation, it should be done before construction starts.
- Adhere to all standards/requirements of the Occupation, Health and Safety Act.
- Sensitize the local community before implementing the project.

Meeting with the department of Museums and Monuments under the Ministry of Tourism, Wildlife and Antiquities

Stakeholder consulted: 1. Jackeline- 2. Sarah- Paleontologist (0772183601)	ESIA Team Nambuusi Suzan Nantaba Olivia
Date: 18th 07 2016	

Comments:

- There are archeological sites along the Wandi-Yumbe power line route. We don't have issues with the other power line routes i.e. Odramachaku-Abiria line and the Midigo-Ludara line.
- Power lines do not have much issues with archeological sites unlike roads which require continuous excavation.
- The ancestors who migrated from Acholi settled in some sections of Terego County.

INSTITUTION CONSULTED	STAKEHOLDER CONSULTED	COMMENTS
UNRA Headquarters	Mr. Kamanda Patrick- Environmental Specialist – 0772410523 Mr. Kansiime Enid – 0701125442	• UNRA has projects that are in the pipe line which should be put into consideration. REA should consult with UNRA to find out the exact areas to put into consideration. • REA should indicate and provide us with the coordinates of the area they intend to use so that we can advise and harmonize our operations. • REA should put their poles at the end of the road reserve so that we do not incur a lot of costs when transferring the poles. This was done successfully in Kaiso Tonya and the costs were minimized. • We shall consult our engineers to recommend the radius of the road reserve. • There are some complaints that in some area where REA worked in, they did assessment for affected property but did not compensate the affected communities and this affects negatively to other Government departments whenever they are implementing other projects in such areas. • World Bank suggested that whenever a project causes discomfort to the communities and their properties, then there must compensation to the affected communities. • There is anticipated influx of many people in the area and will be having money on them, so the temptation will be high especially young children will be convinced by the money and as a result will spread diseases like HIV/Aids. • Many projects tend to use children in their labor force to save on the cost because these young people do not charge highly • They are other complaints that sometimes companies contract people to work for them for example cook for them but end up being arrogant and refuse to pay the locals. • The communities are fully aware of the impacts of such projects, so REA should be very careful especially during implementation to bring these communities on board and fully participate in the project activities. • Provide with us the exact routes the project is going to pass through so that we know and plan accordingly. • REA workers lack the good cord of conduct,

		customer care and they use vulgar language which put off the affected communities. • UNRA and REA should work closely hand in hand to ensure that their projects are a success for the good of the country. • We recommend that all departments in the ministry of Gender, labor and social development be consulted for their input before the project is implemented. • We recommend that REA should look at all the existing policies related to this project and follow them accordingly. **Suggestions/Mitigation measures** 1. REA should put measures to avert some of the bad behaviors. 2. REA should put measures to protect children from these temptations and diseases. 3. The project implementers should provide workers with free Hiv/Aids counseling and protective gears like condoms. 4. We recommend that REA should carry out continuous sensitization to the affected communities about the project. 5. Workers should be sensitized and trained on the customer care and cord of conduct especially in the field because the communities can fail the project. 6. Social issues are very important. Please prioritize these issues whenever such projects come up. 7. Workers should be given formal employment. Here labor ministry should come in and advise accordingly especially concerning child labor. 8. There should be continuous sensitization including implementation phase.
National Forestry Authority	Rukundo Tom – EIA specialist 0772591205 John Dans – Coordinator GIS - 0772410523	• I would recommend that when erecting these electric poles Engineers should follow the proposed plan and avoid disturbance of the forest reserves. The engineers tend to say they will follow the road reserve but end up following a straight line which forces them to clear vegetation. • In case any trees are accidentally cut down please re plant another. • If the local forest reserve is affected, then REA will have to compensate the communities and the district but when it is a central forest reserve, then the developer will have to compensate NFA.

		• Generally we recommend that negative impacts are minimized by avoiding the forests.
UETCL	John Othieno – Environment Officer - 0772670110	• Low and medium voltage transmission do not need compensation. • We are planning to introduce high voltage and I would advise that REA will be connecting to our main grid when time comes. • Who is to operate this electricity is it Umeme or The District. • During excavation phase especially in wetlands, borrowed pits are used and this will lead to stagnation of water which causes floods. • How will pole treatment be managed? • There is anticipated child labor and land conflicts in the project area. **SUGGESTIONS/MITIGATION MEASURES** • Use culverts • REA should have waste management plan, Pollution Management Plan, Health and safety management plan, road signs and traffic management plan and then have a proper training of workers. • Project camps and storage facilities should be managed properly.
Arua District Ag Natural Resources Officer	Adirigo Edson - 0772567190	• On Wandi – Yumbe-Moyo road there is Otumbari local forest reserve which needs attention when implementing this project. If the poles pass through the western part of the reserve, then it means the project will affect the reserve which calls for compensation. • On Onduparaka-Odramachacu, we have Ozu local forest reserve. This will also require compensation in case the project affects the forest. • The community in Ozu clan that the land in question belongs to their grandfathers which has brought conflict with the district as the landlord who collect ground rent from them. • There is Mount Wati near Okubala Trading center which needs consideration during and before project implementation. • As the line goes through, it may pass through resident's wood loads and agricultural plantations which may require compensation. • Socially we really need this power expansion to promote economic activities for example small scale

		enterprises especially on the issue of value addition • It will promote creation of employment to the youth. This will be able through promotion of small scale industries.
UNRA Arua Station	Opio Simon – Inspector of works- 0772672026 Speke Omark – Mechanical inspector- 0772891937	• There is need for harmonization between these Government projects because UNRA can be planning to tarmac a road and yet REA has already put in their electric poles. This is in most cases are challenges we normally face while implementing some of our projects. • If you must work on this project then put the poles on the extra end of the reserve so that it does not cause conflicts. • Lea-Arua will be developed into tarmac in the near future so please put it into consideration.
PAJULE SUB COUNTY	Sub county Chief	• It is a good project. There is a lot of commercial viability especially shops, milling machines, health centers, churches and schools. • People should be compensated when the lines pass through their land. • I anticipate there are going to be many social issues especially when there will be an influx of people in the area especially diseases like HIV/AIDS. • There will be increased pressure on social services like health services, water, accommodation which comes with negative effects. • The project will increase people's incomes since they will be employed by the project. • Is this project similar to the GIZ project where the residents had to contribute some money before the project was implemented? • During the implementation of the high voltage victims hired a lawyer because they were ordered not to use their land where the poles are passing. • What are the implications when the poles fall in the road, or on people's plantations? • The local suppliers should be paid and in time. This is because. There was a case when the company doing roads ended up not paying the local suppliers. **Mitigation measures** • The implementers should have enough social workers to educate and sensitize the communities about the ongoing activities. This can be done through consultations with the area CDOs.

		• In case of any compensation, there should be a lot of sensitization and carefully done to avoid conflicts with the communities.
	GISO	• We have many primary and secondary schools in this area which needs this electricity for example Amara College. • There is a health center, Pajule Health center III • There is Jori water pump in this sub county which needs electricity
NyauNyau Trading Center	Local Community	• The community is very much interested in this kind of initiative. Thanks to Government for bringing this to our villages. • There will be many customers since this area is near the border with Sudan and Congo. • The Indians were interested and wanted to put some manufacturing plant but there were no power to proceed with the project. • There are not many sensitive areas that might hinder the project since the UPDF camped here for some time and there were at peace and lived in harmony with the community. Therefore the project workers will be welcomed here. • It is a good move by Government to bring electricity to Pajulu Sub County because I know I will benefit personally. • I hope this project will be implemented because there are many projects which are introduced to us and we get excited only for the implementers not to come back. • There is going to be problems with Land. Most people cultivate in the road reserve therefore they will expect to be compensated. • We have been waiting but in vain people move around telling us about good projects but in the end go for good. • We expect the connection fees to be very high. • Electricity is expensive to use. • We request the locals to be employed especially those that require unskilled and semi-skilled labor so that the community can own the project. • I thank you for bringing this electricity project to our area. • I was worried about the prices of poles but now that this is a Government project there is no worry now. • We were informed as leaders to talk to our people

		about such projects so I will inform my community. • Since this project is following the road reserve, It will give guidance to other projects. • If this project is true it will give us confidence to talk to our community. • We as leaders now that we know there is a project in the pipeline, we shall advise whoever is buying land not to buy in the road reserve. • We all need power because without power you cannot develop by putting up a factory. The factory will be useless without electricity. • There is need for sustainable power because we have businesses that need electricity badly for example if the petro station is not working other businesses will be paralyzed like our boda bodas here in this trading center. • Government should inform the local leaders to sensitize the communities about the road reserve. • Power will improve security by providing security lights in our trading center here.
AII-VU SUB COUNTY	Sub County Chief	• My People in this sub county are very responsive towards such projects. • Wandi was very remote but when they got electricity. That area changed in a very short time. So we are also very confident that when we get electricity this sub county will change for the better. • There will be economic empowerment to our people. This will be achieved through attaining employment from the project. • This community here is very welcoming provided those people who come to work under this project restrict to what they have come to do and expected of them, not involve in illegal activities. • There will be increase in social challenges and crimes like theft, prostitution, Hiv/Aids etc. Mitigation Measures • There is need for serious and continuous sensitization about the project.
Aii-vu Trading Center	Local Community	• We know the benefit of power but you should also consider our roads because they are also very important. • We need power because of security purposes in this trading center. • There is no one who can sabotage this project

		because it is needed for cooking to lighting. • There were other people who came distributing solar but they went away for good. • We expect the positive effects overlap negative effects. • Electricity cannot be rejected here we wish it can come as soon as possible. • Many projects come around but they are not implemented and in the process we lose confidence in the Government programs. • This area is in darkness as you can see so please we need electricity as soon as possible. • Sometimes we talk but about the youth that they don't like working but in real sense if power is here, every youth would have something to do for him or herself. • We need fair rates for electricity so that many people can benefit for example when water was brought to us they asked us to pay 200,000 for connection which was a bit on the higher end for the local residents. • For those in business power will be very useful. • If the pole falls on your house how can you be compensated? • We want our youth to be recruited for this project instead of getting workers from outside this area. • It will be very good if we see the workers have started digging pits. That is the time we shall gain confidence in this particular project. • We will get good things we only here of in Kampala like fetching Grasshoppers. • She said that it is a good project but is skeptical about its implementation. • I thank you for bringing us this project but I suggest that you recruit labor from this area. For example during the implementation of the water project, the workers to clear land were got from Busia which did not go well with the local residents. • Electricity is very helpful in that some people studied and can start electricity related businesses in this area.

Angurwa Trading Center	Local Community	• I thank you for having brought awareness to our village. • This is our share of the cake as Angurwa and West Nile in general because other areas have gone above us in development. • We have buildings here but because of lack of electricity they are vacant, we cannot use them neither do we rent them. • I personally deal in soft drink business but I find it challenging giving my customers hot drinks. • We the youth can use this electricity to develop some talents we already have like setting music producing studios. • Such Government projects should not pass us because electricity can be used to provide security lights. • We are concerned about those houses that are in the road reserve. What will Government do if the poles pass through people's houses and property? • When I look around there are a lot of unemployment, will this proposed project have any solutions to such problems. • Is this related to solar or it is hydro-Electricity Suggestions • Civic education is encouraged in this area to make the project a success and less costly on part of Government. • This project will provide my husband with many opportunities and in return will be happy; because he will be happy we shall also be happy.
Anyavu Trading Center	Local Community	• Are you following the presidential pledge to the people of Terego or because we really need this electricity to develop our place just like Koboko and other places. • You are welcome to our parish Anyavu, we need this power for many reasons for example to be used in our health centers, schools, praying places like churches and mosques. • He suggested that when workers are coming to work here they should not get worried about food because we have it in plenty. • Youths from our area here should be considered first when hiring these workers especially unskilled and semi-skilled. • We anticipate these poles to go through peoples land

		much as you say it is going to pass through the road reserve only. • Electricity will help us in computer work like printing and photocopying work. • It will help reducing on rural urban migration. This will happen through engaging the youth in income generating activities like welding, saloon works and many others. • Investors will be attracted to this area; they will set up investments like hotels, schools and hospitals. • Land will increase in value when there is power in an area • We have been crying for electricity and water in this area. We really need these services so that our standard of living can improve. • There are no much sensitive issues here in this area that can hinder the project.
Katrine Subcounty	Sub County Chief	• We cannot talk about development when we do not have social services like electricity. • Households can use electricity to increase on income generating activities. • We look forward to the project to succeed. • Electricity can attract investors who in turn will set up factories in this area. These initiatives will increase on employment generation to our youth who are unemployed.
Katrine Trading Center	Local Community	• For us we would like to get employment because we are unemployed. • We are peaceful and very much interested in development. • We hope to increase on the income generating activities to reduce poverty in this area. • We are worried about the rates. If the rates are high we might not afford this electricity. • Without electricity we cannot do any developmental activities however innovative we can be. • The local residents should be the ones to be employed at least as casual workers • Power is very useful to us especially farmers. • I anticipate this power will be highly priced • We need electricity because generators are very expensive to maintain and fuel. • There computers in some of our secondary schools here but they cannot use them because of lack of electricity.

		• Education standard here in west Nile is still low because of lack of electricity. Children here are forced to only study during day and yet children in Kampala do attend night classes as well. Therefore there is no way our children can compete with those other children. • West Nile is full of natural resources, so we need electricity so that we can be able to develop them and also improve on other developments especially in areas of agriculture. Mechanized agriculture can be done using electricity. This was practically seen in Kenya where rice is grown in swamps. • There is going to be a lot of people from all walks of life coming to this area which may increase on social challenges like diseases, increase in crimes like theft and prostitution. • When is this project starting? • We have enough food here so the project implementers will be able to buy food from this area. • We are worried about job slavery in case local youth are given employment. They should not be worked as donkeys. Ministry of labor should come in to regulate on the terms of employment.
Omugo S/C	Sub County Chief-Omugo sub county	• Developments like electricity is welcome in this area. People have been eagerly waiting for this electricity especially in these trading centers. • It will be a relief on part of us the sub county leaders because we have been spending a lot of money on the generator to pump off that water up the hills to Kubala market and to the health center. • There are a lot of opportunities when there is power in the area for example young people can engage in activities like welding and they earn a living. • There will be increased pressure on land. Population is big already in this area and land is not enough which may pose a challenge to the project implementers. • People are receptive and normally respond aggressively to positive projects like this one. • People will need continuous sensitization about this project so that they can fully own the project.
Leju Trading Center	Local Community	• On behalf of Terego we support the project because Government has given us a district.

		• We will not disturb the project because the water project dug our tobacco but no one complained because we knew it was beneficial to us. • We cannot reject electricity because we know it is useful • Can we supply the project with electric poles? • Power helps to reduce on business loses for example we slaughter meat and because we don't have power it goes bad in one day. • I request that the local youth be given a chance to work for the project so that they can be able to develop themselves. • Local labor is available and workers should be considered from all sub counties that are going to be affected. • There is going to be a lot of people who will come with their different behaviors that will promote social challenges and crimes like theft and prostitution. • Because of influx of many people in the area diseases like Aids will spread. • The residents are very much eager for the project.
Omugo Trading Center	Local Community	• There is a lot of poverty here but if there is power we would have developed hence attracting investors that would give us jobs. • People need power here to do welding, sell cold drinks. • I will be glad to see the project happen when I am still alive. • Electricity will help health center to be upgraded and attract more qualified workers like Doctor to come and work in these rural areas. • We have technical institutions, secondary schools that need electricity. • Our children suffer a lot in secondary schools especially those doing sciences when it comes to practical lessons. • I have poles that I can supply the project. • This project will create jobs for our children • Many developments cannot go on smoothly because there is no electricity. • Power has been so unreliable here in west Nile. I think this extension will reduce on power pressure. • We need power for photocopying.
Kubala Trading	Local Community	• We are in full support of this project. • Those dealing perishables like Fruits, cabbages will be

Center		able to store them for more days. • Electricity can be used for photocopying, grinding the maize into finished products. • There are secondary schools and proposed health center III along the line which needs power. • There is a proposed town board here so we will need electricity to make secretarial work like printing and photocopy. • Residents have been using solar and generators which are not reliable enough to do meaningful work. • Will REA buy poles from us or will come with them? • For the women they need this electricity at the health center so much.
Kibala	Sub County Chief and the local community	• Power is an engine to development, it can enable construction of factories • Businesses need power be it in kiosks or entertainment industry needs power. • Generators are very expensive compared to electricity. • We are using solar to pump water which becomes very challenging and very expensive. • We have health a health center, police station and several schools here which need electricity as soon as possible. • We have seen electric equipment like windows and doors elsewhere. So I believe if we have power we can duplicate such into our area here so that we can empower the youth to earn a living. • Do we need money for electricity? • Is there any harm if I sleep in grass thatched house **Mitigation measures** • There is a need to continuously sensitize the residents about the dangers of electricity in case you tap it illegally. • I am very grateful and welcome this project, in this whole sub county there is no electricity at all. • The unemployed youth will get what to do if power comes. • Electricity will attract investors to put business in this area and also provide employment to the people. • We raised these issues long ago, am happy they have started happening. • It will be useful to do our businesses especially us who are dealing in drinks.

		• Factories will be built in this area if power comes. This will help to reduce on the wastage especially our mangoes which are just rotting. • Papyrus near the river Nile can be turned it paper. • Some people die at the health center because of lack of electricity. • Am very happy and support the project. I am 70 years old and I have never seen or even heard about such a project. I pray that it happens. • We have eucalyptus trees in this area but we do not know the type which is used as electric poles. • Some projects are introduced to us but are not implemented. • This is a hard to reach area there are many hardships in this area. • We do not have clean water in this area and yet electricity move hand in hand with electricity. • Electricity is very important. It will bring some opportunities to us especially those that are strategic enough to tap on to the opportunities. • This area is sparsely populated and land is available in case the project requires extra land. • There is high level of unemployment in this area. We hope when the electricity comes it will attract investors in this area that will in turn create employment. • There will be opportunities in business as you can see we are using solar and solar cannot power heavy machines like refrigerators. • We are on a highway from Arua to Juba in South Sudan. So we anticipate there will be a lot of opportunities in welding, bakery etc. and our trading center will boom.
Karunga Trading Center	Local Community	• We are suffering because we lack electricity in this area
Okuyo Trading Center	Local Community	• We are lagging behind other places are developing for example Arua and other places are developed • We are very much supportive and welcoming to this project. • There are many activities that require electricity. For example we split timber manually and yet if we had electricity we would not be suffering like this. • Employment should be given to the local residents especially the youth from the project area. Suggested that in every village they should get labor from there.

		• We lose many businesses because of lack of power for example welding products like Windows and doors are got from either Koboko or Yumbe town. This means we are losing out on some of those lucrative businesses. • Will this electricity benefit the residents who live as far as 3 kms from the main road?
Odravu Sub County	Local Community in Odravil Trading center	• In this sub county there many things that will require this electricity ranging from Churches, Mosques, Primary and Secondary Schools, min factories like milling machines and households. • This project will bring the youth together and find a meaning of life. Currently our young people here keep loitering around eating mairungi and playing Ludo. If electricity is brought all this will end. • We are idle here because there are no jobs • Welding products are got from Yumbe town which is very far and very expensive. • Will Government allow individual residents to connect their houses and how much will they ask for connection. • Shall we need to make application when applying to be connected onto this electricity? • Electricity is the most important aspect when you talk about development. We have a lot of interest in this electricity. • If there is electricity, schools can teach students computers which is impossible now. Also students can attend classes any time as opposed to current situation where children only attend classes during day time when there is light.
Kulikulinga Trading Center	Local Community	• I want to see this electricity at my home because my house is near the health center. • The light is very useful especially to young children when reading their books. • Here students cannot compete with children in Kampala. • The youth should be given work like digging holes for the electric poles. • It would look very nice here if there was light. • This is a hot area so I believe cold drinks can move very fast. • The youth are idle because there is no way they can create something to do and in the end they involve themselves in crimes.

		• There is a problem of scarcity of water in this area. • We are being attacked by thieves every day because there are no lights in the trading center. • There are no complaints about the road reserve here because most of us know very well the road belongs to Government. So when such a project comes we do not expect resistance from residents. • It is a very good experience; I have never heard such an initiative here since I was born. • I am happy to receive this kind of news. We have been crying for this electricity. • It can assist in our health center. The health center will be able to transform from one level to the other. • We believe this is true because campaign period is over, it is time to work now and implement what was promised in the campaigns.

Odravu Sub County	Local Community in Odravu Trading Center	• We lag behind because we lack electricity. • We need electricity as soon as possible, there are places that have developed very first because of electricity. • We can attract investments in this area if we have electricity, factories can be put in this area which can in turn help in creating jobs. • We have shelter here which are empty and can be used by the workers if they come around to work on the project. • We have been waiting for this electricity for quite some time because we see some places have developed because they have electricity. • I am proposing that the labor force to be got from within this area be distributed equally among sub counties or villages. • Whenever projects come and we provide services like cooking for them, some of them when through with their projects go away without paying. How sure are we that we shall be paid in time in case we supply them food. • We the youths eat mairungi because we do not have what to do. If we have power we can be able to create some income generating activities like salons, welding, grinding machines etc. • Previously I worked for some company without a formal contract and in the end we ended up not being paid. How will this project be different from others? • We do not reject anything developmental provided it is going to benefit us as a community. • There are currently no sensitive issues that can cause objection to the project. • We have been engaging authorities for this electricity for example we asked President Museveni during the concluded campaigns at Boma ground that we needed electricity. I am very happy if Government has thought about us.

Kululu Subcounty	Local Community	• We cannot refuse any Government project • Electricity will help our children to learn computers and also attend night preps. • We have enough land which the project can use. We at one time donated land to the refugees and police farm for so long without any problem. • I thank God for what you have told us about electricity project. • In the past we have suffered a lot with our health center here due to lack of electricity • There is a lot of poverty in this area which is due to lack of electricity. • Our children would like to read at night using electricity. • I welcome this project on behalf of the youth because if it is successful, we are the main beneficiaries • As youth we are ready to provide labor to any employment opportunities available especially digging pits. • I have not heard of any Government project which was rejected by our community here. • I will be grateful if given an opportunity to work with this project. • This is a hard to reach area which poses a great challenge to the implementers and in most cases good projects pass us. • We are idle because we have no power to create employment for ourselves.
Keyi Sub County	Local Community	• This place needs to be developed because we have many businesses here. • There are no major sensitive areas that can bring objection to this project. • We are proud and we are happy for this project. • This is one of the concerns our people have been asking their leaders. We are happy it is coming now. • Let the workers feel at home because we are peaceful people here. • There are many things that need electricity here like the proposed mango juice factory in this sub county. • We have a lot of knowledge we can innovate many useful things but lack of electricity is letting us down. • Carpenters cannot do good designs because of lack of electricity. • We have many institutions here like primary secondary schools but lack of electricity is letting us

		down. Students cannot perform and compete like those other students from areas with electricity like Kampala. • We are marginalized from the rest of Uganda, so I do not expect mach benefit from this project. I will fully be confident in this project when I see the outcome. • We need electricity to use in hospitals. If there is electricity, Doctors will appreciate and come over in the village and introduce services like operation. • Electricity is very important in promoting academic standards. Children can be able to study all time including night time. • Government has neglected us in the past and now they are just remembering after 2 decades. • Are there opportunities for local labor? If there are those opportunities we are ready to work for the project. • If this project is real and it is not the promises from the campaigns, then we are very happy to see such a project in our sub county. This is because we as leaders our main target is always development. • We shall be glad to use this electricity in Kei sub county as you can see many young people are using solar to at least provide services like saloon, soft drinks, video halls, and even computer services. • There is Lobi Health Centre in Kei which needs electricity. • Kei Sub County supports Government programs 100%. We are very happy and associate and identify with this project. • We are very sad that sometimes you come and lie to us that there is a project coming and we end up waiting in vain. • Most of the youth are abusing the drugs like mairungi and marijuana. This is as a result of poverty, so we hope to reduce some of these circumstances through providing jobs to our local community. • As a mother I propose that when the project needs workers they should consider the locals first and consider the rest later. • May you consider our road because roads go hand in hand with electricity to attract investors • This is the shortest route to South Sudan (Juba). If we have electricity, it will boost development because of that connection. • We have a health center i.e. Matuma Health Center

		III in our area here please consider providing electricity to improve on the health services. • We have Agabinika falls in Kochi Sub County which can be used for hydroelectricity.
Rodo Trading Center	Local Community	• We are only waiting for electricity the money involved may not threaten us from enjoying such a service. • We lack computer services in this area and yet if we had electricity we would be enjoying such services the way we want. • Someone from outside this district or even outside countries cannot afford putting any development here because we don't have electricity. • We are illiterate because of lack of electricity. Students in this area only attend classes during day time which in return limits their academic performance and exposure.
Ludara Sub County	Local Community	• We cannot reject Government program whatever the circumstances. • We have been in darkness since time immemorial but now it's time for us to see the light. Thanks be to God. • We really need this power because you can really see how people are suffering with solar to do some work especially doing saloon work. • We do not have improved milling machines in this area because we lack electricity. • Rural Electrification in Northern Uganda will make us match with other communities. • We had already requested the sub county to bring us power from WENRECO. • The local labor should come from within our communities because we have all the manpower the project needs. • I recommend that when power project is successful, then the roads should also be worked on as well because Road infrastructure goes hand in hand with electricity to bring complete development.

Appendix 4: Attendance registers for stakeholder meetings

LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: National Forest Authority

Date: 30th

Name	Contact	Designation	Signature
John Dina	0772415523	Coordinator GIS NFA	
RUKUNDO Tom	0772591205	GIAPs	
Nantoosa Olivia	0752635499	Sociologist	
Kumbura George	0782980306	Socio-Economist	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: OSH Apparatment (MGLSD)

Date: 11th-07-2016

Name	Contact	Designation	Signature
EYA KATUSABE	0702 482420	PRINCIPAL SAFETY INSPECTOR	
Nantaba Olivia	0752635499	Sociologist	

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Location: URA HEAD QUATERS

Date: 30/05/16

Name	Contact	Designation	Signature
Karsime Enid	0701125442	Sociologist	
Patrick Kamanda	0772982900	ENV. Pollution Specialist	
Patrick Mulema	0772621123	Head Design	
Nantaba Olivia	0752635499	Sociologist	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: UETCL

Date: 30th May 2016

Name	Contact	Designation	Signature
1. JOHN OTHIENO	0772670110	Project	
2. KUNIHIRA GEORGE	0782980306	Socio-economist	
Nantaba Olivia	0752635499	sociologist	Olivia

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Lima trading Centre (Ludara S. County)

Date: 21st-05-2016

Name	Contact	Designation	Signature
MAFKI ZURAIR	0772585573	Lima T/C	
AMANI BURAN	0789389443	LIMA. C.	
Rokumi	B 0778810534	Lima. C	
ASIKU EDWARD	0773075373	LIMA. C	
DOKA KEMSI		LIMA. C	
TIKO MAMUWA		LIMA. C	
KASSMIR LIMA	0785874481	LIMA C	
BUZU HADIGI	0785578006	Lima C	
ABIRIGA ISMAIL	— —	Lima C	
KEMUSI JUMA ABI	— —	Lima	
ALEZOTO AGNES	0786313932	LIMA C	
MALISH ABDRAHMAN	0782485343	LIMA TC	
IDOSIGA MUZAMIL	0786510851	LIMA TC	
OKUJO MATAL DANIEL	0784640944	LIMA TC	

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Location: Lima trading Centre Kudara S-County

Date: 21st 05-2016

Name	Contact	Designation	Signature
MAMBO RASUL	0778331513	L.C1/Sec for Security LIMA C	
DRIUGA PAUL	0775990936	LIMA	
ALEMIGA FRED	0792899970	LIMA CENT	
MUKI MOSES ENABA	0793899222	LIMA C.T	
OLIMA PETER	0775163088	LIMA C.T	
MEGALOO ALENDY		LIMA CT	
FURDA LAWRENCE		LIMA CT	
MUSEMA RASUL	0775 636393	LIMA CT	
ILIKU SAMUEL		LIMA CT	
ATAI FARIDA		LIMA CT	
ANGUZA GEOFREY	0782413812	LIMA "	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Lima Trading Centre Cwebara S. County

Date: 21st 05. 2016

Name	Contact	Designation	Signature
ACIDRI EMANUEL	—	LIMA - C	
JULIO DRORUGA	—	LIMA - C	
ASA PIRIMO	—	" "	
Anguparu J ALEMIGA FESTO	—	" "	
ALEMIGA FESTO	0784499875	Lima Central	
Prima Candimu	— —	Alube West	
Odi Rosie	— —	Renda	
Abimia Odima	— —	Lima Central	
Candimu Manila	— —	" "	
Gongude A. Isidore	0777628863	Water Office	
EDEMA AMOS	0772983585/ 0772933124	MEMBER LIMA CENTRAL	
ATAMA MOHAMED YASSIN	0782541797	LIMA C.	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: ODIPAKU Trading Centre (Luchara S-County

Date: 21st – 05 – 2016

Name	Contact	Designation	Signature
AUGUYO GERALD	0792569650	—	
AGUWA AFISA	0783543761	—	
ABIJO ASIA	0783757112	—	
Sunday Zumu	—	—	
MAWATSOHN	0793676663	—	
CHARLES AZEM.	0799155212	LUDAKA	
Viga Reay	0793197914	"	
AFIDRA COLLINS STEPHEN	0782-287372	TEACHER.	
MUGOYA MAKSUDU	0751853030	"	
KAWA ALFRED	0773993066	LUDAKA	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Ochupaku trading Centre (Lundara S-County)

Date: 21st-05-2016

Name	Contact	Designation	Signature
MAWA ROBERT	0792899970	LCI C/M	
ABAKARI SOBRI	0774133297	LCI chairman	
METH Isaac	0783607145	VHT	
WAGI P WILFRED	0775253793	COUNCILLOR	
ABIMA SWABIC	0774406487	—	
PAPA BEN	0775262206	—	
ABABAKI RICHARD COX	0774421361		
KOKOLE HENRY	—		
Adubo Alono	0728171591		
ALONO	—		
LIFOROGU ABOW	0782829538	MEMBER	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Koch district local government (Koch trading centre)

Date: 19/05/2016

Name	Contact	Designation	Signature
01 Zaida badawo	—	—	
02 Dawa mary	—	—	
03 WAGA ALPHONSE	0772829492	Ag. S/County chief Koch	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III

Location: Kochin SLC Local government (Kochi trading Centre)

Date: .....

Name	Contact	Designation	Signature
Anaku Renjo	—	Peasant	ART
Bandiga Afulu	0775114749	"	
Drati Musa	0785045844	"	
Kenio Dada	—	"	
Izale Alitai	0785032454	LC II Chman	
TIRO WASIO	0781442643	Peasant	
MALAMUNGU ATUMAS	—	"	
ASIBOKU Hkim	—	—	
Idratu Majid	—	"	
Ajuga Rashid	0775628943	"	
Anguani Peter	—	"	
OFEZU WILSON	—	Peasant	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Koa Chiefs Local government (Koa trading Center)

Date: .....

Name	Contact	Designation	Signature
Swadick Ondwma	–	Peasant	–
Ayub Suma	–	"	
Ayman Amiza	0779066828	"	
Dada Ismail	–	"	
Izama Alex	–	"	
Imbuga Mustafa	–	"	
AHMADU SADIRI	0777145724	"	
Amiriya Lule	0779511675	"	
Ahiga	–	"	
Drani Maharai		"	
Ahmad MABID	0788221194	"	
DRANI MUHAMAD	0755977066	"	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kuchi SLC Local government (Kuchi trading Centre

Date: 19/5/2016

	Name	Contact	Designation	Signature
01	Bulli Rasul			
02	Nosiga geofry			
03	Mawa Mario			
04	ACHILE Zakaria			
05	Chrisa Abibu	0771261790		
06	Pario patric	0785824938		
07	SAAM Jamal	0785495146		
08	Aetti ADINARI	0777280886		
09	Atika Ratib			
10	Ottandiga Kasim			
11	Abasi Aburaga			

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kochi Sub-County (Kochi Trading Centre

Date: 19th 05 2016

Name	Contact	Designation	Signature
Caroline Betty	–	H/wife	–
Hawa Dubose	–	"	–
Maridiyo Christine	–	"	–
Apayi Esther	0781395813	"	
Ezati Grace	–	"	
Mazia Emmily	–	"	
Ondo Jamila	0773998823	"	
Sicra Hindi	–	"	–
Baka Rukia	–	"	
Lami A. Lore	0786268908	Elder	
Ondoga J. Marino	0783448251	Teacher	
Naico Aroba	–	H/wife	–

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kuo chi SLC Local government (Kuo chi trading centre.

Date: 19/5/2016

Name	Contact	Designation	Signature
Drawru Rose	–	Hfarte	–
Bonga Isaac	0774369573	Peasant	
Yasi Hanna	0773944583	"	
Oyabu Frederick	0785240241	Hodar	
Dramai George	–	Peasant	–
Acile Emanuel	0781443973	"	
Badiya Thomas	–	"	
Tada Rasul	–	"	–
Agondya	–	"	–
Dzu Mohamood	0785480724	"	
Taban Rasul	–	"	
Agondya Alfred	–	"	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kochi Sub-County (Kochi trading Centre)

Date: 19th-05-2016

Name	Contact	Designation	Signature
Bayo Ronald	0774278606	Peasant farmer	
BURDEN B. ROBERT	0774944932	"	
Sumbua Senfa	—	H/wife	
Jena Bjrgo	—	"	
Jamle Fanda	0781627586	" "	
TABAN S/K	0783424937	Peasant	
Manzubo Nania	—	H/wife	—
Owoko Asia	—	"	
Candia Rukia	—	"	
Dricin Kalsum	—	"	
Mainuma Dafula	—	"	—
Bako Susan	—	"	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III

Location: Kochi S/c Local government (Kochi Trading Centre)

Date: 19/5/2016

Name	Contact	Designation	Signature
Ol Alumu mk yels	0777137805	LCI / Rep.	
DELU ZAKI	0772692185	P/chief	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Romogi Sub-County (Barakala Trading Centre)

Date: 19th 05 - 2016

	Name	Contact	Designation	Signature
01-	BUSY RAMULAC.	0777710056	CDO Romogi	
02-	OLEGA SAFFI	0785045737	Peasant	
03-	CHAMBINA RATIB ASHADULAH	0778221083 0792123825	Farmer	
04-	OMBELE MANISUR U BZK	0792452841	Farmer	
05-	LATO ISSA	0792031320	Farmer	
06-	SADAM MAHAZIN	0791163993	Farmers	
07-	Maama Rasulu	0776731244	Farmer.	
08-	Ajiga Godson	0785574373	P.I.S.O Swinga para	
09-	AGUTA ZUBEDE	–	Farmer	
10-	AMANZURUKU LUCIO	0774560816	FARMER.	
11-	IBAKASON E. BRAN	0777682228	TEACHER.	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Ramogi Sub-County (Barakala trading Centre

Date: 19th-05-2016

	Name	Contact	Designation	Signature
12 -	ALAM ANGUPAC	—	FARMER.	
13 -	BAKU ANIFA	—	Famer	
14 -	ZABUD ZARU	—	Famer	
15 -	FATMUA MAKARAU	077712907[illegible]	Some Seller	
16 -	ADUWI RATIBU	0771543[illegible]26	BODA BODA	
17 -	AJ LAKID LORD	—	BDCIDR	
19 -	RASULH MUKASA	0792795752	PWASANT	
20 -	ASINA SIRAJI	0782962853	Some Seller	
21 -	ONJIA MAUZU	—	HOTEL OPERATOR	
22 -	BITANDIRU RAIMA	—	PWASANT	
23 -	ABASI MATHAMUDU	—	PWASANT	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: .....

Date: 19/05/2016

	Name	Contact	Designation	Signature
24-	SAFIYA JUMA	—	Sone Seller	
25-	AJAGA ASRAFU	—	BUSSINESSMAN	
26-	MAIMUNA ONZIA	—	PARENT	
27-	ZUBEDA AKASA	—	PARENT	
28-	DRICIRU CHRISTOPHER	—	PARENT	
29-	GOMURANJI BIKONGE	—	PRASENT	
30-	ABDUL SADALA	—	PERSANT	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Apo Sub-County (Kerie trading Centre

Date: 19th-05-2016

Name	Contact	Designation	Signature
BORUBI ASIJAD	0777717655		
GALUMGBE ZACCHAEUS	0771537205		
KIIKU ABDUL	0778153323		
AMAKU JUMA	0758718949	Headmaster	
NYAKUNI JAMIL	0794[illegible]8542		
KAWAWA AMIN	0775121809	farmer	
GULE JAMAL	0794403301	Butcherman	
MANENO ALIMA	-	farmer	MH
MAIZAZA SUNDAY	-	farmer	
AGUA Zainab		farmer	
FATUMA	—	Hotel Manager	
BATULU	—	"	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Apo Sub-County Kenile trading Centre

Date: 19th-05-2016

	Name	Contact	Designation	Signature
1	ANDRUGA SIRAJI	0783570814 0753400738	ACDO	
2	Koll. K. Moses	0776035244	P/C Kenile	
3	WATUGA ASHIRAF	0775697527	LC1 Chairman	
4	VIGA FENAS	0777023437	"	
5	AJUTE SAFI	0782975244	Tailor	
6	TIBO KALIDI		"	
7	Jumulat omar	0778439642	KENIT	
8	IBARAHIM AZOGA	0777285373		
9	ETIMA RATIB	0792255337 0786698105	LC1 Chairman Anatio Village	
10	BAZE ABAKARI			
11	ONBUGA KHALID			

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Aro Sub County (Yesile Trading Centre

Date: 19th 05 - 2016

Name	Contact	Designation	Signature
GERIGA HABIB			
TUWAHA KARIM	0777622683	DRIVER	
AMPKU	Sulumu		
YAYA YASIN	0775793911	wadada	
ABIRIGA SALIM			
OGANACI ADIZA	0755345630	central	
BUSIRA	0782288125		
BEINA SIRASI	0791304207		
RASHID TOAH	0778665859		
YAHAYA KARIM	0786737778		
IFIKU MADI	0777632899		
ADROLE R	0792795958		

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Apo Sub County Kerile Trading Centre

Date: 19th 05 - 2016

Name	Contact	Designation	Signature
Adruzo Fatima	0787217144		
ICHIKIT ZAINAB			
CHANDIRU AMANA			
OWOKORU IDZA	0787123294		
LIOBIRU AFISA			
MAJOMA ZULEKA			
ASIKO MARITINI	0785792321		
GURUBO MAMBO	0793293123		
MUCHOSOT [illegible]	0777841873		
MAWOKA DAVID	0759781231		
MINGERO Sanje	0778649800		

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Orpotani Village

LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Odupi Sub-County

Date: 18th-05-2016

Name	Contact	Designation	Signature
ALIONI KUKA	—	FARMER	
MATURU R.	—	—	
AMAKO TOM	—	—	
ABEBO G	—	—	
AMIKIS STEPHEN	—	—	
AZAMUKE ROBERT	—	—	
ALIBRIGA BONIFACE	—	—	
ANGUNDU DAVID	0775089349	—	
ESIMANDRE GEOFREY	0779619421	—	
DRICALE JAMES	0779161555	MTN	
BANONA D.	—	former	
Aliimu D.	—	former	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: OMPI SUB-COUNTY

Date: 18/05/2016

Name	Contact	Designation	Signature
EDEMA STANLEY	0786489011	TUTOR	
Ongima Sunday	0784549799	Committee	
Ajoti Godfrey	0793442132	Student	
OCITI GA [illegible]		FARMER	
ANGUYE K. JUMA	0777766284	M.V.T	
ADEBO SAMSON	0781465815	FARMER	
AISHA TOM	—	LC1 C/person	
Jambo F.	—	farmer	
ABIRIGA STEPHEN	—	farmer	
AMIRA GASPER	—	—	
Rose Ojom	—	—	farmer
[illegible]	—	—	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: .....

Date: .....

Name	Contact	Designation	Signature
Adrabo Sabino	0773797976	TC SEC FOR RUBLKIN	
EDEMA	0789159472	KENNEDY	
SANDE	0793792501	JON	
ALIGOZ	0781623830		
IZAMA M	—	Farmer	
Mangua	—	farmer	
Sidu A.	—	—	
Peter Alaga	—	—	
Joseph A.	—	—	
Dram R.	—	—	
AMADIRA	—	—	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Odupi Sub-County

Date: 18th 05-2016

Name	Contact	Designation	Signature
Abiriga ZUBERI	0773622099	H.K	
ADROLE JOSEPH	0788191510	Farm	
BAKOLE ALFRED	0774147831	TA	
BANDUGA	—	—	
ASIIKU HENRY	0789285971	—	
AMIKORI S.	—	—	
ORAMADRI	0794472537	—	
SALIM OROBI	0784659582	—	
Polin Zubeda	—	—	
YOSA ELIZEO	0793658770	—	
Vitoka Amos	0783691698	—	
PARUKU FRED	0781436674	—	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Odupi Sub-County

Date: 18th-05-2016

Name	Contact	Designation	Signature
OJOBILE	0787150910	Sop Keeper	
DRIBE JOHN	0789498862	SOPKeeper	
OLEMA: BOSCO	0777766507	—	
ASIZWI DNBWARO	—	—	
ADIGO PETER	0782665584	Liaidman	
ODAMA MICHEAL	0794330631		
DRIMALE JOHN	0787214980	Student	
DRAPARI SUNDAY	0783783850	Hair Sawing	
AMAGURU PALISER	—	BUSINESS	
ACIDRI WILSON	0793200273	Farmer	
ATATIRU EUNICE		Farmer	
OPIA KUBURA	0782379373	Farmer	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Odupi Sub County

Date: 18th-05-2016

Name	Contact	Designation	Signature
DRAIOU JOHN	0772348152	SAS	
MAWA A. BERNARD	0782346881	Parish Chief	
DRICIRU CENTENARY	0784856766	CDO	
ABIGO ELIAS	0774109579	Tr	
AUGUGA JOHNS	0792707854	Tr	
Tito Gaspar	—	Peasant farmer	
ASIKU JOHN	0793888512	peasant farmer	
AMINI DONYAZIANO	—	peasant farmer	
DRASIKU SIMON	—	Peasant farmer	
ABOLE GEORGE	0784655897	P. Famer	
Kwanira Alice	—	Tea Seller	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Arivuni Sub-County

Date: 17th-05-2015

Name	Contact	Designation	Signature
Agani Grant	0772616458	SAS	
Angazu Jonas	0772968091	Village person	
Obeyo F.	0777081979	Farmer	
Kiyaka y. K.	0782288548	farmer.	
Ajia Stephen	0773992493	production	
NGURU JULIUS	0775010411	SUA	
Onyo. P.	- - -	KUA	
LEKURU DELUM	0781627367	KWA	
MADIRA JOSEPH		SUA	
CANDIA YOANA	0782300261	NUBI	
DRAZA	–	KUA	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Ayivuni Sub-County

Date: 17th-05-2016

Name	Contact	Designation	Signature
Killiam	0783771614		
MAWA LUKE	0791076565	BODA BODA	
OPIA NIKAZIO	0781469907	BODA	
ABIKO Samuel	0772400048	TRADER	
TIDRI VALSON VERO	0772198968	TEACHER	
ANGUYO FELIX		BUSINESS	
ANGUYO ROB	0773493599	BODA	
OTOO YOI	—	BODA	
ACIDRI Dominic	0779670929	BUILDER	
ALICE	0781483741	BODA	ALICE
DRAMAZA	0789391328	BUILDER	
Acidri-Jimmy	0782832407	BUSINESS	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Ayivuni Sub-County

Date: 17th - 05 - 2015

Name	Contact	Designation	Signature
Ewadio Duman	- -	KUA	
Ekuru Deborah	- - -	SUA	
Acia Moses	Secretary T/C 0778073579	Odramacaku T/C	
ONETI JOHN	CHAIRPERSON HEALTH 0772848009	- do -	
Agani Grant	0772616458	SAS	
ENATA NICHOLAS	0776191917	MEMBER	
FENI - EMMANUEL	0791704633/0793623040	LC I chair Kiokiko	
ABRIKO CHRISTOPHER	079380499	LC I Gen Sec K.Kubo	
ABIDRABO CHRISTOPHER	0782-195855	MEMBER	
OTI ARIKANZIKO	0777441470	Kioko-Kubo	
ABRIKO TOM	0782357494	" "	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Ayivuni Sub-County

Date: 17th - 05 - 2016

Name	Contact	Designation	Signature
PANGU · M		~~EN. WORK~~ BOLOKA	Pangu · M
AFAYOA. K		BOLOKA	
NYAKU BOSCO	0774942222	ELECTRICITY	
LOAZINO		BOBABDA	
AMUDRA	0781890644		
DRATIGI SAMUEL	0784664158	Chairman LC1	
ACIDRI YOFASHI	0778286851	BOBABDA	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Arua district local Govt

Date: 17th 05 -2016

Name	Contact	Designation	Signature
UMA CHARLES	0772646184	Deputy CAO	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Adumi sub-County

Date: 17th 05 2016

Name	Contact	Designation	Signature
NZILA MUSA	—	YOUTH	
EZANGU DENIS	0705140995	YOUTH	
OPIA ELERIND	—	YOUTH	
ERISO TOMAS	—	YOUTH	
STEPHEN AMANGU	—	YOUTH	
OPIA JULIAN	—	YOUTH	
BAZILIO PETI	—	Elder	
PETILIO CHARLES	—	Elder	
LEMATIA RONALD	—	Youth	
OMBY GEORGE	0776123415	Youth	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Adjumani Sub-County

Date: 17-05-2016

Name	Contact	Designation	Signature
MIREMBE STELLA	0791587015	TEACHER.	
OBARU SIMMON	0793135467	YOUTH	
Okuonzi Lonzi	—	YOUTH	
Odradri Phillipo	—	YOUTH	
ONZOMA Paulo	—	YOUTH	
ONZIMA JACKSON	0794294216	YOUTH	
ERejo	—	Elida	
Ekodri		Elida	
BATRA Peter	0794151589	Senior Educ Ass.	
madelena	—	Elder	
Nzia Simons	—	YOUTH	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Adumi Sub County

Date: 17th Dec 2016

Name	Contact	Designation	Signature
CANIORU AGNES	—	Youth	
DERU ASINATA	—	Elder	
PIA NZIRU	—	Elder	
AMVIKO PENSATA	—	ASINATA	
OLEPU AGNES	—	OLEPU	
JOYCE INZIKURU	—	house wife	Joyce
ETIGIA ELINA	—	Elder	
BETTY TUSURU	—	elder	
JEMA OSORU	—	house wife	
INZIKURU LUCIA	—	house wife	
NADIKO YEMA	—	house wife	yema

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Adumi Sub-County

Date: 17th-05-2016

Name	Contact	Designation	Signature
Mua Galileo		Catechist	
SANYU MARGARET	0781470865	V/C/PERSONS	
Matua Stephen	0774013292	Parish Chief	
Eguu Mariko	–	Member in Barize	
EZANGU MOSES	–		
ASIASTA GODFREY	0774144119	C/P LCIII	
ANYAMA MUSAMY	0756515268	H/WORKER	
ETOMA JAMES	0787752901	Member	
GEORGE	0792376641		
ADERO.B	–		
PIRIO ISHAC	0792867897	mechanic	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Adumi Sub County

Date: 17th-05-2016

Name	Contact	Designation	Signature
ANGURU MASIAL	0793681170	SECURITY OFFICER	
DEDO MATHIAS	0785089090	SPC PAJULU	
MASEWAT ALEX	0787886632	PARENTS	
Andama Ben	0752-662450	S/ACC	
EZATI STEPHEN	0779700757	L.C I C/MAN	
ONDIA VINCENT	0775193631	Rep. PWD	
ASIA SABINO		FARMER	
ANGUZU JOEL	0786616669	L C I C/m.	
[illegible]	0783912588	FARMER	
Acali Francis	0774735150	P/chairman	
Aramla [illegible]	0782785[illegible]	OPINION LEADER	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Yumbe District Local Government

Date: 18th-05-2016

Name	Contact	Designation	Signature
INJIKURU JUSTINE	0775997418	FOR CAO YUMBE	
KAWAWA SERBEE	0772607368	DNRO/ENVIRONMENTAL INSPECTOR	
Della A.	0782979350	SLMO	
Nantaba Olivia	0752635499	Sociologist	
Olama Isaac	0782831805	Consulting Community	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kuluku Sub-County

Date: 18th-05-2016

Name	Contact	Designation	Signature
[illegible]	—	Lomunga	[illegible]
Lukwago Mansour	0782 710992 0752684004	Lomunga	[illegible]
Dufan Mohamadi	—	Lomunga	[illegible]
Rashid Olega	0752710852	Lomunga	[illegible]
MAWA RAJIB	0779886439	LOMUNGA	[illegible]
AZIGA [illegible]	0772246244	Lomunga Grade	[illegible]
Lebuga Rand	—		[illegible]
Kapere Abdala	0777253953	Lomunga	[illegible]
INGAMLE [illegible]	0777164039	LOMUNGA	[illegible]
Ratum Nasuru	0792797318	Lomunga	[illegible]
ALIBALI BURAMI	0771452134	Lomunga	[illegible]

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kululu Sub-County

Date: 18th-05-2016

Name	Contact	Designation	Signature
EZAMA SIRAJI	0782702865	LC3 c/m Kululu	
AGUKU BADRU ARIASON	0775179066	Lomunga T. Centre	
ODRABI SAFI AL HAJ	0782453881	" "	
CHIRIGA SAMUEL	0776284827	peasant farmer Lomunga T.C.	
OLEMA-IBRAHIM	0786181203	peasant Lomunggu T.C	
HAKIM AHMED	0772796331	" " "	
BAMBUGA AKIBARU	0785570296	Lomunga	
ECHILE JOMA MARIO	0794108896	Lomunga	
ALEMIGA SWABU	0754680323	"	
ZUBER T. ARIA	0782353577	Lomunga	
NASURU ANULE	0788624508	Lomunga	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kuluva Sub-County

Date: 18th 05-2016

Name	Contact	Designation	Signature
MIZAMIL MAUTAL	—	Lomunga	
MUHAMADI SWALI	0794137940	Lomunga	
ABUBAKAR RAB	0781160490	Lomunga	
ABDALA ISMAIL	—	Lomunga	
BHANAREIGA BABUEI	0773268980	Lomunga	
SABIB ALI	—	Lomunga	
YSALAEL ANK	—	Lomunga	
YASEN ANGA	0787755584 0777875584	Lomunga	
Ibrahim	KEOGA 0785579577	Lomunga	
Buzani	murugani	Lomunga 0784415765	
Zafi USN			

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kululu Sub County

Date: 18th - 05 - 2016

Name	Contact	Designation	Signature
AMANI SAFI	/	Ismungo	
ADINANI NURU	0785580968	LOMUNGA	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Koboko District Local Govt

Date: 20th.05-2016

Name	Contact	Designation	Signature
Lewunya Denu	0774179577	CAO	
Ambe George	0772636777	Dist. Council Speaker	
Kenyi Desmond	0782906566	DFO	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: UNRA Moyo Station

Date: 20th 05 2016

Name	Contact	Designation	Signature
BAIREGHAKA BENEDICTO	0772375464 0703057795	Ag. Station Manager	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Moyo District Local Government

Date: 20th-05-2016

Name	Contact	Designation	Signature
Jack Byanhanga	0772516389	DCAO	
Lomeriga George	0772332390	PLANNER	
Vita Betty Leo	0774904460	Vitaland gfia	
Alule Habert	0773217373	DEnvt Officer	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Lejori trading Centre

Date: 20th 05 2016

Name	Contact	Designation	Signature
KUIRO NELSON		MOYO	
Jalke Rahman	0789352602		
MUKASA	—	MOYO	
BUTEEE	—	M	
VUNI MANGUE	—	MOYO	
AYIGA JAMES	0786808263	MOYO	
YAKA RATIB	0775934504	MOYO	
ASIKU TAIRI	0780170457	MOYO	
LEO SAFI	0777270996	MOYO	
Andach Joyce	0771584457	MOYO	
DRADRIGA Mohamed	0782165534	MOYO	
PASULU DEGA	0785526848	MOYO	
AZUGA ALEX INU	0782071657	P/CHIEF	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Lepori Sub-County (Lepori trading Centre)

Date: 20th-05-2016

Name	Contact	Designation	Signature
BAKOKE MANSUR		MOYO	
LILEMA NORBERT		MOYO	
NELSON MANDELA		MOYO	
JOVAN MUWANDA		MOYO	
ALULE JAMES		MOYO	
STEVEN LOBING		MOYO	
ALABU INNO		MOYO	
TIFOGU EMMANUEL		MOYO	
AKANGI RAGUL		"	
SAKI SARAHAN		"	
AZIZ BEGERE	0781172977	"	
GADAFI ISMAIL	0781172765	"	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Lepori Sub-County / Lepori Trading Centre

Date: 20th-05-2016

Name	Contact	Designation	Signature
MAJIDI ABADI	0776937362		
Gule BRAN / Juma	0756309236 ~~0756309236~~	LC II Cellor	
Lamuel Samuel	0773923228	GISO Lepori	
Chandesa			
Albright Ismail	0774216570		
TABAN KASSM	0772985603		
ZUBARI BIGOSSA	0777280425		
TABAN	0777416729		
Alijaber NURU	0782246873		
MOLUNASSE Ali	0738738326		
Dasul Sebbi	0778860075		

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Lefori Sub-County (Lefori trading Centre)

Date: 20th-05-2016

Name	Contact	Designation	Signature
HASSAN WINSIWORI	0771258377	Moyo/Lefori	
MAWADRI	0774788852	MOYO	
NYABRU	0782702819	MOYO	
ARUKI KASIM	0781312825	MOYO	
ONGITA MUZAMIL	?		
AYUB KASIM	0781389178	MOYO	
MATTAD MUZAMIL	0786525918	MOYO	
ALATI MUDASHIR		MOYO	
AYIBU	?	MOYO	
NDUGU Martino		MOYO	
DILIGA ALEX	0777725877	MOYO	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Lefori Sub County Lefori trading centre

Date: 20th-05-2016

Name	Contact	Designation	Signature
EDEMA ZAKARI	LEFORI	MOYO	
TOYA Safi			
OBUA	0774924257		
AJUGA WILLIAM	0777143990	MOJO	
TURAB	0771291074		
AZIKU			
SWABIK			
ABIBU RAMANDAN	0774687567	MOYO	
MALISH SWADIK	0785888601	MOYO	
LAGHU FAUSTO	0789492955	MOYO	
GERIGA GALE BOSCO	0773421662	MOYO	
ANDRUGA JAY	0771982510	MOYO	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Andimia T/C

Date: 17/05/2016

	Name	Contact	Designation	Signature
1	DRICIGA ALEX	0784022176	T/C chairman	
2	ADIGA GODFREY	0777714494	TEACHER	
3	ASEGA DCDLI	0774812856	TEACHER	
4	AMAJURU AMZA	—	NATIVE	
5	Onziga Joel	—	Native	
6	Amati Geofrey			
7	Driaku Sunday	—	Native	
8	DRIGO ALLEN	—	Native	
9	OGAMA S	—	—	OGAMA
10	AMATI G.	—	—	
11	Agbo GODFREY	0773306361	—	
12	OMARIA JOHN	0774188066	TR	
13	AVUA YASIN	—	ELDER	
14	DEBO GIFT		Resident	
15	ABASI JUMA	0774338028	WIKOA	
16	ADEBO JOEL	0772356264	ANAVUE	
12	AMADI NOA		WIKOA	
	OPUTI GODFREY	0780844215		
18	Ongua Jimmy	0789860234	—	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Pajulu Sub county/Onduparaka T/C community.

Date: 17/05/16

Name	Contact	Designation	Signature
Amel. Simmy	0772829894	Sub county chief	
Yusuf Zaidu	0770555665	Community Devpt Officer	
ABINIKU HENRY	0784494618	Gulu Pajulu S/c	
TRIMA ADAM	0794625614	A.S.P/C.I Adelafo	
ECOKU MIKE ALEX	0782789260	LCI ONDUPA	
AMAKO MATIA	0776437445	LCI Ondoraka	
CANDIA BOSCO	0782106239	Community	
DUDUMA ADIRIS		LCI SEC	
OANDIRU ALICE	0752286921	FEMALE COUNCILLOR	
ENZAMA JAMES	0751751244	member	
ENZIRU AGNES	0782574474	Trading centre Secr	
OJANDU MAMANON	0776529206	"	
ABIRIA RICHARD	"	"	
Anguyo Godfrey	0779570972		
AMAKU INNOCENT			
ANDIMA JONATHAN	0772879925		
CHANDIA SAMUEL BAKER	0750981758		

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: LEJU T/C

Date: 18/05/2016

	Name	Contact	Designation	Signature
34.	DRAMADI	JAMES		
35.	ANUA	CIRILO		
36.	ACABO	GRAJIMERO		
37.	AGONDUA S.	0705969809	MARAJU VILLA	
38.	AFEKU DAVID		MARAJU	
39.	ANYAKU PHILLIP	07705377	NGAKIBA	
40.	OKUYU JIMMY		EJAULI	
41.	AJUA ALEX	–	"	
42.	MAJA ROBERT	0787304755	P/FARMER	
43.	OLIMA EDWARD	–	P/FARMER	
44.	DRABE LAZORUS	–	P/F	
45.	TOKO GEORGE	0773879802	PEASANT FARMER	
46.	EZALEA SIMON	0759871223	P/F	
47	AROLIA JOSUA	–	PF	
48	DRAMADRI BAZILIO			
49	EZATI DOMINIC		P. F	
50	EDEMA ROBERT			
51	ATAMA BOSCO KALANGUA	0775473275 / 0794133566		
52	ENZAMA ISAAC		ENIA	
53	JUSIPIN ANGUPARU		HOUSE / WIFE	
54	OJOBILE FERUA JAMES		EJAULI VILLAGE	
55	ABAP [illegible]		[illegible]	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: LRW T/C

Date: 18/5/16

	Name	Contact	Designation	Signature
1	TARAM CHARLES	0772901241	T/C Chairman	
2	EYOTARU MOLLY	0774902826	PARISH COUNCILLOR	
3	AMANYIO BIBILEY	—	OTRENU Member	
4	OLIVA	—	T/C F. ELDER	
5	ONZIRU FIONA	—	Member	
6	ONBIRU ANZILA	—	"	
7	ANDRIKERU BETTY	—	"	
8	OJOBIRU SUZAN	—	Member	
9	ONZIRU REGINA	—	Membe	
10	ANDEMA PETER	—	Member	
11	Nabuly P	0756190872	"	
12	ANDAMA . V		"	
13	ADIGA GEORGE	0784655390 0794655390	Teacher	
14	BEPINO C	—		
15	ADAKU C	—	Farmer	
16	JOMA WILLIAM	—		
17	Nyakuni Collins	—		
18	ADAICU STEPHEN	0784646608	Member	
19	EMILLY AFAYO	0775794777	M/LEFU T/C	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: LESU T/

Date: 18/05/2016

Name	Contact	Designation	Signature
23- EDEKIII MARIAN	0772939692	PARISH	
24- AKUMA KENNEDY	0791309318	PARISH	
25- ASIANO FELBERTAS	—	"	
26- ADOBE GADI	—	"	
27- ARIKU ALFRED	0792653576	Parish	
28- ASIKU ALFRED	—	Otrava	
29- OZAMA SAMUEL	—	"	
30- ANDEMA GEOFREY	0778851622	OTREVU	
31- LINO PHILIP	0788649510	ALIA	
32- OJEKU DAVID	—	ALIA	
33- ANDEMA REMIS		OTREVU	
34- ABIRIGA GABRIEL	—	"	
35 HENRY MUNIGUNIRA	-	"	
36 ASEGA ROBERT		"	
37 ABASE JOKIMI		"	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: LEJU T/C

Date: 19/5/2016

	Name	Contact	Designation	Signature
12-	ADA CHARLE	—	L.C	
13-	OCOOI KENNEDY	0786519209	"	
14-	AZIZI ALI		"	
15	AMAKU GILBERT	-	"	
16	ADRABO [illegible]	0773998959	member	
17	ARUMBARI		"	
18.	ABIRIA JOSEPH	0773299896	Farmer	
19.	ANDROA JOHN	0777893778	Farmer	
20.	DUKULE G.		Farmer	
21.	ABIRIGA	0772905053	FARM	
22.	DRAKU . M.	0775793417	Teacher	
23-	ATUMA.E.	0771645080	LCI C/MAN	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Leju T/C

Date: 18/5/16

Name	Contact	Designation	Signature
ESOYI ANDREW	0791684977	FARMER	
CIKA FRED	0777905067	ELECTRICIAN	
Angiyo Charles	0753396853	Farmer	
BALTI ISMAIL	07745 289	Farmer	
OFUTA JONATHAN	0778262329	"	
Akatkeo Jimmy	—	"	
ALIONI GIFT	—	"	
ASOMA Grant	0793429112	farmer	
ASINO GBRIEL	0779714532	"	
Alionzi Akim	0758033471	P/ chairperson	
MIRIA Samuda	—	farmer	
DRUSILLA Emanuel	0793279[illegible]	"	
Anna Majid	0775424749	Med. Offic	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

1 - Location: Aii-Vu Sub County

2 – Date: 17/05/2016

Name	Contact	Designation	Signature
3. NIKU GEOFREY	0772632814	SAS	
4- Acen Florence	0776978183	CDO	
5- MUSA I. DRA	—	NCC	
6- AMODOU A. M.	0392942067	LCII	
7- AVINIA SAVERIOUS	0784500694	Member	
8- Tamas Acidri	0774806044	Member	
9- EDRENDO PETER	0774588547	TEACHER	
10- ALI Y. Kassim	= =	MEMBER	
11- AMURAN O. KARIM	0781614889	NRM party C/M	
12 OTUKITI EMMANUEL	0780874531	Office Adm.	
13 EZARUKU	ISAAC	M m	
14 ADOMATI JOSEPH	0792626180	Member	
15 EZALE	ISAAC	MEMBER	Efsaac
16 ECIMA	MOSES		
17 TIMAZE	JACOB		
18 ONZIMA	M.m		

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Ali-Vu Subcounty / Owafa T/C

Date: 17/05/16

Name	Contact	Designation	Signature
ABIRIGA Robert	0775050914	ALIA	
NRANGU Juma	0784497903	LC1/ODAGWOBU	
HABIB MUZAMIL	0776692525		
AMOLO MARIA	0773865793	OWAFFA	
Draaku John	—	OWAFFA	Draaku John
Ongimah K. Bundi	—	O. Ojia	
SULIMAN NURU			
ADIG ADAM	0794849022	OWAFFA. D.	
ADIMA FRED	0792501600	WAFFA	
ONYIRIA KHIM	0781184450	Pumerariar	
BAMUKE Robert	0785272915	Ojia-V.	
Adi Abdulai		Owafa Wadi	
AFADRIAYO JAMES	0772915253	Ali-Vu S/C	James

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Katrim S/c / Wandi T/C Community

Date: 18/5/16

Name	Contact	Designation	Signature
Abobo Simon	0782231120	Sub County Chief	
Furua Fanny	0788-754448	Health Worker	
Sotema Santo	0773626172	P/Farmer	
Acila Solomon	0785546822	P/Farmer	
Debo Godfrey	0782613662	Saloon operator	
Ezajobo Bosco	0791266000	Saloon operator	
Fela Godfrey	0793854	P1 farmer	
Adriko			
Lekiano			
Simon		farmer	
Godwin Afiluni	0778425343	P/farmer	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Katrini S/C / Wandi T/C Community

Date: 18/5/16

Name	Contact	Designation	Signature
KALEB I. KAMURE	0782262546	Farmer	
OJAMBU JACOB	0791740001	BODA BODA	
AMAKU JAMAL	0787900311	BODABODA	
AMAII JIMMY	0793040387	BUSSINESS	
APANGU ROBERT	0791929875	GRINDER	
NYAKNI PATRICK	0774252208	BUSSINESS	
ADRAKA JOHN	0783032924	BUSINESS	
TAMA CLIFF	0759978184	Farmer	
JINO CAMILO	—	Farmer	
PARYO	0791801293	—	
ASIMA	JOSEPH		

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kubala T/C

Date: 18/5/16

Name	Contact	Designation	Signature
[illegible] Simon	0781615590	LC1 C/MAN	[illegible]
AIMAGA PASCAL	—	LC1 security	[illegible]
ANZUA APOLLO	0787117350	" Informator	[illegible]
CANDIA NATHAN		"	[illegible]
ATUMA VALENTINE	078151170	LC1 C/MAN	[illegible]
TANDU CLEMEN	0775588221	ELDER	[illegible]
AMAGU O. KUDRA	—	LC I Chman Okaba	[illegible]
VITO PEDRA	0782644358	—	[illegible]
ANIMUA FELIX	—	LC 1 C/MAN	[illegible]
PONZIO O.	—	—	[illegible]
OBIREB'MM	Buldere	LC1	[illegible]
OCITIA CHARLES	FARMER	"	[illegible]

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kubala T/C

Date: 18/5/16

	Name	Contact	Designation	Signature
01	ANGABATI EMMANUEL	0773891592	MEMBER	
02	NASAHA DRASIRU	—	RESIDENT	
03	LINDRA ADRESIRU	—	MEMBER	
04	DRICILE EMMANUEL	—	MEMBER	
05	ABIODU JAMES	—	MEMBER	
06	EZAMA MAGDI	0785561212	MEMBER	
07	SIMON DUSA	"	"	
08	OCACC SIMON	—	student	
09	ABIRIGA MARTIN	—	member	
10	AILOUNI SAM	—	Member	
11	ADROLE NATINI	"	"	
12	ANGUFI BOSCO	0775798070	Student	
13	ALUMA LUKA	"	Member	
14	NAKUNIE GASPEAR	079834—	student	
15	ABOUNA	KALIMORO	"	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kubala T/C

Date: 18/5/16

Name	Contact	Designation	Signature
01 DELIFINA KAYSO	—	MEMBER	DELIFI
02 ONZIRU BETTY	—	MEMBER	ONZIRU
03 HELINA ANDEMA	0771472970	//	Hel
04 MUNSURU DORIS	—	MEMBER	[illegible]
05 LENJA MILKA	—	//	[illegible]
06 ADRABO	—	//	ADRABO
07 ONIANA M BUGA	0785571823	//	ONIANA
08 AVAKO GLORIA	—	//	AVAKO
09. DENISA DEMURU	—	//	[illegible]
09 LEKURU PRISCA	—	//	LEKURU
10 BULERU SUSAN	—	//	Buleru
11 LEKICETO LIBERI	—	—	Likeeto

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: OMUGO T/C

Date: 15/08/2014

Name	Contact	Designation	Signature
ALUMA D	0782844054	NYAKAMIKE	
BAKOLE ALEX		NYAKAMIKE	
AMBILI JOHN		WENDE	AMBILI
ACIDRI MATIAS	0773486109	DRIMVEN	
ACIDRI COLLINS	0752405074	ARIMVENI	
EZAMA DAVID	=	WENDE	
ANGUNDU DAN SAMSON	0774362216	NYAKAMIRE	
YOKKA ROBERT		Angazi	
OJOMA MARK	0788514760	YIDRU	
ASEGA SIMON		Wanda	
ARIKU LEONE	0776707935	Ludiria	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: OMUGO TRADING CENTRE

Date: 18/05/2016

	Name	Contact	Designation	Signature
01	ONDOPU CELINA	"		
02	ALUKIA PATRICK			
	DRICILE MODESTE	0793840026		
	OLORO JAMES	–	OMUGO T/C	
	ALIGA DARIOS	–	– do –	
	TATIGA EMMANUEL	–	– do –	
	ASIKU ASUMAN	–	– do –	
	MATUA ROBERT	–	– do –	
	OBITRE GALIDIN	–	– do –	
	ANGUYO ALBERT	–	– do –	
	MUNDUGA PETER	–	– do –	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Omugo T/C

Date: 18/5/16

Name	Contact	Designation	Signature
AGONDUA ZAKARY	0787613918	ANGAZI-Parish Mani P Village	
OBITI SANTO	0782184265	Wende-Angazi	
TABULE JACKSON	—		
ANDABA FRED	—	"	
AMACI ROBERT	—	"	
TATA NOBERT	—	BORA	
ETRILOARO	—	M B	
Asiku Tom	—	Wende Angazi	
Aziku GABI	—	ANGAZI-P VILLAGE WENDE	
ALEIMGA ROJAS		VILLAGE MLRE	
NYAKUNI ALBERT		" MUTTE	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Omugo S/C

Date: 18/5/16

Name	Contact	Designation	Signature
OJEDRA JOEL	0772359186	SUBCOUNTY CHIEF	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: ~~SWARE~~ Karunga T/C

Date: 19/5/16

Name	Contact	Designation	Signature
GULE ASHRAF	0777030607	youth	
NATUFIA RASHID		"	
BAKOLE MIZAMIL	0778252741	"	
ANGUTO MAHAD	0755449906	"	
ANGUTO ROBERT		"	
ANGOLIGA MAHAZIN		"	
TABAN NISARI		"	
BAKO AMINA	—	ADULD	
AWAKO FIKRA	—	"	
ACHIMARASUL	—	YOUTH	
ZANABU DAWA	—		
TIKO MAKA	—		
AIKO ZUBEDA	—		
ABHINGER MARO.			
JACKLIN ATIBU			
AFISA MANENO			
C.A BAMURU			
MAJIBU KHALID			
BAKOLE AZIBU	0781013658	"	

YOUTH

BIMCO Consult Ltd

ADULD
youth

LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: OKUYO T/C / Arua S/C

Date: 19/05/16

	Name	Contact	Designation	Signature
01	ASMAU D.P	0753625360	Agricultural Tech.	
02	AIKUMAANISURU	0784000047	VHT	
03	ALUMA ABRAHAM			
04	Jimmy ASUMANI	IMOMU	0785519175	
05	ABIRAFU DAUDI	---	V.H.T	
06	ANDAMA REN	0754852626	B. MAN	
07	ORABMAN NICHO	—	TEACHER	
08	ITOGO B. JAMES	—	—	
09	LEMAKO AMIRI ISOSIO	0759669215	CARPITAR	
	META ALORO	-	P/FARMER	
10	TAIRI	-	—	
11	BRUAIN. Mo	0782831963	- -	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: OKUYD T/C / Arma S/C.

Date: 19/5/16

Name	Contact	Designation	Signature
Mini Huseni	ILIDRA		
Hafizu Sabbith			
YASSIR SULAIMAN B.			
MUSA JR	F.		
AYILE MUSA	F		
MUGABI RASUL	F		
ASIKU DALILU	CURDENDAR		
SCISSOR FADR	F		

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kukukuhinga T/C Odravu S/C

Date: 19/5/16

Name	Contact	Designation	Signature
ONDOMARI SAID	0754912553		
SADICA SILIMANI			S.S
VUNI SWADIK	0774599795		
ANGUYO MUMBO	—		
SALIMU ANATO	—		
AYIMANN BRON	—		
DRAMANO SWALI	0753391055		
EJOTRE	—		
HEASE 7	—		
YASIN ABIGA	0772959495		
ACHAMA AMIBI	0779770518		

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Kulikulinga T/C Odramu S/C

Date: 19/5/16

Name	Contact	Designation	Signature
KAWA KASSIM	0777624856 0751584770	LCI C/person	
ORINJIGA FARASI		MEMBER	
PARDIKU ISMAILI	0782670092 0758948985	L.C II V/C	
ASHRAFI ISMA	0788095354		
Adamu makelele	0753474689	Secretary Elder	Makelele
OLIMA MUGAID	0782590531	Resident	
ABIRIGA BASHIR	—		
ASIKU MALIK	—	Student	
ALUMA AKASA	0751636551	P/F	
Adebo Ratibu		P/F	
KALIDI LIKAMBO	— c/o —	youth C/person	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Odravului T/C / Odravu S/C

Date: 19/5/16

Name	Contact	Designation	Signature
Lumago Vincent Chris	0777 550 690 0703 355 390		
Kamila Viko			
Ayikoru Baiga			
Angupara Rejina			
Anize Lekuru			
Lillian Likicho			
Cicilia Angupara			
Analibo Robert	0794 647 050		
ASIKU NATHAN A	0772990932	HT TEACHER	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Odravulu T/C / Odravu S/C

Date: 19/5/16

	Name	Contact	Designation C/M	Signature
1	BAKOLE ALBAN	0758234440	Irakinga Vill	
2	CANDIGA SIMON	0756573662	MEMBER	
3	SILVANO	–	"	
4	ATIGA ALSON	–	MEMBER	
5	ATIKU JOHN	0786695234	member	
6	ASEGA CHARL	0777966585	MEMber	
7	AZADO ONORIO	0751423670	V/LM	
8	NIK	AJGMA	V.A.O	
9	GUMA JIMMY	0773602968	MEMBER	
10	MUNDUGA TOM	0775420015	"	
11	AGONDUA RICHARD	—	KLGI	
12	IJOBILE GASPER	0777912479	KLGI	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Odravu T/C

Date: 19/5/16

Name	Contact	Designation	Signature
1- DRASI IDDI	0756491325	ODRAVU LC3 AP	
2- Okugo Silma	0756790984	ODRAVU	
3 ASUMA ARONE	0750601152	WOLO	
4 ACIDRI SIRAJI	0753922125	ODRAVU	
5 Angaza Rasuli	0703366931	wolo	
6 Morobuga SAFI	0759737364	odravu	
7 CANDIGA SHADIK	20	NAPIA	
8 BARLA ABDULA HAKIM	0775803436	IBABIRI	
9- Juma SADALA	0758676771	BADIMA	
10. Olima Alli	- - -	NAPIA	
11. SAFI KENIGA	0759006091	BARAVU	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: WOLO PARISH, ODRAMA SUB COUNTY, YUMBE DISTRICT.

Date: 19-05-2016

Name	Contact	Designation	Signature
AJOBE DRATE CUXSON	0775288488	BUSNESS	
DRATE TOM SWAIB	0775103380	NIGONGA-V-P. Farmer	
BUGA BRAN	0753927766	P. FARMER	
NOAH RAMANDAN	–	P. FARMER	
ARUNA SANDALA	–	P. FARMER	
IRIMA HASSEN	0775923997	BICYCLE REPEARER	
GULE BRAN	0753476711	L.C.I C/m	
Onekorga Nuhu	0789869070	B-N	
ALIGA MOSES	0750313125	farmer	
OBITI MIZAMILI	0757776049	TAILER	
MTATA	– – – –	Kapea	
DIGDONGO M	0772698922	LC1 chm OTAMEungs	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Nalu Panch – Odrama S/C

Date: 19/6/16

	Name	Contact	Designation	Signature
1	Swaliki	KEMISI	Ukukunga	
2	MALIAMUNGU	0759520011	LUBARA	
3	TABAN SEBI	– – –	UKUKUNGA	
4	DYAPAGAJEB	– – – –	N.A Y/P A	
5	AYUBU	– – – –		
6	ONZI NASUR	0753896763	LC II Chairperson	
7	Swali Juma	– –	Farmer	
8	SALIM, ABDUL	0775736622	AJI VILLAGE	
9	SAlimu	–	I LC. Bedimu	
10	CANBIGA		Farmer	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Wolo Parish – Odravu S/C

Date: 19/5/16

Name	Contact	Designation	Signature
DRABIGA SWALI	—	WOLO/RENA	
AMAKU ISA	—	WOLO/MARING	
BAKO SALIM	—	WOLO/ORUKUNGA	
ALONI.	—	WOLO	
CHANDIRU KASITA	—		
MANZUIDO SAMA	—		
CHANDIRU MAKIA	—	WOLO	
ALIMA NURUSI	—	BUSSINESS	
RAIMA DRAGA	—	FARMER	
RAMULA SALIM	—	FARMER	
DRATE ANIKU NURU	0782632516	TEACHER	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: WOLO Parish

Date: 19/5/16

Name	Contact	Designation	Signature
DEL M MAIMBU	—	MEMBER	
MAFU Ahmad	0755033056	V.H.T.	
Asiku Juma	0789868606	L.C Com.	
ABINO YASSIN	0788232430	V.H.T	
Swai Maiwseli	0778118575	Farmer	
ACIDRI Ahmad	—	Farmer	
MUZE NASURU	—	Farmer	
Gabu Yasini	—	Farmer	
Ayimani Akuo	—	Farmer	
MALIAMUGE	0777626237	Member	
[illegible]	0757156278		

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Wolo Padish

Date: 19/5/16

Name	Contact	Designation	Signature
CANDIGA HAMURADI	0789579942	TEACHER	
KASSIM YUSUF	0771962036	PEASANT	
NAFISH ZULEIKA	0750711350	PEASANT	
OLEMA YASIN	0771836308	Bodaboda/moto	
ODRUGO S. SEBI	0704675192	RTD LAB. Assist	
TOKARA NASIFI	=	TRCher	
MANENO RUKIA	0774711081	BUSSINESS	
ALIONZI ADAM	0774481714	POLICE	
BABU RASHID	0786772466	BUSSINESS man	
AMAKU Sayd	0792376377	OKOIYI	
SAMBA MADSHEN	0774757049	MEMBRE	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Wolo Ramsh - Odrawu S/C

Date: 19/5/16

Name	Contact	Designation	Signature
LOKU RASHID	—	PEASANT FARMER	
ATAMVA ZUBERI	0791363237	STUDENT	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Moyo Trading Centre

Date: 19/5/16

Name	Contact	Designation	Signature
Jagama-Vasco	0751442647	Youth	
OCHITIGA TAIR	0789601151	Youth c/man	
ATOBUGA NURU	0777228357	Elder c/man	
ALUMA RATIRU	0753831511	Youth	
AMAKU YUSUF	0777277672	PWD c/man	
MALARIA ZUBERO	0781123578	LC1 c/man	
CHANDIRU FAIZA	—	F. Youth	
BAKU ZULAIKA	—	"	
MALIKU SWAL	—	"	
NAFISI ZULAIKA	—	"	
ASINA CATEKA	—	"	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: ....TOTO.... PARISH

Date: 19th/5/2016

Name	Contact	Designation	Signature
CHANDIGA RASHULU	0780981820	Secretary for Sec	
ADINAN ELLY	0775044033	Youth V/C/M	
BABU ABAMU HASSAN	0779743215	Elder	
ALU ZAIDA		Elder	
ASIBUK MUDASIR		Youth	
DRANI RASUL	0786178176	Elder	
JOBO KASSIM	0789095061	Youth	
AKASA MUSA		elder	
ISOGA SUAZ		elder	
AIIGA D. BRAN		Youth	
ALUMA JAMES		YOUTH	
TAIC ABIBIRO	0773581693	Youth	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Yoyo Parish

Date: 19/5/16

Name	Contact	Designation	Signature
AZIKURU MANGENO	—	Female Youth	[illegible]
ONJIA FARIDA	—	"	[illegible]

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Arivua S/C | Okubomi (Yumbe)

Date: 19th/05/2016

Name	Contact	Designation	Signature
ONDOGA MIKE	0782772086 0777395985	FARMER / PEASANT	
ALIGO ASHIRAF	0751972945	LCII C/MAN ARUIPGA PARISH	
ALI Buri	0779003768	AWINGO PARISH	
ALI ABIGOSI	0784509034	AWINGA "	
MANIKA ISAMAIL	0776604050 0703366888	FARMER and BUSINESS	
KUZA RAHIM	0775683917 0792082079	- -	
MRAJI ABWERE	0753345168	AWINGA - -	
Amika	=	AWINGA	
ALEMA FREDERICK		DELLO	
Amali MUZAMIL	—	ARUNGA	
AMBATO ADINANI	=	=	
ABDUL RAHIM TAMMA	—	ARUNGA	
OLEKUA RASHID	0784656688	AWINGA	
Amyule L. Mahamadi		Elder	
LICOGA KASSIM		For SAS	
GAGIPORO POGO		BIMCO Consult Ltd	
ANGEDO RATIBU	=		

LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Arima S/C / Okubani T/C or Market

Date: 19/5/16

Name	Contact	Designation	Signature
Mansour Aviolo	0755242313 mansouraviolo56@gmail.com	Business Man	
ALORO MOSES V	0787624219		
ATIKU TAMIMU			
AZIKU IHMEU	0703366886	FARMER	
AKUMA FRED	-		
AZUBA SWALI	0779770435	SECRITARY for Security ARWA S/C	
AWABI WERI	—	P. FARMER	
FETA STEPHEN	0759551874	GISO	
CANDRU MARY	-	FARMER	
NAFISI ZABIB	—	— do —	
OKOVORO RAIMA	—	"	
BAKOLE RATIBU	-	Youth	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: UNRA - Arua

Date: 20/5/16

Name	Contact	Designation	Signature
Opio Simon	0772672026	Inspector of Works	
SPEKE OMARK	0772891937	MECH SUPERVISOR	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Arua District

Date: 10/5/16

Name	Contact	Designation	Signature
ADIRIBO EDISON	0772-567190 adiribo@yahoo.co.uk	DFO/AgDNRO	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: CILIO T/C / Health Centre (Arua)

Date: 20/5/16

Name	Contact	Designation	Signature
DRAKU ANTONY	—	CILIO T.C	
ETIMA LORENZO	—	"	
ALUMA WILLIAM	—	"	
AZITO ALFRED	—	0792402448	
ADRICO DEO	—	"	
DRAPARI ISAAC	—	"	
PASIRU FULLET	—	"	T.S
Drateru Sally	—	"	
DRATELE NIKOLA	—	"	
ABITO CHARLES	0789349653	"	
ACIBI FATUMA	—	"	
OPIMA G	0778306181		Opima G

BIMCO Consult Ltd

LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Cilio T/C (Arua)

Date: 20/5/16

Name	Contact	Designation	Signature
AREMA CYRIL	0781615585	CILIO T-C	
GUMA NIKOLA	–	"	
Anguyo willy	0785560292	"	
Abiniga NICKOLA	0783005870	"	
BATI IBM KHAMIS	0779703286	"	
OKUZEA LAZOLO	–	"	
OHZIMA CHARLES	–	"	
TIPEA SILVANO	–	"	
AIMA LIZIRLE	–	"	
ASEGA BIASO	–	"	
ANARUA AMBROSE	–	"	
AIAMPALU ZABERI	0782685975	"	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: Cilio TC (Arua)

Date: .....

Name	Contact	Designation	Signature
LEMUBU S	[illegible]	Cilio TC	[illegible]
ALITIRU	RAKEL	Cilio TC	Rakeli
ASERU	KEVIN	"	Kevin
ABARU	MAGRATE	"	Magrate
DRIWARU	JANE	"	[illegible]
ALIFERU	KATHERINE	"	[illegible]
ALEZOYO	AMINA	"	[illegible]
CANDIRU	ZUBEDA	"	[illegible]
ADAIGURU	PAMAELA	"	[illegible]

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: KEMI S/C

Date: 20/5/16

Name	Contact	Designation	Signature
APELI SWAL	0755266833	parish chief	
EFIKU ABASI	0752802954	LC I CM IRUNGU	
EZULE SWAN	0789600626	LC I CM AMBALA	
ZAKEMA SHAMA	0786977662	[illegible]	
ANGUPALE MANSA	0773177110	KOBWA VILLAGE	
OKUSIGA MASID	0786153548	ODRUBI	
AKUGA MUSA	0784626416	YAKATA	
AMULE AKASA	0789669985	YAKATA	
ANGUTO JAMAL	—	AKAYA	
MUGAIS GABRIEL	—	XKAYA	
JADA SULAIKA	0783439032	JRKAIA	

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: KEYI S/C

Date: 20/5/16

Name	Contact	Designation	Signature
OYE JAMAL	—	TAPARGO	
BUNI JAMAL	—	AMABALI	
AFIGA MOHAMED	—	AKAYA	
AYIZOLO SIDAS	—	TAPARAGO	
AFICA	0778141145	LEFE	
ABDUL MALIKI A	0773626330	YALATA	
BRAMAN MASION	0778977653	AMBALA	
WAKU TOFLA	0775620067	AKAYA VILLAGE	
JAMAICA ALI	0773626209	AMBALA VILLAGE	
TALI RASHID	0789499867	GOBU	
	0753571601		

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU, ABIRIA) ERT III

Location: ~~Natural Resources Officer Arua District~~ REUBIA TRADING CENTRE

Date: 20/5/2016

Name	Contact	Designation	Signature
BUBU ZAITUN HASSAN	—	Female councillor	B. Zaitun Hassan
OSORU LILLIAN	—	PUPIL	
SITARAYA ZULAIKA	—	"	
DRAJIRU MONICA	—	P: farmer	
TI-AZARU HARIET	—	P. farmer	
Hillary Alidé	—	Peasant	Alidé
Alogoku	0782548555	famer	
ARIKU MOSES	—	P. farmer	
ODAMA	ANDREO		
Alwonzi George	0773508938	Student	
Agutaa Gilbert		Student	

CANDIA FABIANO

BIMCO Consult Ltd

LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: AGURUA T/C Ali-vu Sub-County Terego County.

Date: 20/5/2016

Name	Contact	Designation	Signature
AMAJO FRED	0794259888	Farmer	
JOKUDU KASSIANO			
ABITO CHARLES	0789349653	AGURUA T.C	
AMAYO JOEL			
OTOBILE STEPHEN	0794 -612050		
BRAZILE LAZARUS	0773891523/0794962440	P. Farmer	
Anguparu Ayisha	–	P. F	
YENO SIMMON	–	PUPIL	
ABIDIA DORCAS	0793903831	P. farmer	
Candia Kasim	0774489486	" "	
Mr. DAN Amuda	0787143662	H/ASSISTANT	
ABIMA HENRY			

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LIST OF STAKEHOLDERS ENGAGED DURING THE ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF RURAL ELECTRIFICATION PROJECTS IN WEST NILE (WANDI - YUMBE-MOYO, ONDUPARAKA – ODRAMACAKU - ABIRIA) ERT III.

Location: AGURUA TRADING CENTRE

Date: 20/5/2016

Name	Contact	Designation	Signature
OKUDUA HERIBERT	0781322244	C/MAN LC1	
BAITBUKHEMIS	0779703286	FARMER	
MASUD ABINA		FARMER	
ADANGU F	0775795044	"	
ABDUL NASA	—	"	
TUMA MOHAMMED	0775328883	CARPENTER	
AJUA OBIA PAULO	0780780547	Elder	
EDRAONZI W.	0789713275	RETIRED C/OFFICER	
ADIMA BENARD	0789749649	C/MAN TRADING CENTRE	
AKULE MODESTO		FARMER	
ANDUA JOSEPH	— — —	MACHENIC	

BIMCO Consult Ltd

KEMI S/C

No.
Date.

NAME	CONTACT	TITLE	SIG
TOOTH MOTO	0715058198	student	
ASIA ANYIKA	—	H/W	
BAKO KALISUM	—	"	
IRABO KALISUM	—	"	
Ubosu MARIAMU		"	
BAKO AMIANA	—	"	
Chader AGIJA	—	"	
YUNI ADINAN	0776118148	"	
ALI TURABU H	0756741023		
MODINA OVERU			
CHANDIRU RAHIMA			
FATUMA CHANDIRU			
ALISI ANIMU			
AMARA ODRARU			
EDEMA SWADIRI	"		
SUMA SIRAJI	0784498293		
CHRIGA SWAIBU MUSIIMA			
ADINAN ISMAIL	0778342028		
IJOSIGA RASHID	0777254489		
CHANDIGA SWAIBU	0788214705		
[illegible] R. KASSIM	0773379814		

KEMI S/C

No.
Date.

ATIKU	ALIASI	0782288515
MAGARA	KASIM MOHAMAD	—
ADINANI	RATABU	—
GERIA	RAMMA	0776179627
AYIKU	BETY	—
AYIKU	AYISA	—
Odonga	Alabai	0785736631
AZIKU	JAIRI	0794055195
AGU	ADINANI S	
DRAIS	ABIBO	—
OUDUGA	RASHID	0774802763
UOSIGA	KASIM	—
UGOGA	MATHAMUAU	0785512356
AGONDUA	BAIRU	0776874019
ATIKU	AIRU	—
ADEIZUGA	ALIASIA	
ASUMA	ONAASIRI	
ABAKU	GULE	0786698173
ASIBO	MADI	0778141445
OPITI	SILALI	

KEMI S/C

No.
Date.

Name	- Conduct	TITLE	sign
AIIKU RASULU 0788235122	L.C		
KABURIWAZI ISMAIL 0772788516			
AL HAJ AMIN Elder			
ALI AHMAD Elder 0772051264			
EZATI ZAITUN 0779774518		H/W	
Juma Nasuru	-	-	
Amaku muzamilu 0789620263			
Ijamaru Amiga	- -	HW	
Faidah Zakia	-	H/W	
Aliru Zainabu	-	"	
Zahara Jamali	-	"	
Naima Abakari	-	"	
Naima mustafa	-	"	
Dodo Raima	-	"	
Bako Kubura	-	"	
Jimia Akuru	-	"	
Candiru Asia	-	"	
Abaru Zabibu	-	"	
Drigau Zaitun	-	"	
Olima JAFAR 0773365755		"	
SWAL J MUSA formar			

Date 7/06/20

Consultative meeting
West Nile Rural Electrification Project

1. Peter Kibyo ES/ERA
2. Andrew Aloka EO/ERA
0788586880

Appendix 5: Results for water analysis

NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY - BUGOLOBI.
P.O.BOX 7053 KAMPALA.
E-mail: waterquality@nwsc.co.ug

CERTIFICATE OF ANALYSIS

CLIENT: BIMCO CONSULT LTD
Address: Plot 49 Ntinda road, Kampala
Tel; 0312114891
Email: bimco@bimco.co.ug
Date Sample Received: 21-June-2016

Ref No:LS097/INV/2016/724
Sampled by: Client
Type of container: Glass
Sample Source: River
Date of Report: 29-June-2016

Table of Analytical Results

Parameters	Units	Village: Nabbara River: Kochi District: Yumbe 36N0326505039390 4	National Standards For potable water. (un-treated water)
WS Sample Nr	--	**K3004/2016/C**	
pH	--	**8.9**	**6.5 – 8.5**
Electrical Conductivity (EC)	µS/cm	166.9	**2500**
Total Dissolved Solids (TDS)	mg/L	106.8	**1200**
Total Suspended Solids (TSS)	mg/L	**52**	**0**
Colour: Apparent	PtCo	**808**	**15**
Turbidity	NTU	**99.9**	**10.0**
Alkalinity: total as $CaCO_3$	mg/L	96	**500**
Total Phosphorous (TP)	mg/L	0.44	**Not specified**
Hardness:Total	mg/L	96	**500**
Ammonia-N	mg/L	**1.1**	**1.0**
Chemical Oxygen Demand (COD)	mg/L	20	**Not specified**
Magnesium: as Mg^{2+}	mg/L	12.5	**50**
Flouride: F	mg/L	0.0	**1.5**
Chloride- Cl	mg/L	1	**500**
Calcium: Ca^{2+}	mg/L	17.6	**75**
Iron:Total	mg/L	0.0	**1.0**
Fat, Oil & Grease (FOG)	mg/L	0.24	**Not specified**
Sulphate: SO_4^{2-}	mg/L	57	**200**

Remarks:
The sample showed complying physicochemical characteristics with the exception of pH, TSS, Colour, Turbidity and Ammonia as compared to the National Standards for un-treated potable water.
ANALYSED BY: Muheirwe Robinah.

AUTHORISED BY: .....**MANAGER, Central Laboratory Services**

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

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

NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY - BUGOLOBI.
P.O.BOX 7053 KAMPALA.
E-mail: waterquality@nwsc.co.ug

CERTIFICATE OF ANALYSIS

CLIENT: BIMCO CONSULT LTD
Address: Plot 49 Ntinda road, Kampala
Tel; 0312114691
Email: bimco@bimco.co.ug
Date Sample Received: 21-June-2016

Ref No:LS097/INV/2016/724
Sampled by: Client
Type of container: Glass
Sample Source: River
Date of Report: 29-June-2016

Table of Analytical Results

Parameters	Units	Village: Azapi River: Oru District: Arua 36N0292717036147 2	National Standards for potable water. (un-treated water)
WS Sample Nr	--	**K3093/2016/C**	
pH	--	**9.1**	**6.5 – 8.5**
Electrical Conductivity (EC)	µS/cm	186.4	**2500**
Total Dissolved Solids (TDS)	mg/L	119.3	**1200**
Total Suspended Solids (TSS)	mg/L	**24**	**0**
Colour: Apparent	PtCo	**382**	**15**
Turbidity	NTU	**57**	**10.0**
Alkalinity: total as $CaCO_3$	mg/L	100	**500**
Total Phosphorous (TP)	mg/L	0.4	**Not specified**
Hardness:Total	mg/L	140	**500**
Ammonia-N	mg/L	0.54	**1.0**
Chemical Oxygen Demand (COD)	mg/L	19	**Not specified**
Magnesium: as Mg^{2+}	mg/L	20.2	**50**
Flouride: F	mg/L	0.0	**1.5**
Chloride- Cl	mg/L	2	**500**
Calcium: Ca^{2+}	mg/L	22.4	**75**
Iron:Total	mg/L	0.0	**1.0**
Fat, Oil & Grease (FOG)	mg/L	0.23	**Not specified**
Sulphate: SO_4^{2-}	mg/L	18	**200**

Remarks:
The sample showed complying physicochemical characteristics with the exception of pH, TSS, Colour and Turbidity as compared to the National Standards for un-treated potable water.

ANALYSED BY: Muheirwe Robinah.

AUTHORISED BY: .....**MANAGER, Central Laboratory Services**

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

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

Appendix 6: REA Chance Find Procedures

Chance find procedures will be used as follows:

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

Appendix 7: Proposed Grievance Redress Mechanism

Grievance redress mechanisms provide a way to provide an effective avenue for expressing concerns and achieving remedies for communities, promote a mutually constructive relationship and enhance the achievement of project development objectives. Grievance redress mechanisms are increasingly important for development projects where ongoing risks or adverse impacts are anticipated. They serve as a way to prevent and address community concerns, reduce risk, and assist larger processes that create positive social change. It has been learned from many years of experience that open dialogue and collaborative grievance resolution simply represent good business practice both in managing for social and environmental risk and in furthering project and community development objectives.

Considering the nature and extent of works on the power distribution line, grievances are expected to arise from the following:

- Land requirements for the power line, including locations of poles and transformer sites, access to construction sites and staging areas and material storage areas
- Changes in designs, including power line alignment, and locations of support infrastructure
- Clearance of right of way which may affect crops and trees
- Temporary displacement of road side activities in urban centers, including vendors
- Complaints related to noise, dust, traffic incidents
- Complaints on workers behavior or conduct, specially towards women, youg girls and children
- Disruption of social set up and security
- Disputes on compensation values
- Increased pressure on social services and infrastructure, including water supply

REA GRM structure and composition

REA will establish a Grievance Management Mechanism, with Local Grievance Review Committees (LGRC) at Village, Subcouncty and District Level. The roles of these committees will be mainly to receive grievances and facilitate mediation. REA through a Grievance Officer or the Supervising Consultant will set up the committees, provide the necessary logistics, provide Grievance Forms, coordinate the meetings, as well provide training for the LGRCs.

REA will participate in the Local Grievance Committee at Village level or be represented by the Supervising Consultant, together with LC1 Chairpersons, a representative from Project Affected Persons, Area Land Committee Representative, a Women Representative and an Elder, at Village levels.

At Subcounty Level, the committee will include a Subcountuy Chief, Area Councillor including a Woman Representative, and Area Land Committee Chairperson.

At District Level, the District Lands Officer, Subcounty Chief, Community Development Officer, District Councilllor and Women Representative. The idea is to ensure grievances not resolved at village level are handled at subcounty, and if not resolved, will be addressed at District Level, or by the District Land Tribunal.

Where grievances cannot be resolved at local levels, there is also the opportunity to be handled by top management at REA or MEMD, by the Sector Minister, or by the Electricity Tribunal, before court redress is sought as the final option.

At village level, timely response to grievances should be emphasized, of about 1 week, and 2 weeks for the subcounty and district GMC one month.

Procedure and timelines for grievance handling

Grievances will be received by the LC1 Office and recorded in a grievance log book. REA will ensure adequate copies of the Grievance registration formsare available at the village level, preferably at the LC1 office. The grievances will then be screened, validated and compiled by the Supervising Consultant or REA for review by the GMC. The GMC will acknowledge receipt of the grievances by communicating to the PAPs. The grievances will be assessed and resolutions agreed upon communicated to the PAPs. The PAPs will be invited to discuss the GMC position and proposed actions. Progress in implementation of agreed actions will monitored by the GMC reported by REA to the GMC.

i. The LGRC will interrogate the PAP in the local language and complete a Grievance Form which will be signed by the leader of the LGRC and the PAP/complainant. This will then be lodged in the Grievance Log/Register provided by the Grievance Officer Response will be provided to the PAP from the LGRC within seven days of filing the complaint. If the issue is not resolved, the LGRC will forward the complaint to the GRC at the Sub County;

ii. The GRC at the Sub County will be given a fourteen day notice to hold a meeting. Two days after the meeting, the Sub County GRC will call the PAP and LGRC for discussions and resolution. The resolution will be presented to the PAP in written form within the same day of the meeting. If there is no resolution to the grievance, the GRC at the Sub County and the PAP shall then refer the matter to the GRC at the District;

iii. The GRC at the District will be given a fourteen day notice to hold a meeting. Two days after the meeting, the GRC will call the PAP and LGRC for discussions and resolution. The resolution will be presented to the PAP in written form within the same day of the meeting;

iv. If there is no resolution to the grievance, the GRC at the district and the PAP shall then refer the matter to the District Land Tribunal for land-related issues and to REA /Implementing agency head office for all other grievances;

v. Appeal to Court - The Ugandan laws allow any aggrieved person the right to access to Court of law. If the complainant still remains dissatisfied with the District Land Tribunal or MEMD/PCU, REA/implementing agency top management in Kampala, the complainant has the option to pursue appropriate recourse via judicial process in Uganda. Courts of law will be a last resort option, in view of the above mechanism.

Table 1: Grievance handling procedure

Steps	Process	Description	Time frame
1	Grievance received	Face to face; phone; letter, e-mail; recorded during public/community interaction;	1 Day
2	Screen and validate	Authenticity, significance assessed and grievance recorded or logged (i.e. in a log book)	3 days
3	Grievance acknowledged	Acknowledgement of grievance through appropriate medium	1 – 7 Days
4	Development of response and resolution	• Grievance assigned to appropriate party for resolution • Approach selected, consultations with affected person and local leaders • Response developed	7 – 14 days
5	Implement approach	Redress action approved at appropriate levels; Response signed off	7 – 14 days
6	Implementation and communication of response	Redress action implemented and update of progress on resolution communicated to complainant	7 -14 Days
7	Complaints Response and follow up	Redress action recorded in grievance log book; Confirm with complainant that grievance can be closed or determine what follow up is necessary Track and evaluate results of	7 - 14 Days
8	Close grievance	Record final sign off of grievance; If grievance cannot be closed, return to step 2 or refer to Top Management at REA or sector minister or recommend third-	7 Days to one month

Steps	Process	Description	Time frame
		party arbitration or resort to court of law	

Capacity building

Local leaders and the GMC in general will be trained or oriented in grievance management. The field-level staff of implementing agencies and Contractors will be provided with adequate information on the project such as project design, activities, implementing schedules, and institutional arrangements as well as enhanced skills in effective communication, understanding community dynamics and processes, negotiation and conflict resolution, and empathizing with communities and their needs.

Building trust and maintaining good rapport with the communities by providing relevant information on the project and responding effectively to the needs and concerns of the community members will help solve issues before they even become grievances. It is also important that field-level staff and Contractors provide regular feedback on their interactions with the communities to implementing agencies, and PCU. The Project Management will ensure that copies of the standard grievance registration forms are available to members of the GRC and are kept in sufficient numbers at the respective levels. This should enable local communities to access the forms easily. It is important to note that the capacity building will incorporate gender aspects.

Stakeholder engagement

REA will proactively engage the PAPs through its Stakeholder and Public Disclosure Plan, keeping the communities informed of developments on the project, including planned activities, project impacts and mitigation measures, and about the LGMC and its functioning. Capacity of field staff, including Community Liason Officers will be built, to ensure they can inform and engage the communities, resolve conflicts and address their needs.

Reporting

There will be periodic reporting of progress with GRM implementation on a weekly and monthly basis, and reports shared with District Authorities and Project Financiers. Each complaint and grievance should be ranked, analyzed and monitored according to type, accessibility and degree of priority. The status of grievances submitted and grievance redress will be reported through the monthly report.

Appendix 8: Table with Load Centers and Potential connections

Load Center	Administration Center	House Hold	Shops	Bars & Restaurant	Maize Mill	Water Pumps	Masts	Welding	Schools	Church	HC	Micro Institution	Markets
Ogenda Girls High School	0	25	8	0	0	0	0	0	1	1	0	0	0
Pakia	0	32	3	0	0	0	0	0	1	2	0	0	1
Pokwero	0	46	28	2	3	0	0	2	2	2	1	1	1
Fualwonga	0	45	8	1	1	0	0	0	0	0	1	0	0
Onthowol	0	42	10	1	1	0	0	0	1	0	0	0	0
Kuchwiny	1	84	32	8	4	0	0	2	2	2	1	0	0
Awadiri	0	38	24	1	3	0	0	0	0	0	0	0	0
Ocelo	0	39	28	1	2	0	0	0	1	1	0	0	0
Akango	0	67	42	0	1	0	0	0	1	1	0	0	0
Mamba Tc	0	78	42	8	2	0	0	0	1	1	0	0	0
Mamba Village	0	56	34	2	1	0	0	0	0	0	1	0	0
Jacan Pri Sch	0	4	2	0	0	0	0	0	1	0	0	0	0
Lobodego	0	15	12	1	1	0	0	0	0	0	0	0	0
Ajibu	0	18	4	3	4	0	0	1	1	1	1	1	1
Regem	1	12	10	2	3	0	0	0	1	1	1	0	0
Paten	0	36	31	0	1	0	0	0	1	1	1	0	0
Uganda Prison Farm	0	12	4	0	0	0	0	0	1	1	0	0	0

Load Center	Administration Center	House Hold	Shops	Bars & Restaurant	Maize Mill	Water Pumps	Masts	Welding	Schools	Church	HC	Micro Institution	Markets
Wedalai	1	23	37	2	1	1	0	1	1	1	0	0	0
Pacola HC	0	48	26	2	2	0	0	0	1	1	1	0	0
Padei	0	36	14	3	5	0	0	3	2	1	0	1	1
Olyevu	1	18	8	2	2	0	0	0	1	1	1	0	0
Pawor	0	54	46	1	2	0	0	0	0	1	0	0	0
Inde technical Institute	0	26	8	2	3	0	0	0	2	1	1	0	0
Payawo	0	15	11	1	2	0	0	1	1	1	0	0	0
Okuban	0	28	14	5	3	0	0	0	1	1	1	1	0
Rhino camp SSS	1	12	6	0	1	0	0	0	2	1	0	0	0
Rhino Camp Ginnery	0	32	15	1	1	0	0	0	1	1	0	0	0
Rhino camp TC	0	84	83	12	5	0	0	4	1	2	1	1	1
Marize	0	24	15	0	1	0	0	0	1	0	0	0	0
Bandili	0	42	39	2	2	0	0	0	1	1	0	0	0
UNHCR (Rhino Camp)	0	36	17	2	1	0	0	0	1	1	1	0	0
Ocia HC	0	28	56	1	2	0	0	1	2	1	1	0	0
Siripi	1	15	12	3	4	0	0	2	1	1	1	0	1
Mailo Kumi	0	12	8	2	3	0	0	1	2	1	0	0	0
Gbulukuatun HC	0	26	10	1	1	0	0	0	2	1	1	0	0

Load Center	Administration Center	House Hold	Shops	Bars & Restaurant	Maize Mill	Water Pumps	Masts	Welding	Schools	Church	HC	Micro Institution	Markets
Drabi	0	36	16	8	5	0	0	4	4	2	0	0	1
Nicu HC-2	0	45	18	5	3	0	0	2	0	1	1	0	0
Ipa	0	38	12	2	1	0	0	0	2	0	0	0	0
Bileafe	1	45	35	2	2	0	0	0	2	8	1	1	1
Riki HC		52	28	2	3	0	0	0	1	1	1	0	0
Ocodiri Cath. Parish	0	35	26	3	4	0	0	1	0	2	1	0	1
Lilia	0	24	14	3	4	0	0	0	1	4	1	0	1
Yole	0	68	53	1	8	1	0	4	2	4	1	1	1
Vvu Village	0	14	6	15	2	0	0	0	2	2	0	0	0
Kati water Pump	0	12	1	2	0	1	0	1	2	3	1	1	1
Baribu	1	49	33	2	4	0	0	0	1	1	1	0	0
Akino HC	0	16	9	2	0	0	0	0	1	1	1	0	0
Pacero	1	46	35	0	1	0	0	0	0	1	0	0	0
Ndewu	1	28	23	2	0	0	0	0	0	1	1	0	0
Pamaka	1	46	31	0	0	0	0	0	0	1	1	0	0
Erussi TC	0	108	121	4	2	1	1	2	2	2	1	0	1
Erussi Water Pump	0	15	43	1	1	0	0	0	0	0	0	0	0
Erussi S/county	1	23	3	0	0	0	0	0	0	0	0	1	1
Ogoko s/county	1	26	20	2	4	0	0	1	2	1	1	1	1
Ayavu	0	48	29	1	1	0	0	0	1	1	0	0	0

Load Center	Administration Center	House Hold	Shops	Bars & Restaurant	Maize Mill	Water Pumps	Masts	Welding	Schools	Church	HC	Micro Institution	Markets
Ogoko SSS	0	12	0	0	0	0	0	0	1	1	0	0	0
Olevu	1	48	29	0	0	0	0	0	2	1	0	0	0
Ajia	0	45	63	3	7	1	0	4	2	1	0	0	1
Ariwa	0	23	16	3	5	1	1	6	4	3	1	1	1
Meridian Tobbaco Industry	0	0	1	0	0	0	0	0	2	2	0	0	0
Ewaa	0	36	28	2	2	0	0	0	0	2	0	0	0
Wandi TC	0	36	25	2	3	0	0	0	2	3	0	0	0
Wandi HC	0	15	0	0	2	0	0	0	1	1	1	0	0
Andinio	0	23	20	2	4	0	0	1	2	2	1	1	0
Ogua HC	0	8	2	2	2	0	0	0	2	2	1	0	0
Ogua (Hon. Kasiano Wadri)	0	6	2	1	0	0	0	0	1	1	0	0	0
Owaffa	1	38	36	2	1	0	0	0	1	1	1	1	1
Itia	0	32	20	6	3	0	0	0	2	3	1	1	1
Cilio	0	35	14	2	1	0	0	0	0	1	1	0	0
Agurwa	0	22	15	2	5	0	0	2	3	2	0	1	1
Aripea	0	36	30	1	1	0	0		0	1	0	0	0
Ogoloko	0	38	27	4	7	0	0	3	2	4	1	1	1
Ogofia HC	0	64	35	2	4	0	0	1	2	2	1	0	0
Leju	0	35	29	0	0	0	0	0	0	0	0	0	0
Ozobi	0	26	16	2	1	1	0	0	2	2	1	0	0

Load Center	Administration Center	House Hold	Shops	Bars & Restaurant	Maize Mill	Water Pumps	Masts	Welding	Schools	Church	HC	Micro Institution	Markets
Addu	0	32	13	2	1	0	0	0	0	1	0	0	0
Tondolo	0	20	12	2	3	0	0	1	2	2	0	0	0
Welife TC	1	38	21	4	2	0	0	2	1	1	1	1	1
Welife Village	0	42	8	15	23	0	0	8	4	3	0	2	1
Omugo water Pump	0	14	1	0	0	1	0	0	2	1	1	0	0
Akipako	0	36	18	17	12	0	0	15	3	5	1	4	1
Omugo	1	54	51	0	2	0	0	0	2	2	1	1	1
Omugo Tech. School	0	45	15	0	1	0	0	0	1	1	0	0	0
Kubalo	0	45	54	4	4	1	0	2	1	1	0	0	1
Santori High Sch	0	14	0	2	2	0	0	0	2	1	0	0	0
Mt. Wati SSS	0	12	2	3	3	0	0	1	1	1	0	0	0
Oboji	0	15	8	0	0	0	0	0	1	1	0	0	0
Duku Village	0	48	2	2	4	0	0	0	0	0	0	0	0
Otumbani	0	64	43	27	14	1	1	15	3	2	0	3	2
Otumbani Sisiters Convent	0	26		3	2	0	0	0	2	2	1	0	0
Odupi HC	0	54	28	7	5	1	0	3	3	3	1	0	0
Okpatani	0	86	64	0	0	0	0	0	1	1	1	0	0
Dera	0	24	15	4	2	0	0	0	2	1	0	0	0
Odravu	1	150	49	2	2	0	0	1	1	1	1	1	1

Load Center	Administration Center	House Hold	Shops	Bars & Restaurant	Maize Mill	Water Pumps	Masts	Welding	Schools	Church	HC	Micro Institution	Markets
Odravu SSS	0	16		4	4	0	0	2	1	1	0	0	0
Ambelechu HC	1	26	21	0	0	0	0	0	1	1	0	0	0
Nyoko	0	34	3	2	1	0	0	0	1	1	0	0	0
Kulikulinga	1	83	56	2	2	0	0	1	1	1	0	1	1
Okuyo	0	32	23	4	4	0	0	0	1	1	0	0	0
Ikafe Police Training Sch	1	12	6	15	12	1	0	8	4	3	1	1	1
Ariwa	1	33	22	5	2	0	0	0	2	8	1	1	1
Okubani	1	54	34	2	2	0	0	0	0	2	0	0	0
Wolo Tc	0	28	31	2	3	0	0	0	0	0	0	0	0
Anubeni	0	46	24	3	4	0	0	1	0	2	1	0	1
Kululu P/sch	0	15	2	3	4	0	0	0	1	4	0	0	1
Yoyo HC	0	12	8	1	1	0	0	0	1	0	1	0	0
Lomunga	1	34	29	15	8	1	0	4	2	4	1	1	1
Gilla	0	28	26	2	2	0	0	0	2	2	0	0	0
Govule Islamic Inst.	0	15	6	2	4	0	0	1	2	3	0	0	0
Apo Army Boarding Sch.	o	12	0	2	4	0	0	0	1	1	1	0	0
Barakala Village	0	36	4	0	0	0	0	0	1	1	0	0	0
Barakala TC	0	26	29	2	1	0	0	0	0	1	1	0	0
Aringa Sch	0	45	26	0	0	0	0	0	0	1	1	1	1

Load Center	Administration Center	House Hold	Shops	Bars & Restaurant	Maize Mill	Water Pumps	Masts	Welding	Schools	Church	HC	Micro Institution	Markets
of tech													
Munu University Site	0	3	0	4	2	0	1	2	1	1	0	0	1
Locongo	1	26	21	1	1	0	0	0	0	0	0	0	0
Kerila	0	54	34	0	0	0	0	0	0	0	1	0	0
Limidia	0	23	20	2	4	0	0	1	2	1	0	0	0
Achilaka	1	24	11	1	1	0	0	0	1	1	0	0	0
Midigo Water Pump	0	0	1	0	0	1	0	0	1	1	0	0	0
Midigo-1	0	15	12	0	0	0	0	0	2	1	0	0	0
Midigo-2	1	49	66	3	7	1	0	4	2	1	1	1	1
Oyakwa	0	8	9	3	5	1	1	6	4	3	0	0	0
Lobe Tobbaco Fact	0	15	17	0	0	0	0	0	2	2	0	0	0
Kei HC/Lodo TC	0	40	38	2	2	0	0	0	0	2	1	0	0
Lobe TC	1	38	39	2	3	0	0	0	2	3	0	1	1
Lima TC	0	25	27	0	2	0	0	0	1	1	1	0	0
Lima SSS	0	12	2	2	4	0	0	1	2	2	1	0	0
Ochepago	0	13	16	2	2	0	0	0	2	2	0	0	0
Ludara	1	36	24	1	0	0	0	0	1	1	1	1	1
Umbechi	0	54	35	2	1	0	0	0	1	1	1	0	1

Load Center	Administration Center	House Hold	Shops	Bars & Restaurant	Maize Mill	Water Pumps	Masts	Welding	Schools	Church	HC	Micro Institution	Markets
Manibe	0	23	7	6	3	0	0	0	1	3	1	1	1
Romogi SS	0	12	0	2	1	0	0	0	2	1	1	0	0
Kochi	1	48	35	2	5	0	0	2	3	2	0	1	1
Gobolo HC	0	37	23	1	1	0	0		0	1	0	0	0
Aliodronyisi	0	45	29	4	7	0	0	3	2	4	1	1	1
Amaguru HC	0	12	2	2	4	0	0	1	2	2	1	0	0
Gwere	0	24	6	0	0	0	0	0	0	0	0	0	0
Lofori TC	1	58	52	2	1	0	0	0	2	2	1	1	1
Lofori Water Pump	0	0	1	2	1	1	0	0	0	1	0	0	0
Munu HC	0	8	2	2	3	0	0	1	1	1	1	0	0
Soke HC	0	15	4	4	2	0	0	2	1	1	1	1	1
Masoloa	0	25	21	15	23	0	0	8	4	3	0	2	1
Eria Village	0	32	15	0	0	0	0	0	2	1	1	0	0
Onduparaka-1	0	98	115	17	12	0	0	15	3	5	1	4	1
Onduparaka-2	0	100	200	0	2	0	0	0	2	2	1	0	0
Oria	0	46	34	0	1	0	0	0	1	1	0	0	0
Adumi HC	1	24	17	4	4	0	0	2	1	1	1	1	1
NyauNyau Village	0	42	33	2	2	0	0	0	2	1	0	0	0
Apaka	0	38	28	3	3	0	0	1	1	1	0	0	0
Pajulu	1	36	12	3	2	0	0	2	1	1	1	1	1

Load Center	Administration Center	House Hold	Shops	Bars & Restaurant	Maize Mill	Water Pumps	Masts	Welding	Schools	Church	HC	Micro Institution	Markets
S/county													
Andelizu	0	54	43	2	3	0	0	2	3	2	0	0	0
Alipenzu p/sch.	0	26	2	1	1	0	0	0	1	1	0	0	0
Endru	0	24	9	2	0	0	0	0	0	1	0	0	0
Adumi Cath. Parish	0	36	14	5	2	0	0	0	2	1	1	0	0
Lia	0	109	155	10	6	0	0	8	2	4	1	3	1
Ayivuni HC	0	23	6	1	0	0	0	0	1	1	1	0	0
TOTAL	**33**	**5396**	**1587**	**442**	**424**	**17**	**5**	**45**	**209**	**237**	**77**	**52**	**51**