



BURNSIDE

Uganda Electricity Transmission Company Limited

Bujagali Interconnection Project Social and Environmental Assessment Main Report

Prepared by

R.J. Burnside International Limited
292 Speedvale Avenue West, Unit 7 Guelph ON N1H 1C4 Canada

In association with

Dillon Consulting Limited, Canada
Ecological Writings #1, Inc., Canada
Enviro and Industrial Consult (U) Ltd., Uganda
Frederic Giovannetti, Consultant, France
Tonkin & Taylor International Ltd., New Zealand

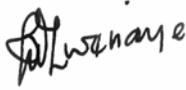
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Uganda Electricity Transmission Company Limited

Bujagali Interconnection Project
Social and Environmental Assessment – Main Report
December, 2006



Dr. Patrick Mwesigye
Certified Environmental Practitioner
Certificate No. CC / EIA / 034 / 06
In Country SEA Team Leader
Enviro and Industrial Consult (U) Ltd., Uganda



Mr. Robert Turland
Certified Foreign Environmental Practitioner
Certificate No. CC / F002 / 06
SEA Project Manager
Dillon Consulting Limited, Canada



Dr. Brett Ogilvie
Certified Foreign Environmental Practitioner
Certificate No. CC / F003 / 06
SEA Specialist / Natural Resources Team Leader
Tonkin & Taylor International Ltd., New Zealand



Mr. Frederic D. Giovannetti
Certified Foreign Environmental Practitioner
Certificate No. CC / F001 / 06
Socio-Economic Team Leader and Resettlement Specialist
Frederic Giovannetti, Consultant, France

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Glossary

| | |
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| µg | Microgram |
| µS | Micro Siemens |
| AC | Asphaltic concrete |
| AESNP | AES Nile Power |
| AfDB | African Development Bank |
| AMSL | Above Mean Sea Level |
| ASTM | American Standard for Testing of Materials |
| BDSP | Bujagali Dam Safety Panel |
| BEL | Bujagali Energy Limited |
| CBO | Community Based Organisation |
| CDAP | Community Development Action Plan |
| CDO | Community Development Officer |
| CFR | Central Forest Reserve |
| CIO | Community Information Officer |
| CMO | Change Management Objectives |
| CPMP | Cultural Property Management Plan |
| D/s | Downstream |
| DAO | District Agricultural Officer |
| dBLAeq | Energy Equivalent Sound Level in Decibels, A-weighted |
| DCS | Distributed Control System |
| DEG | Deutsche Investitions und Entwicklungsgesellschaft mbH |
| DEO | District Environmental Officer |
| DFID | Department for International |
| DHO | District Health Officer |
| DLB | District Land Board |
| DMU | Dispensary and Maternity Unit |
| DWD | Directorate of Water Development |
| EA | Environmental Assessment |
| EAP | Environmental Action Plan |
| EH&S | Environmental, Health and Safety |
| EIB | European Investment Bank |
| EIA | Environmental Impact Assessment |
| EIS | Environmental Impact Statement |
| EMMP | Environmental Mitigation and Monitoring Plan |
| EPC | Engineer, Procure, Construct |
| EPFI | Equator Principle Financial Institution |
| ERA | Electricity Regulatory Authority |
| ERP | Environmental Review Panel |
| EU | European Union |
| FAO | Food and Agriculture Organisation (of United Nations) |
| FD | Forest Department |

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| FIRRI | Fisheries Resources Research Institute (formerly known as Fisheries Research Institute) |
| FSL | Full Supply Level |
| GDP | Gross Domestic Product |
| GoU | Government of Uganda |
| GWh | GigaWatt hours |
| H&SMP | Health and Safety Management Plan |
| HEP | Hydro-Electric Power Department |
| HPP | Hydropower Project |
| HVAC | Heating, Ventilation and Air Conditioning |
| IA | Impact Assessment |
| IBRD | International Bank of Reconstruction and Development |
| ICSID | International Centre for Settlement of Investment Disputes). |
| IDA | International Development Association |
| IFC | International Finance Corporation |
| IP | Interconnection Project |
| IUCN | International Union for the Conservation of Nature |
| JITDA | Jinja Tourism Development Association |
| LAC | Limits of Acceptable Change |
| LC | Local Council (ranging from RDC Resident District Commissioner LC1 [village] to LC5 [district]) |
| LFMP | Labour Force Management Plan |
| LFRP | Local Forest Reserve Project |
| LV | Low Voltage |
| LVFO | Lake Victoria Fisheries Organisation |
| m above MSL | Metres Above Mean Sea Level |
| MDE | Maximum Design Earthquake |
| MFI | Multilateral Financial Institution |
| MFL | Maximum Flood Level |
| MFNP | Murchison Falls National Park |
| MIGA | Multilateral Investment Guarantee Agency |
| MoH | Ministry of Health |
| MOL | Minimum Operating Level Environmental Mitigation Plan |
| MRF | Minimum Residual Flow |
| MTWA | Ministry of Tourism, Wildlife and Antiquities |
| MUIENR | Makerere University Institute of Environment and Natural Resources |
| MW | Megawatt |
| NAFIRRI | National Fisheries Resources Research Institute |
| NARO | National Agriculture Research Organisation |
| NEA | National Environment Act |
| NEMA | National Environment Management Authority |
| NFA | National Forestry Authority |
| NGO | Non-Governmental Organisation |

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| NRE | Nile River Explorers Ltd. |
| NTU | Nephelometric Turbidity Units |
| NWSC | National Water and Sewerage Corporation |
| ODs | Operational Directives |
| OECD | Organisation for Economic Co-operation and Development |
| OPD | Out-Patient Department |
| OPs | Operational Policies |
| OPSD | Operational Private Sector |
| PAP | Project-Affected Person |
| PCDP | Public Consultation and Disclosure Plan |
| PM10 | Dust with an aerodynamic diameter of less than 10 microns (μm) |
| PoE | Panel of Experts |
| PPA | Power Purchase Agreement |
| PPAH | Pollution Prevention and Abatement Handbook |
| PPB | parts per billion |
| PPE | Personal Protective Equipment |
| PPS | Policy and Performance Standards |
| PSCP | Pollutant Spill Contingency Plan |
| PSOC | Private Sector Operation Committee |
| Q | Water flow in m ³ /sec |
| RAP | Resettlement Action Plan |
| RCDAP | Resettlement and Community Development Action Plan |
| REA | Rural Electrification Authority |
| RUWASA | Rural Water and Sanitation |
| SEA | Social and Environmental Assessment |
| SEAP | Social and Environmental Action Plan |
| SEO | Site Environmental Officer |
| SERP | Social and Environmental Review Panel |
| SOP | Setting-out Point Development (UK) |
| SR | Social Responsibility |
| STD | Sexually-transmitted disease |
| TASO | The Aide Support Organisation |
| TCU | True Colour Unit |
| TMP | Traffic Management Plan |
| ToRs | Terms of Reference |
| TSC | Timed Species Count |
| TSS | Total Suspended Solids |
| UEB | Uganda Electricity Board |
| UEGCL | Ugandan Electricity Generation Company Limited |
| UEMoP | UEB Transmission System Environmental Monitoring Plan |
| UEMP | UEB Transmission System |
| UETCL | Uganda Electricity Transmission Company Limited |
| UIA | Uganda Investment Authority |
| ULC | Ugandan Land Commission |

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| UMA | Uganda Manufacturers Association |
| UNBS | Uganda National Bureau of Standards |
| UNCCI | Uganda National Chamber of Commerce and Industry |
| UGX | Ugandan Shillings |
| UTB | Uganda Tourism Board |
| UWA | Uganda Wildlife Authority |
| VCU | Vector Control Unit |
| WB | World Bank |
| WCD | World Commission on Dams |
| WMP | Waste Management Plan |
| WRAP | Water Resources Assessment Programme |
| WWR | White water rafting |

1.0 Introduction

1.1 Project History

The Bujagali Interconnection Project (hereinafter “Project” or “IP”) involves the proposed construction and operation of the high voltage electrical transmission infrastructure needed to interconnect the proposed Bujagali Hydropower Project (HPP) to the national electrical grid. The proposed infrastructure, the general locations of which are shown on Figure 1.1, includes:

- A 75 km, 220 kV double circuit steel tower initially to be operated at 132 kV transmission line to convey power generated at the HPP to a new 132 kV substation to be located in Kawanda, on the outskirts of Kampala;
- A 17 km, 132 kV double circuit steel tower transmission line to connect the Kawanda substation to the existing Mutundwe substation located in the southwest section of Kampala, where some minor upgrades will be needed to accept the new line; and,
- Two 5 km, 132 kV double circuit steel tower transmission lines to establish interconnections between the HPP and the Tororo substation in eastern Uganda and the Nalubaale substation in Jinja.

The Bujagali HPP is a proposed 250 MW hydropower plant on the Victoria Nile near Jinja, in the Republic of Uganda. It is located at Dumbbell Island, approximately 8 km downstream and north of the existing Nalubaale and Kiira hydroelectric plants that are located at the outlet of Lake Victoria, as shown on Figure 1.1. The Project sponsor of the HPP is Bujagali Energy Limited (BEL), a project-specific partnership of SG Bujagali Holdings Ltd. (a wholly owned affiliate of Sithe Global Power, LLC) and IPS Limited (Kenya).

Development of the HPP and IP as a single integrated project was first initiated by AES Nile Power Ltd., (AESNP) in the late 1990’s. Among other things, AESNP prepared Social and Environmental Assessment (SEA) documentation that was approved by the Government of Uganda’s National Environmental Management Authority (NEMA) in 1999/2001 and by the World Bank, IFC and African Development Bank Boards in December 2001.

In 2003 AESNP withdrew from the Project, leading the Government of Uganda (GoU) to initiate an international competitive bidding process for the HPP aspects of the project. BEL was selected as the preferred bidder and entered into a power purchase agreement and an implementation agreement with the GoU. The IP component of the project was retained by the GoU, with UETCL identified as the implementing agency. UETCL has involved BEL to assist with development of the SEA for the IP.

The lenders' Board approvals and the permits issued by NEMA for AESNP's project are no longer valid. Thus, UETCL was required to prepare and submit for approvals new SEA documentation. This report constitutes the required SEA documentation. It has been prepared to address the requirements of NEMA and the African Development Bank (AfDB), which at the time of writing was the principle multilateral financial institution involved in the financing of the Project. The SEA also addresses World Bank Group requirements, in recognition that the Project is closely associated with the HPP, which is being financed by AfDB as well members of the World Bank Group and other financial institutions.

These regulators and potential lenders each have their own nomenclature for SEA documentation, including "Environmental Impact Assessment", "Environmental Impact Statement" "Environmental and Social Impact Assessment", and "Social and Environmental Assessment". For the purposes of this project, and for consistency with the HPP, the term Social and Environmental Assessment, or SEA, is considered to be synonymous with the different terms used by NEMA and the various potential lenders.

The preparation of this SEA has been based broadly on the guidance provided in "A Common Framework for Environmental Assessment – A Good Practice Note" (Multilateral Finance Institutions Working Group on Environment, 2005). For this SEA assignment, BEL has, on behalf of UETCL, appointed a consulting team led by R.J. Burnside International Limited of Canada (henceforth referred to as the "Consultant") to conduct and oversee the SEA tasks, manage the SEA process on behalf of BEL and UETCL, and author the SEA documentation to comply with GoU and international lender requirements.

1.2 Project Need and Description

There is no transmission infrastructure directly adjacent to the proposed Bujagali HPP. Therefore, new transmission infrastructure is needed to evacuate power from the proposed HPP. Moreover, due to the fact that most of Uganda's transmission networks are presently at, or near, capacity, new transformer stations would also need to be built to interconnect Bujagali's electricity output into the national grid. The IP would not be needed if not for the HPP; therefore the IP constitutes an "associated facility" for the Bujagali HPP according to the IFC's definition of "Area of Influence" (IFC Performance Standard 1, 2006). The "Integrated SEA Summary for the Bujagali Hydropower Project and the Bujagali Interconnection Project" that accompanies this SEA integrates the findings of the HPP SEA and the IP SEA in one place.

The IP consists of the following facilities:

- A 132kV switchyard on the west bank of the Victoria Nile adjacent to the Dumbbell Island hydropower facility (previously approved by NEMA in its 220/132 kV configuration as part of the Hydropower EIS, Atkins 1999);

Figure 1.1 Location of the Bujagali Interconnection Project

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- A 132 kV line south from the Bujagali switchyard to the existing 132 kV line from Owen Falls to Tororo (length –5 km), where that line will be severed;
- A second 132 kV line extending north from the severed Owen Falls-Tororo line to interconnect with the Bujagali switchyard (length – 5.0 km);
- A new 220 kV capacity transmission line operating at 132 kV from the Bujagali switchyard to a new substation at Kawanda, north of Kampala (length 75 km);
- A new substation at Kawanda;
- A new 132 kV line from the Kawanda substation to the existing 132 kV substation at Mutundwe in southern Kampala (length – 17.5 km). Internal improvements (i.e. new bay and switching gear) at Mutundwe to accommodate this new 132 kV line will also be required; and,
- Installation of 2 x 132 kV Reactors of 70 ohm each at Bujagali switchyard.

The HPP Project, which is closely associated with the IP Project, will consist of a power station housing up to 5 X 50 MW Kaplan turbines with an associated 28 m high earth-filled dam and spillway works. The project will require 125 ha of land take for project facilities and a new inundation area (45 ha for the project facilities themselves and 80 ha of newly inundated area adjacent to the Victoria Nile River) and 113 ha of land take for the project’s ancillary facilities (concrete batching plant, roads, cofferdams, rock quarries and stockpile areas).

The dam will impound a reservoir extending back to the tailrace areas of the Nalubaale (previously known as Owen Falls) and Kiira (previously known as Owen Falls Extension) Hydropower facilities. The reservoir waters will be contained within the steeply incised banks of the Victoria Nile between Dumbbell Island and Owen Falls, thereby minimising the amount of newly inundated land.

1.3 Project Schedule

BEL was awarded the HPP on April 20, 2005 following an international tendering process. Following negotiations, BEL and the GoU signed a power purchase agreement, paving the way for BEL to begin work on the approvals for both the IP and the HPP. The expected project schedule is as follows:

| Milestone | Timing |
|--|---------------|
| Submit SEA to NEMA | Q4 2006 |
| Select EPC Contractor | Q2 2007 |
| Receive Approval from NEMA/Complete Financing | Q2 2007 |
| Start Construction HPP | Q2 2007 |
| Start Construction of IP | Q4 2007 |
| Complete Construction/Start Operations of IP & HPP | Q1 2010 |

1.4 SEA Process

The contents of this SEA report are designed to meet requirements of the GoU as well as the policies and guidelines of the AfDB, and the various International Financial Institutions (IFIs) that are expected to finance the HPP.

This SEA Report is comprised of the following two volumes:

- Bujagali Interconnection Project: SEA Report; and,
- Bujagali Interconnection Project: SEA Appendices.

An SEA in two volumes is also being prepared by BEL for the HPP:

- Bujagali Hydropower Project: SEA Report; and,
- Bujagali Hydropower Project: SEA Appendices.

A key aspect of the approach undertaken by UETCL/BEL for the IP has been to conduct the SEA according to terms of reference (ToRs) that were approved by NEMA, and reviewed with IFI representatives, project affected peoples, NGOs and the general public. The SEA ToR for the IP is provided as Appendix A.1. A comparable SEA TOR for the HPP is available in Appendix A.1 of the HPP Technical Appendices.

The main SEA work for the interconnection project commenced in early 2006; including ecological fieldwork, social surveys and consultations with relevant review agencies and potentially affected people.

Following this introduction, the contents of this SEA are as follows:

- Chapter 2 describes the legislative, regulatory, and policy requirements for the project;
- Chapter 3 describes the baseline conditions in the area of the interconnection project from both an environmental and socio-economic perspective;
- Chapter 4 provides an alternatives analysis;
- Chapter 5 describes the proposed project, including its construction and operation activities;
- Chapter 6 describes the public consultation and disclosure programme undertaken for the project;
- Chapter 7 provides impact identification, management and monitoring; and,
- Chapter 8 provides the framework for the Social and Environmental Action Plan for the project.

A more detailed breakdown of the contents of each of these chapters can be seen in the Table of Contents in the front of this report. A Technical Appendices (Volume II) and Action Plan Appendices (Volume III) complete the SEA.

1.5 SEA Consultant Team

The experts that contributed to this SEA Report are as listed in Table 1.1.

Table 1.1: List of Experts

| Name | Representing | Role / Area Covered on Study |
|-------------------------|--|---|
| Robert Turland* | Dillon Consulting Limited | SEA Project Manager |
| Patrick Mwesigye* | Enviro and Industrial Consult (U) Ltd. | In Country SEA Team Leader |
| Brett Ogilvie* | Tonkin & Taylor International Ltd. | SEA Specialist/Natural Resources Team Leader |
| Fred Giovannetti* | Independent Consultant | Socio-Economic Team Leader and Resettlement Specialist |
| Lee Doran | Ecological Writings # 1, Inc. | Senior SEA Advisor |
| Peter Somers | R.J. Burnside International Limited | SEA Specialist |
| Rob Rowland | R.J. Burnside International Limited | SEA Specialist |
| Rui DeCarvalho | R.J. Burnside International Limited | SEA Reviewer |
| Jennifer Burnham | R.J. Burnside International Limited | SEA Coordinator |
| Robert Kityo | Makerere University Institute of Environmental and Natural Resources | Terrestrial Ecology |
| Yakobo Moyini | YOMA Consultants Limited | Forest Economic Assessment |
| Don McKinnon | Dillon Consulting Limited | Public Consultation / Stakeholder Engagement |
| Florence Nangendo | Independent Consultant | Social Science Research Team / Resettlement Action Plan Auditor |
| Eddie Mutesa | UETCL / Bujagali Implementation Unit | Resettlement, Community Development |
| Thomas Kasule | UETCL / Bujagali Implementation Unit | Resettlement, Community Development |
| Steve Gibbons | Ergon Associates | Labour |
| Ramon Nadira | PTI Siemens | Electrical Engineering |
| J. Fernando Arze-Peredo | TRC Solutions | Electrical Engineering |

* NEMA registration for those specialists, who comprise the core SEA team, are provided as Appendix A.2.

1.6 External Advisors

A Witness NGO, InterAid Uganda, was retained to provide independent advice to UETCL and BEL on the SEA process, focussing on the consultation activities and on the resettlement related activities. InterAid conducted the following tasks in their role as witness NGO:

- Witnessed topographical surveys along the proposed transmission line route;

- Witnessed, on a sample basis, identification of stakeholders, including co-owners as per Ugandan laws (child land owners, spouses etc.);
- Witnessed information meetings with the affected communities;
- Witnessed, on a sample basis, valuation of properties;
- Witnessed, on a sample basis, socio-economic surveys; and,
- Developed and coordinated a grievance procedure, whereby PAPs had the ability to lodge a grievance related with the survey, identification, Valuation and Socio Economic survey process.

InterAid completed event reports after each meeting and submitted monthly Assessment Reports to BEL/UETCL. A final report was provided to BEL/UETCL at the end of the witness' assignment related with the survey exercise.

2.0 SEA Regulatory Requirements

The purpose of this section is to set out the legislative, regulatory, and policy context in which the IP is being proposed and with which the project must comply.

2.1 Ugandan Requirements

There are a number of legislative and regulatory instruments in Uganda that deal with environmental management in both general and specific terms, and which are relevant to the IP. The most important of these instruments is the Constitution of the Republic of Uganda (1995), which is the supreme law in Uganda. The Constitution of Uganda provides for, *inter alia*:

- Matters pertaining to land, natural resources and the environment, and the sustainable development thereof (Objective XXVII), including energy resources;
- The right of every Ugandan to a clean and healthy environment (Article 39);
- The responsibility of government to enact laws that protect and preserve the environment from degradation and to hold in trust for the people of Uganda such natural assets as lakes, rivers, wetlands, CFRs, game reserves and national parks [Article 237(2)]; and,
- The right of every Ugandan to fair and adequate compensation in instances of the compulsory acquisition of land.

The specific legislation that deals with environmental impact assessments (EIA) in Uganda is the *National Environment Act* (NEA), Cap 153. NEMA was created under NEA and mandated with the responsibility to oversee, coordinate and supervise environmental management in Uganda.

The Third schedule of the NEA specifies that, any development that involves dams, rivers and water resources (including storage dams, barrages and weirs) or electrical infrastructure (including electricity generation stations, electrical transmission lines and electrical substations) requires an EIA. Thus, an EIA is required for the IP. The EIA is to be prepared in accordance with the EIA Guidelines (1997) and the EIA Regulations (1998) for Uganda, as provided by NEMA. The EIA process is identified as having three major stages, namely screening, EIA and decision-making, as shown on Figure 2.1.

Part V (I) of the same Act further provides for the setting of environmental standards. These include standards for air quality, water quality, discharge of effluent into water, control of noise and soil quality. The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations (1999), The National Environment (Wetlands, Riverbanks, and Lake Shores Management) Regulations (1999), Minimum Standards for Management of Soil Quality Regulations (2001) and National Environment (Noise Standards and Control) Regulations (2003) are in place.

Other regulations that have been developed under the NEA include the National Environment (Waste Management) Regulations (1999), the National Environment (Conduct and Certification of Environmental Practitioners) Regulations (2003), and the National Environment (Control of Public Smoking) Regulations (2004). NEMA is also contemplating air quality emission standards at the time of writing this report (Aryamanya-Mugisha, pers. comm., 2006).

The National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003 apply to:

- All persons certified and registered under the regulations as Environmental Practitioners; and,
- Corporate persons and partnerships registered under the regulations to co-ordinate individually registered persons to conduct environmental impact assessments or environmental audits.

In Regulation 16 (1), no person shall conduct an EIA or carry out any activity relating to the conduct of an environmental impact study or environmental audit as provided for under the Act, unless that person has been duly certified and registered in accordance with these regulations. The regulations set out the procedures of the application for certification and the code of practice and professional ethics. The practitioners have to pay prescribed fees (Fourth Schedule) before they can be fully registered.

Apart from the NEA, the following additional statutes and regulations of the GoU apply to the SEA work done for the IP:

- The Water Act, Cap. 152 - Provides for the management of water in Uganda and is under the mandate of Directorate of Water Development (DWD) in the Ministry of Water, Lands and Environment. Under section 107, the Water (Waste Discharge) Regulations (1998); the Water Supply Regulations (1999) and the Sewerage Regulations (1999) have been put in place to operationalise the Act and are aimed at minimising pollution of public waters by developers and other users.
- *The Rivers Act, Cap. 347* – Sets out that, amongst others things, a dredging license for dredging activities is required in certain rivers, including in the Nile.
- *The Electricity Act, 1999* – A generation license for the IP will need to be secured from the ERA. Application for this license must address social and environmental matters.

Figure 2.1 EIA Process and Flowchart

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- *The Public Health Act* - provides local authorities with administrative powers to take all lawful, necessary and reasonable measures to prevent the occurrence of, or deal 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.
- *The Land Act (1998)* – provides, amongst other things, for the Government or local government to acquire land in accordance with the provisions of the Constitution. The Land Regulations (2001) have been put in place to operationalise the *Land Act*. The Regulations provide details on how matters such as application for Certification of Occupancy, converting leasehold into freehold system, formation of Community Land Associations, procedures for paying annual ground rent by bona fide occupants to landlords, etc.
- *The Fish Act, CAP 197 and the Fish (Beach Management) Rules, 2003* – The Fish Act makes provision for the control of fishing, the conservation of fish, the purchase, sale, marketing and processing of fish and other issues related to fish. The Fish (Beach Management) Rules No. 35 2003 delegates’ legal authority to local people for fisheries planning and management. Fisheries stakeholders may join together to form legally empowered groups known as Beach Management Units (BMUs) that are formed from a diverse cross section of the local community.
- *The Factories Act, Cap. 198* - Makes provisions for the health, safety, welfare and appropriate training of persons employed in factories (including at hydropower dams). Additional labour laws relevant to employment, industrial relations and workers’ conditions are set out in the *Employment Act (2000)* and *Employment Regulations (1977)* and the *Workers' Compensation Act (2000)*. The relevant regulations address such matters as:
 - Contracts of Service;
 - Pre-service Medical Examination;
 - Termination of Contract;
 - Weekly rest;
 - Illness of employee;
 - Illness caused by misconduct;
 - Occupational Diseases;
 - First-Aid;
 - Dust and Fumes;
 - Meals in certain dangerous trades;
 - Protective clothing and appliances;
 - Protection of eyes in certain processes;
 - Sickness and Disease;
 - Treatment of injuries and sickness;
 - Drugs and Medical Equipment;
 - Examination of Employees; and,

- Failure to provide for the Sick.

The *Uganda Wildlife Act, Cap 200* and the *National Forestry and Tree Planting Act, 2003*, which set up the Uganda Wildlife Authority (UWA) and the National Forestry Authority (NFA), respectively, are also significant to the SEA work on the IP.

2.2 Requirements of International Financial Institutions

The AfDB is expected to provide UETCL with the foreign component financing for the Project, and thus the project will need to address AfDB's social and environmental safeguard policies. Because the Project is also closely associated with the HPP it is also being planned to address the requirements of the World Bank Group (the International Development Association (IDA), the International Finance Corporation (IFC) and the Multilateral Investment Guarantee Agency (MIGA). The requirements of AfDB, IFC, IDA, and MIGA are set out below.

Other Lenders who may be involved include the European Investment Bank (EIB) and Deutsche Investitions und Entwicklungsgesellschaft mbH (DEG). These institutions require projects adhere to the Equator Principles, details of which are provided below.

2.2.1 African Development Bank and its Relevant Policies

The AfDB Group is a regional multilateral development finance institution established in 1964 and comprised of 77 member countries from Africa, North and South America, Europe and Asia. The AfDB is headquartered in Abidjan, Côte d'Ivoire, but has temporary offices in Tunis.

The AfDB policy on environmentally sustainable development in Africa is described in the 2004 Bank Group Policy on the Environment. The new policy acknowledges the need to preserve and enhance ecological capital to sustain and enrich economic growth in Africa. The main goals of the new policy are to:

- Promote a long-term view and perspective of economic and social development;
- Reverse, where possible, and halt the impoverishment process in Africa by enhancing the access of the poor to environmental resources;
- Help Regional Member Countries to build their human capacity and sensitise policymakers on environmental issues and bring about institutional changes to achieve sustainable development; and,
- Reinforce the existing partnerships with international institutions and network also with regional and sub regional organisations to coordinate interventions in environmental sustainable development.

Two procedural guidelines central to the new Policy on the Environment were completed in 2004, namely the Strategic Impact Assessment Guidelines (SIA) and the

Integrated Environmental and Social Assessment Guidelines (IESA). The SIA is a systematic process of evaluating the environmental consequences of any proposed policy or programme, as well as a tool for assessing social and environmental sustainability of policy-based lending, structural adjustment, and sector investment lending. The IESA Guidelines are designed to ensure the inclusion of environmental and social issues in Bank projects throughout the project cycle. These provide guidelines for sector-specific issues and impacts that should be taken into account during the preparation and assessment phases of a project. Of relevance to the Bujagali HPP is the AfDB's sector-specific Hydropower Production – Appendix 8 and Dams and Reservoirs – Appendix 9 guidelines. The companion documents to the IESA Guidelines are the Environmental and Social Assessment Procedures for African Development Bank's Public Sector Operations (2001) and the Environmental Review Procedures for Private Sector Operations of the African Development Bank. These documents provide the procedural process by which public and private sector sponsored projects are categorised and assessed.

More information on the AfDB's environmental and social requirements can be viewed at www.afdb.org.

2.2.2 IFC and its Performance Standards

The International Finance Corporation (IFC) is a member of the World Bank Group (WBG), headquartered in Washington, D.C., and is the private sector financing arm of the WBG. IFC's Environment and Social Development Department is tasked with evaluating, appraising and monitoring the environmental and social impacts of proposed and existing IFC projects. Compliance with IFC's social and environmental framework is a requirement for project sponsors.

The IFC recently completed an integrated review process to update its former Safeguard Policies into a new policy framework that came into effect on April 30, 2006. It includes:

- Policy and Performance Standards on Social and Environmental Sustainability;
- Policy on Disclosure of Information; and,
- Environmental, Health and Safety (EHS) Guidelines (in process).

The IFC Sustainability Policy identifies IFC's roles and responsibilities in ensuring project performance in partnership with project sponsors. The Performance Standards clarify what is expected of project sponsors, and detail requirements that project sponsors will be required to fulfil in order to receive and retain IFC support.

There are eight performance standards, as follows:

- Performance Standard 1 - Social and Environmental Assessment and Management System;
- Performance Standard 2 - Labour and Working Conditions;
- Performance Standard 3 Pollution Prevention and Abatement;
- Performance Standard 4 - Community Health and Safety;
- Performance Standard 5 - Land Acquisition and Involuntary Resettlement;
- Performance Standard 6 - Conservation of Biodiversity and Sustainable Natural Resource Management;
- Performance Standard 7 - Indigenous Peoples; and,
- Performance Standard 8 - Cultural Heritage.

The IFC's Disclosure Policy outlines IFC's commitments and responsibility to disclose information about itself as an institution. Public disclosure requirements for clients are found in the proposed Performance Standards to encourage project sponsors to initiate early and ongoing engagement with the community/communities that are affected by a project.

The IFC currently uses two sets of guidelines for its projects:

- The environmental, health and safety guidelines contained in the *Pollution, Prevention and Abatement Handbook (PPAH)* (World Bank, 1998); and,
- Additional environmental, health and safety guidelines that IFC has prepared since 1993 and for which there no parallel guidelines in the PPAH.

These guidelines are specific to particular industries, sectors, or types of project. There are, at present, none available for the construction of dams. Where no sector specific guideline exists for a particular project, the World Bank *General Environmental Guidelines* and the IFC's *Occupational Health and Safety Guideline* are applied, with modifications as necessary to suit the project.

Additional publications that the IFC has produced to assist project sponsors in the environmental and social review of their projects include the following:

- Guidance Notes for each Performance Standard;
- Environmental and social review procedure (internal);
- Good practice publications;
- Manual for implementing Environmental Management Systems; and,
- Policies and guidelines glossary.

Additional information on IFC's social and environmental requirements can be found on www.ifc.org.

2.2.3 World Bank Group and its Safeguard Policies

The World Bank Group (WBG) includes two development institutions owned by 184 member countries—the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA). The IBRD focuses on middle income and creditworthy poor countries, while IDA focuses on the poorest countries in the world.

2.2.3.1 IBRD and IDA

The operations of these World Bank members are guided by a comprehensive set of environmental and social policies and procedures dealing with the Bank's development objectives and goals, the instruments for pursuing them, and the project sponsor requirements for Bank-financed operations. These policies and guidelines, known as Operational Policies (OPs), are set out in the Bank's Operational Manual. The OPs are focused statements that follow from the Bank's Articles of Agreement, general conditions, and Bank policies specifically approved by the Board. The Manual also addresses procedures, good practice and advice on implementation of policies.

Within the overall set of OPs, the Bank has identified ten key policies critical to ensuring that potentially adverse environmental and social impacts are identified, minimised, and mitigated. These ten are known as the "Safeguard Policies" and include:

- Environmental Assessment (EA);
- Cultural Property;
- Disputed Areas;
- Forests;
- Indigenous Peoples;
- International Waterways;
- Involuntary Resettlement;
- Natural Habitats;
- Pest Management; and,
- Safety of Dams.

The Bank undertakes screening of each proposed project to determine the appropriate extent and type of EA to be undertaken. Depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts, the Bank will classify the proposed project into one of four categories (A, B, C, and FI). The project sponsor is responsible for any environmental due diligence required by the Safeguard Policies, with general advice provided by Bank staff. Further details of the Bank's environmental and social Safeguard Policies can be viewed at www.worldbank.org.

2.2.4 MIGA Safeguard Policies

The Multilateral Investment Guarantee Agency (MIGA) addresses concerns about investment environments and perceptions of political risk in developing countries by providing three key services:

- Political risk insurance for foreign investments;
- Technical assistance to improve investment climates and promote investment opportunities; and,
- Dispute mediation services, to remove possible obstacles to future investment.

MIGA's environmental and disclosure policies are derived from WB policies. They are a tool for identifying risks, reducing development costs, and improving project sustainability. Their application benefits affected communities and helps preserve the environment. MIGA's Issue-Specific Safeguard Policies include:

- Natural Habitats;
- Forestry;
- Pest Management;
- Dam Safety;
- Projects on International Waterways;
- Involuntary Resettlement;
- Indigenous Peoples; and,
- Physical Cultural Resources.

During the underwriting of a project, MIGA identifies the policies and guidelines that are applicable to a project. Projects are expected to comply with the applicable policies and guidelines, as well as applicable local, national, and international laws. Considerations include:

- Environmental Assessment Policy;
- Disclosure Policy;
- Environmental and Social Review Procedures;
- Stakeholder Comments – 1999;
- Environmental Guidelines;
- Interim Issue-specific Safeguard Policies;
- Available Category A Environmental Impact Assessments;
- World Bank Note on Alcoholic Beverages; and,
- IFC/MIGA Office of Compliance and Ombudsman.

Further information is available on MIGA's website: www.miga.org.

2.2.5 Equator Principles

The Equator Principles are a voluntary set of guidelines developed by leading financial institutions around the globe for managing environmental and social issues in their project finance lending. They were originally based on the environmental and social safeguard policies of the IFC.

On June 4, 2003, ten international banks adopted the Equator Principles for project finance in emerging markets on projects with a capital cost of USD50 million or more. Since that time, a number of additional financial institutions have made the same commitment, bringing the total number of Equator Principles institutions to about 40.

In July, 2006, a majority of the 40 Equator Principle signatories adopted a revised set of the Principles to reflect the April 2006 revision of IFC's social and environmental framework. The updated Equator Principles apply globally and to all sectors and were revised to:

- Apply to all project financings with capital costs above USD10 million (threshold lowered from USD50 million);
- Also apply to project finance advisory activities;
- Specifically cover upgrades or expansions of existing projects where the additional environmental or social impacts are significant;
- Streamline application to countries with existing high standards for environmental and social issues;
- Require each signatory to report on the progress and performance of Equator Principles' implementation on an annual basis; and,
- Adopt stronger and better social and environmental standards, including more robust public consultation requirements.

Complete information on the revised Equator Principles is available at: www.equator-principles.com

2.3 Concordance Analysis of Lender Policy Requirements

Table 2.1 provides an overview of the environmental and social safeguard policy requirements applicable to the IP, along with a brief statement regarding the status of the project and the prime locations where the requirements are address in the SEA, as applicable. Though not specifically required for the IP, the construction and operation of the project is to be consistent with WBG and other Multilateral Financial Institution's (MFI's) environmental and social policies and guidelines. Policies of the following IFIs are included in the table: WB (IDA), MIGA, IFC and the AfDB. The EIB approach is equivalent to the "Equator Principles (2003)" adopted by a number of commercial banks and based on IFC guidelines. The EIB subscribes to these

principles when working outside of the EU (EIB Environmental Statement, 2004). DEG benchmarks are the Environmental and Social Policies and Guidelines of the World Bank Group. For Equator Principle Financial Institutions (EPFIs) that may be involved in the project, EPFI Principle 3 “Applicable Social and Environmental Standards” applies. Specifically EPFI Principle 3 states that “for projects located in non-OECD countries and those located in Organisation for Economic Co-operation and Development (OECD) countries not designated as high-income, as defined by the World Bank Development Indicators Database, the Assessment will refer to the then applicable IFC Performance Standards and the then applicable Industry Specific EHS Guidelines (“EHS Guidelines”). The Assessment will establish, to a participating EPFI’s satisfaction, the projects overall compliance with, or justified deviation from, the respective Performance Standards and EHS Guidelines”. Table 2.1 addresses WB (IDA), MIGA, AfDB and IFC’s Performance Standards and environmental and social guidelines. Industry Specific EHS guidelines are addressed in Section 2.4 of this SEA Report.

Table 2.1: Interconnection Project SEA Regulatory Requirements - Concordance Table

| Agency/Requirement | SEA Status: • SEA Report Section Where Addressed |
|---|---|
| <ul style="list-style-type: none"> • WB (IDA) OP 4.01 - Environmental Assessment (EA). • IFC Performance Standard 1 – Social and Environmental Assessment and Management Systems. • MIGA Environmental Assessment Policies. • AfDB Integrated Environmental and Social Assessment Guidelines. Appendix 8 - Hydropower Production, Transportation and Distribution Compliance. AfDB Environmental Review Procedures for Private Sector Operations. | <p>Complies:</p> <ul style="list-style-type: none"> • The social and environmental assessment that has been completed by UETCL for the project is documented herein. UETCL has developed, and is committed to further developing, appropriate management programs, organisational capacity, training, community engagement, monitoring and reporting. |

| Agency/Requirement | SEA Status: • SEA Report Section Where Addressed |
|---|---|
| <ul style="list-style-type: none"> • WB (IDA) OP 4.04 - Natural Habitats. • IFC Performance Standard 6 – Biodiversity Conservation and Sustainable Natural Resource Management. | <p>Complies:</p> <ul style="list-style-type: none"> • See section 7.3.2, 7.3.3 and 7.3.5. The project involves traversing terrestrial forest habitat. In compliance with the policy, the overall local, regional and national benefits derived from the project substantially outweigh the environmental costs. UETCL is committed to mitigation measures that have been included to minimise habitat loss. |
| <ul style="list-style-type: none"> • WB (IDA) OP 4.09 - Pest Management | <p>Complies:</p> <ul style="list-style-type: none"> • See table 7.9 Public Health. UETCL is committed to controlling pests by a combination of environmental design (avoid creating vector breeding habitat), mechanical control (i.e., bed nets), use of medications and prophylaxes, and limited use of approved, non-persistent pesticides (e.g., pyrethrum sprays). |
| <ul style="list-style-type: none"> • WB (IDA) OP 4.10 - Indigenous Peoples. • IFC Performance Standard 7 – Indigenous Peoples. | <p>Not Applicable:</p> <ul style="list-style-type: none"> • The World Bank Group has confirmed that no indigenous peoples as defined by the World Bank Group are considered to be resident in the project area. |

| Agency/Requirement | SEA Status: • SEA Report Section Where Addressed |
|--|--|
| <ul style="list-style-type: none"> • WB (IDA) OP 4.11 – Cultural Property. • IFC Performance Standard 8 – Cultural Heritage. | Complies: <ul style="list-style-type: none"> • See table 7.9 General Construction Related Issue: Archaeological Sites. Cultural properties potential within the area to be affected during construction have been identified. UETCL has provisions in place on how the discovery of unknown artefacts (if any are found before or after construction commences) will be managed. |
| <ul style="list-style-type: none"> • WB (IDA) OP 4.12 - Involuntary Resettlement. • IFC Performance Standard 5 – Land Acquisition and Involuntary Resettlement. • AfDB Policy on Resettlement and Involuntary Displacement. | Complies: <ul style="list-style-type: none"> • See section 7.3.1. UETCL has completed an Assessment of Past Resettlement Activities and Action Plans have been prepared to ensure those affected are not worse off as a result of the Project. |
| <ul style="list-style-type: none"> • WB (IDA) OP 4.36 – Forests. | Complies: <ul style="list-style-type: none"> • The project will not involve significant conversion or degradation of critical forest areas or related critical natural habitat. |
| <ul style="list-style-type: none"> • WB (IDA) OP 7.60 - Projects in Disputed Areas | Not Applicable: <ul style="list-style-type: none"> • The Project is not situated in a disputed area. |
| <ul style="list-style-type: none"> • IFC Performance Standard 2 – Labour and Working Conditions. | Complies: <ul style="list-style-type: none"> • See table 7.9 General Construction Related Issue: Labour & Working Conditions. UETCL labour and working conditions requirements as set out in the PS and will require corresponding compliance of its contractors and subcontractors. |

| Agency/Requirement | SEA Status: • SEA Report Section Where Addressed |
|--|--|
| <ul style="list-style-type: none"> • IFC Performance Standard 3 – Pollution Prevention and Abatement. | Complies: <ul style="list-style-type: none"> • See section 2.4 and 7.1.3. UETCL will comply with the relevant country and lender environmental performance and EH&S standards and guidelines. |
| <ul style="list-style-type: none"> • IFC Performance Standard 4 – Community Health, Safety and Security | Complies: <ul style="list-style-type: none"> • See section 7.3.4. The project sponsor will take appropriate steps to reduce worker and the general public’s exposure to vector borne diseases, STDs and construction and operation related safety hazards. Emergency Response Plans will be prepared prior to project operations (see section 8.4.1 and 8.4.5). UETCL will develop appropriate security hiring, training and enforcement protocols in line with local regulations. |
| <ul style="list-style-type: none"> • Disclosure of Information Policy (IFC) and WB OP 4.01. | Complies: <ul style="list-style-type: none"> • See Chapter 6.0. Information about the project has been made available locally and nationally in Uganda by UETCL. Information disclosure has been carried out in English and in the local language, as appropriate. |

2.4 Environmental Performance Requirements Concordance Analysis

In order to demonstrate the current status of the IP with respect to the environmental standards and guidelines of the World Bank Group (WBG) and the Government of Uganda (GoU), a concordance analysis has been undertaken. The following standards, regulations and guidelines were consulted as being applicable to the IP:

- The Government of Uganda Occupational Safety and Health Act, 2006;
- The Government of Uganda National Environment (Standards for Discharge of Effluent into Water or on Land), Regulations, 1999;

- The Government of Uganda National Environment (Standards for Maximum Permissible Noise Levels), Regulations, 2003;
- World Bank Group’s Monitoring Guidelines (July, 1998);
- IFC’s Environmental, Health and Safety Guidelines for Electric Power Transmission and Distribution (July 1, 1998);
- IFC’s Environmental, Health and Safety Guidelines for Polychlorinated Biphenyls (PCBs) (July 1, 1998);
- IFC’s Environmental, Health and Safety Guidelines for Hazardous Materials Management Guidelines (December, 2001); and;
- IFC’s Environmental and Social Guidelines for Occupational Health and Safety (June, 2003).

World Bank/IFC guidelines indicate that projects should meet the more stringent values between the in-country environmental standards and those set out in the WBG guidelines. The concordance analysis, presented below in Table 2.2, summarises the applicable WBG environmental performance guidelines, in tabular format, and compares them side-by-side with the equivalent GOU requirements. For each parameter/ consideration required, the column labelled “Project Standard or Requirement” lists the most stringent standard that the project must comply with.

Table 2.2: Summary of World Bank Group and Government of Uganda's Environmental Standards and Guidelines Applicable to the Proposed Bujagali IP

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|--|--|---|---|
| <i>Workplace Air Quality</i> | | | |
| Workplace air quality: monitoring | <p>^{2,3} Periodic monitoring of workplace air contaminants relative to worker tasks and plant operations is required. Workplace air quality monitoring equipment should be well maintained.</p> <p>⁴ Ventilation systems should be provided and appropriately maintained to control work area temperatures and humidity. HVAC and industrial cooling systems shall be operated in a manner to prevent growth/spread of disease agents.</p> | None stated | Periodic monitoring of workplace air quality should be conducted for air contaminants relevant to employee tasks and the plant's operations. |
| Workplace air quality: maintenance of protective equipment | <p>² Ventilation, air contaminant control equipment, protective respiratory equipment and air quality monitoring equipment should be well-maintained.</p> <p>⁴ Air inlet filters must be kept clean and free of dust and micro-organisms.</p> | ⁶ Where mechanical means of ventilation are used they shall not be regarded as satisfactory unless they provide a supply of air that adequately removes odour and contamination of the atmosphere that arises from human occupation of the room. | Ventilation, air contaminant control equipment, protective respiratory equipment and air quality monitoring equipment should be well-maintained |

¹ Number preceding the requirements indicates the specific WBG guidelines that apply, as follows:

- 1 WBG General Environmental Guidelines (July, 1998).
- 2 IFC's Environmental, Health and Safety Guidelines for Electric Power Transmission and Distribution (July 1, 1998).
- 3 IFC's Hazardous Materials Management Guidelines (December, 2001).
- 4 IFC Environmental Guidelines for Occupational Health and Safety (July 24, 2003).

² Number preceding the requirements indicates the specific GoU guidelines that apply, as follows:

- 5 The Government of Uganda Guidelines for Environmental Impact Assessment in Uganda, 1997.
- 6 The Government of Uganda Occupational Safety and Health Act, 2006.
- 7 The Government of Uganda National Environment (Standards for Discharge of Effluent into Water or on Land), Regulations, 1999.
- 8 The Government of Uganda National Environment (Standards for Maximum Permissible Noise Levels), Regulations, 2003.

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|--|---|---|---|
| Workplace air quality: use of protective respiratory equipment | <p>² Protective respiratory equipment must be used by employees when the exposure level for welding fumes, solvents and other materials present in the workplace exceed local or internationally accepted standards, generally expressed as threshold limit values (TLVs).</p> <p>⁴ The employer shall identify and provide appropriate personal protective equipment (PPE) that will offer adequate protection to workers, co-workers and occasional visitors without incurring unnecessary inconvenience.</p> | <p>⁵ Annexes 4 and 5 of NEMA EIA Guidelines set out generic checklists for determining project effects on occupational health and safety, but provide no specific standards or guidelines for workplace air quality.</p> | <p>Protective respiratory equipment must be used by employees when the exposure level for welding fumes, solvents and other materials present in the workplace exceed the following threshold limit values (TLVs): Asbestos (all forms, >5 mm length): 0.5 fibers/cm³ Coal dusts (<5% SiO₂): 2 mg/m³ Coal dusts (>5% SiO₂): 0.1 mg/m³ Gypsum (Calcium Sulfate): 10 mg/m³ Mineral Wool Fibre: 10 mg/m³ Particulate (Inert or Nuisance Dusts) 10 mg/m³ Portland Cement: 10 mg/m³ Silica/Crystalline Quartz: 0.1 mg/m³.</p> |
| Limits for Liquid Effluents (process wastewater, domestic sewage and contaminated storm water discharged to surface waters) | | | |
| pH | ¹ 6 to 9 | ⁷ 6 to 8 | 6 to 8 |
| BOD | ¹ 50 mg/l | ⁷ 50 mg/l | 50 mg/l |
| COD | ¹ 250 mg/l | ⁷ 100 mg/l | 100 mg/l |
| Oil & Grease | ¹ 10 mg/l | ⁷ 10 mg/l | 10 mg/l |
| Total Suspended Solids | ¹ 50 mg/l | ⁷ 100 mg/l | 50 mg/l |
| Coliform bacteria | ¹ <400 MPN/100 ml | ⁷ 10,000counts/100 ml | <400 MPN/100 ml |
| Environmental Management Considerations for Hazardous Materials and Wastes | | | |
| Hazardous material handling and storage: Storage and labelling | <p>¹ All ignitable, reactive, flammable, radioactive, corrosive and toxic materials must be stored in clearly labelled containers or vessels.</p> <p>² All hazardous (reactive, flammable, radioactive, corrosive and toxic) materials must be stored in clearly labelled containers or vessels.</p> <p>³ Hazardous materials must be packaged in a manner that keeps them from interacting with each other or with the environment or from being tampered with, either purposefully or otherwise. Packaging labels must comply with standards acceptable to IFC. Unless otherwise specified by national regulations, it should contain the corresponding UN number preceded by the letter “UN” on each package.</p> <p>⁴ All chemicals and hazardous materials present are labelled and marked according to national and internationally recognised requirements and standards. International Chemical Safety Cards (ICSC), Material Safety Data Sheets (MSDS) or equivalent data/information in an easily understood language must be readily available to exposed workers and first aid personnel. The employer must ensure adequate and competent supervision of the work, work practices and the appropriate use of PPE.</p> | <p>⁶An employer shall ensure that the packages of a hazardous chemical delivered to a workplace are labelled and that the appropriate chemical safety data sheet is delivered to the workplace.</p> | <p>All hazardous (reactive, flammable, radioactive, corrosive and toxic) materials must be stored in clearly labelled containers or vessels</p> |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|--|---|---|--|
| Hazardous material handling and storage: local/international standards | <p>^{1,2} Must be in accordance with local regulations or international standards and appropriate to their hazard characteristics.</p> <p>³ Unless otherwise specified by national regulations, the package should contain the corresponding UN number preceded by the letter “UN” on each package.</p> <p>⁴ All chemicals and hazardous materials present are labelled and marked according to national and internationally recognised requirements and standards.</p> | <p>⁵Annexes 4 and 5 of NEMA EIA Guidelines set out generic checklists for considering effects of a project’s hazardous materials management, but provide no specific standards or guidelines for hazardous materials management.</p> | Must be in accordance with local regulations or international standards and appropriate to their hazard characteristics. |
| Hazardous material handling and storage: spill containment | <p>^{1,2} Storage and liquid impoundment areas for fuels, raw and in-process materials, solvents, wastes, and finished products should be designed with secondary containment (e.g. dykes and berms) to prevent spills and the contamination of soil, groundwater and surface waters.</p> <p>³ The sponsor must produce an Emergency Preparedness and Response Plan.</p> <p>⁴ Organisations that produce handle, store, transport and dispose of hazardous materials shall fulfil the requirements of the IFC Hazardous Materials Management Guidelines.</p> | | Storage and liquid impoundment areas for fuels, raw and in-process materials, solvents, wastes, and finished products should be designed with secondary containment (e.g. dikes, berms) to prevent spills and the contamination of soil, groundwater and surface waters. |
| Hazardous materials handling and storage: fire prevention systems | <p>^{1,2} Fire prevention systems and secondary containment should be provided for storage facilities, where necessary or required by regulations, to prevent fires or the release of hazardous materials to the environment.</p> <p>³ Project companies must design construct and operate all buildings and plants financed by IFC in full compliance with local building codes, local fire department regulations, local/legal insurance requirements and in accordance with internationally accepted life and fire safety standards.</p> <p>⁴ The workplace must be equipped with fire detectors, alarm systems and fire fighting equipment. Fire and emergency alarms systems shall be audible and visible.</p> | | Fire prevention systems and secondary containment should be provided for storage facilities, where necessary or required by regulations, to prevent fires or the release of hazardous materials to the environment. |
| Hazardous materials and wastes: asbestos | <p>¹ New installations of manufactured products should not contain unbonded asbestos fibres.</p> | | Processes, equipment, materials and products involving the use or potential release to the environment of asbestos or asbestos containing materials (ACMs) should not be installed. |
| Hazardous materials and wastes: chromates | <p>¹ Formulations containing chromates should not be used in water treatment processes</p> | | Formulations containing chromates should not be used in water treatment processes |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|--|---|--|---|
| Hazardous materials and wastes: PCBs | ^{1,2} Transformers or equipment containing polychlorinated biphenyls (PCBs) or PCB-contaminated oil should not be installed. | | Transformers or equipment containing polychlorinated biphenyls (PCBs) or PCB-contaminated oil should not be installed. |
| Hazardous materials and wastes: ozone depleting substances | ^{1,2} No systems or processes are to be installed using chlorofluorocarbons (CFCs), halons, 1,1,1-trichloroethane, carbon tetrachloride, methyl bromide, or hydrobromofluorocarbons (HBFCs) unless it can be shown that no alternative exists. | | Processes, equipment and central cooling systems involving the use or potential release to the environment of chlorofluorocarbons (CFCs), including halon, should not be installed. |
| <i>Solid Wastes</i> | | | |
| Solid wastes: recycling/reclamation | ^{1,2} Solid waste materials are to be recycled or reclaimed where possible. | ³ Annexes 4 and 5 of NEMA EIA Guidelines set out generic checklists for considering effects of a project's solid waste management, but provide no specific standards or guidelines for solid waste recycling/reclamation. | Solid waste materials are to be recycled or reclaimed where possible. |
| Solid wastes: disposal | ^{1,2} If recycling or reclamation is not practical, solid wastes must be disposed of in an environmentally acceptable manner and in compliance with local laws and regulations. ⁴ Places of work, traffic routes and passageways shall be kept free from waste and spillage, regularly cleaned and maintained. | ³ Annexes 4 and 5 of NEMA EIA Guidelines set out generic checklists for considering effects of a project's solid waste management, but provide no specific standards or guidelines for solid waste management. | If recycling or reclamation is not practical, solid wastes must be disposed of in an environmentally acceptable manner and in compliance with local laws and regulations. |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|--|---|---|---|
| Solid and liquid wastes: hazardous materials | <p>^{1,2} All hazardous materials, process residues, solvents, oils, and sludges from raw water, process wastewater and domestic sewage treatment systems must be disposed of in a manner to prevent the contamination of soil, groundwater and surface waters.</p> <p>³ Where appropriate disposal options are not available, the EA process for the project must address appropriate alternatives for the handling and disposal of hazardous waste and propose a reasonable solution for handling and disposing of hazardous waste.</p> | ⁵ Annexes 4 and 5 of NEMA EIA Guidelines set out generic checklists for considering effects of a project's hazardous materials management, but provide no specific standards or guidelines for hazardous materials management. | All hazardous materials, process residues, solvents, oils, and sludges from raw water, process wastewater and domestic sewage treatment systems must be disposed of in a manner to prevent the contamination of soil, groundwater and surface waters. |
| Ambient Noise | | | |
| Ambient Noise – Construction period | ⁴ No employee may be exposed to a noise level greater than 85 db (A) for duration of more than 8 hrs per day. In addition no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dBC. The use of hearing protection must be actively enforced when Laeq,8h reached 85 dB(A), the peak sound levels 140 dB(C) or the Lamax, fast 110dB(A). | ⁸ 75 dBLAeq daytime 65 dBLAeq night time | 75 dBLAeq daytime 65 dBLAeq night time |
| Ambient Noise – Operational Period | <p>^{1,2} 55 dB(A) in the day and 45 dB(A) in the night in residential/ institutional or educational areas; 70 dB(A) in the day or night in industrial or commercial areas; or a maximum increase in background levels of 3 dB(A).</p> <p>⁴ No employee may be exposed to a noise level greater than 85 db (A) for duration of more than 8 hrs per day. In addition no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dBC. The use of hearing protection must be actively enforced when Laeq,8h reached 85 dB(A), the peak sound levels 140 dB(C) or the Lamax, fast 110dB(A).</p> | ⁸ 75 dBLAeq daytime 65 dBLAeq night time | 55 dB(A) in the day and 45 dB(A) in the night in residential/ institutional or educational areas; 70 dB(A) in the day or night in industrial or commercial areas; or a maximum increase in background levels of 3 dB(A). |
| Workplace Noise | | | |
| Workplace noise: control measures | ² Feasible administrative and engineering controls, including sound-insulated equipment and control rooms should be employed to reduce the average noise level in normal work areas. | None stated | Feasible administrative and engineering controls, including sound-insulated equipment and control rooms should be employed to reduce the average noise level in normal work areas. |
| Workplace noise: plant maintenance | ² Plant equipment should be well maintained to minimise noise levels. | None stated | Plant equipment should be well maintained to minimise noise levels. |
| Workplace noise | <p>² Personnel must use hearing protection when exposed to noise levels above 85 dBA .</p> <p>⁴ No employee may be exposed to a noise level greater than 85 db (A) for duration of more than 8 hrs per day. In addition no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dBC. The use of hearing protection must be actively enforced when Laeq,8h reached 85 dB(A), the peak sound levels 140 dB(C) or the Lamax, fast 110dB(A).</p> | ⁸ Factory/Workshops 85 dB(A) Factory/Workshop compound 75 dB(A) | Personnel must use hearing protection when exposed to noise levels above 85 dBA |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|---|---|---|--|
| Work in Confined Spaces | | | |
| Work in confined spaces: dangerous gases and lack of oxygen | <p>² Prior to entry and occupancy, all confined spaces (e.g. tanks, sumps, vessels, sewers, excavations) must be tested for the presence of toxic, flammable and explosive gases or vapours, and for the lack of oxygen.</p> <p>⁴ Unavoidable confined spaces shall, to the extent possible, be provided with permanent safety measures for venting, monitoring and rescue operations. The area adjoining an access to a confined space shall provide ample room for emergency and rescue operations.</p> | <p>⁶All practical steps are taken to remove any fumes and, unless it is ascertained by a suitable test the space is free from dangerous fumes and the person wears a belt to which there is a securely fastened rope of which a person outside holds the free ends.</p> | <p>Prior to entry and occupancy, all confined spaces (e.g. tanks, sumps, vessels, sewers, excavations) must be tested for the presence of toxic, flammable and explosive gases or vapours, and for the lack of oxygen.</p> |
| Work in confined spaces: ventilation | <p>² Adequate ventilation must be provided before entry and during occupancy of these spaces.</p> <p>⁴ Unavoidable confined spaces shall, to the extent possible, be provided with permanent safety measures for venting, monitoring and rescue operations.</p> | None stated | <p>Adequate ventilation must be provided before entry and during occupancy of these spaces.</p> |
| Work in confined spaces: use of respirators | <p>² Personnel must use air-supplied respirators when working in confined spaces which may become contaminated or deficient in oxygen during the period of occupancy.</p> <p>⁴ Unavoidable confined spaces shall, to the extent possible, be provided with permanent safety measures for venting, monitoring and rescue operations.</p> | <p>⁶A person shall not enter the confined space for any purpose unless the person entering wears a suitable breathing apparatus.</p> | <p>Personnel must use air-supplied respirators when working in confined spaces which may become contaminated or deficient in oxygen during the period of occupancy.</p> |
| Work in confined spaces: requirement for observers/assistants | <p>² Observers/assistants must be stationed outside of confined spaces to provide emergency assistance, if necessary, to personnel working inside these areas.</p> <p>⁴ The area adjoining an access to a confined space shall provide ample room for emergency and rescue operations.</p> | <p>⁶There shall be provided and maintained in every confined work place a sufficient number of workers trained in the practice of using breathing and reviving apparatus, belts and ropes and in the methods of restoring respiration and who shall be readily accessible.</p> | <p>Observers/assistants must be stationed outside of confined spaces to provide emergency assistance, if necessary, to personnel working inside these areas.</p> |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|--|--|--|---|
| Right of Way Alignment | | | |
| Right of way alignment: minimising environmental impacts | ² All new rights of way should be aligned taking environmental factors into consideration, in a manner which will minimise, to the extent possible, the need for physical alteration and the impact on sensitive natural environments, cultural resources, agricultural lands, and residential and commercial areas | ² Annex 3 of NEMA EIA Guidelines establishes that electrical transmission lines are subject to Ugandan EIA process. Annexes 4 and 5 of NEMA EIA Guidelines set out generic checklists for determining project effects, but provide no specific guidance for transmission lines. | All new rights of way should be aligned taking environmental factors into consideration, in a manner which will minimise, to the extent possible, the need for physical alteration and the impact on sensitive natural environments, cultural resources, agricultural lands, and residential and commercial areas. |
| Right of way alignment: land acquisition | ² Land acquisition must be carried out in accordance with World Bank resettlement guidelines, which require identification and quantification of any impacts on land-based livelihood, and compensation to landowners and people relying on the land for their livelihood. | ² Annex 5 of NEMA EIA Guidelines sets out screening criteria for considering impacts on human settlements (including displacement of people and effects on available housing), but does not prescribe procedures for addressing these impacts. | Bujagali IP RAP addresses the details of this project requirement. |
| Right of way alignment: environmentally sensitive areas | ² Where rights-of-way are to be established though remote and currently inaccessible environmentally sensitive areas, the potential impacts on the natural environment, indigenous populations, population immigration and natural resource exploitation must be assessed and measures adopted to minimise these impacts. | ² Annex 5 of NEMA EIA Guidelines sets out screening criteria for considering impacts on biological resources (including ecologically sensitive areas), but does not prescribe procedures for addressing these impacts. | Where rights-of-way are to be established though remote and currently inaccessible environmentally sensitive areas, the potential impacts on the natural environment, indigenous populations, population immigration and natural resource exploitation must be assessed and measures adopted to minimise these impacts. |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|--|---|---|--|
| Right of way alignment: minimising environmental impacts | ² Environmental impacts of proposed projects should be minimised through such measures as visual impact considerations in siting and design, restricting right-of-way use by non-authorized persons, erosion and sediment control during and after construction, and use of low-impact maintenance procedures. | ⁵ Annexes 4 and 5 of NEMA EIA Guidelines set out generic checklists for determining project effects, but provide no specific guidance for managing aesthetic and “access” impacts of transmission lines. | Environmental impacts of proposed projects should be minimised through such measures as visual impact considerations in siting and design, restricting right-of way use by non-authorized persons, erosion and sediment control during and after construction, and use of low-impact maintenance procedures. |
| Electrocution | | | |
| Electrocution: de-energising of equipment | ² Strict procedures for de-energising and checking of electrical equipment must be in place before any maintenance work is conducted. ⁴ Electrical installations must be designed, constructed and maintained to eliminate fire or explosion hazards and risks to employees. | None stated | Strict procedures for de-energising and checking of electrical equipment must be in place before any maintenance work is conducted. |
| Electrocution: maintenance of energised equipment | ² In cases where maintenance work has to be performed on energised equipment, a strict safety procedure must be in place and work must be performed under constant supervision. ⁴ Electrical installations must be designed, constructed and maintained to eliminate fire or explosion hazards and risks to employees. | None stated | In cases where maintenance work has to be performed on energised equipment, a strict safety procedure must be in place and work must be performed under constant supervision. |
| Electrocution: revival training | ² Personnel training must be conducted in revival techniques for electrocution. ⁴ Electrical installations must be designed, constructed and maintained to eliminate fire or explosion hazards and risks to employees. | None stated | Personnel training must be conducted in revival techniques for electrocution. |
| Other Physical Agents | | | |
| Other physical agents | ² Equipment should be designed and maintained for accepted safe working levels of physical factors that may have adverse health effects (e.g., ionising and non-ionising radiation, magnetic fields). ⁴ Places of work involving occupational and/or natural exposure to ionising radiation shall be established and operated in accordance with the “International Basic Safety Standard for Protection Against Ionising Radiation and for the Safety of Radiation sources. | None stated | Equipment should be designed and maintained for accepted safe working levels of physical factors that may have adverse health effects (e.g., ionising and non-ionising radiation, magnetic fields). |
| Other physical agents: monitoring | ² Work areas should be monitored regularly for radiation and field levels, and equipment integrity (e.g., protective shields, lockouts). | None stated | Work areas should be monitored regularly for radiation and field levels, and equipment integrity (e.g., protective shields, lockouts). |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|---|---|---|--|
| Health and Safety | | | |
| Health – General: sanitary facilities | <p>² Sanitary facilities should be well equipped with supplies (e.g., protective creams) and employees should be encouraged to wash frequently, particularly those exposed to dust, chemicals or pathogens.</p> <p>³ All employees working with hazmats should be provided with suitable PPE, emergency eyewash and shower stations, ventilation systems, sanitary facilities, pre employment and scheduled periodic medical examinations. Periodic monitoring of workplace air contaminants relative to worker tasks and plant operations is required. Workplace air quality monitoring equipment should be well maintained.</p> <p>⁴ Facilities must include locker rooms, an adequate number of toilets with wash basins, and a room dedicated for eating. Water supplied to areas of food preparation or for the purpose of personal hygiene must meet drinking water quality standards.</p> | <p>⁶In any building where work is carried out sufficient and suitable sanitary conveniences shall be provided, maintained and kept clean.</p> | Sanitary facilities should be well equipped with supplies (e.g., protective creams) and employees should be encouraged to wash frequently, particularly those exposed to dust, chemicals or pathogens. |
| Health – General: workplace ventilation | <p>^{2,4} Ventilation systems should be provided and appropriately maintained to control work area temperatures and humidity. HVAC and industrial cooling systems shall be operated in a manner to prevent growth/spread of disease agents.</p> <p>³ All employees working with hazmats should be provided with suitable PPE, emergency eyewash and shower stations, ventilation systems, sanitary facilities, pre employment and scheduled periodic medical examinations. Periodic monitoring of workplace air contaminants relative to worker tasks and plant operations is required. Workplace air quality monitoring equipment should be well maintained.</p> | <p>⁶There shall be an effective and suitable system for securing and maintaining the circulation of fresh air in each room.</p> | Ventilation systems should be provided and appropriately maintained to control work area temperatures and humidity. |
| Health – General: work in high temperature/humidity | <p>² Personnel required to work in areas of high temperature and/or humidity should be allowed to take frequent breaks away from these areas.</p> <p>⁴ The employer shall maintain indoor temperatures that are reasonable and appropriate for the type of work. Risks of heat or cold related stress must be adequately addressed and feasible control measures implemented for work in adverse environments.. A fresh drinking water supply should be conveniently available for workers.</p> | <p>⁶A suitable room temperature shall be secured for workers in buildings, having regard in any workplace, to the number of workers, the ventilation and air movement, the air humidity and temperature of the surroundings.</p> | Personnel working in areas of high temperature and/or humidity should be allowed to take frequent breaks away from these areas. |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|--|--|--|---|
| Health – General: medical examinations | <p>² Pre-employment and periodic medical examinations should be conducted for all personnel, and specific surveillance programmes instituted for personnel potentially exposed to toxic or radioactive substances.</p> <p>³ All employees working with hazmats should be provided with suitable PPE, emergency eyewash and shower stations, ventilation systems, sanitary facilities, pre employment and scheduled periodic medical examinations.</p> <p>⁴ When extraordinary protective measures are required, the employer shall provide appropriate and relevant health surveillance to workers prior to first exposure and at regular intervals thereafter.</p> | <p>⁶The Minister may require a medical supervision or medical examination of a person or any class of persons employed where in any workplace there may be risk of injury to the health of the workers in the workplace as a result of any process or from any substance used or handled.</p> | <p>Pre-employment and periodic medical examinations should be conducted for all personnel, and specific surveillance programmes instituted for personnel potentially exposed to toxic or toxic or radioactive substances.</p> |
| Safety – General: prevention of mechanical injuries | <p>² Shield guards or guard railings should be installed at all belts, pulleys, gears and other moving parts.</p> <p>⁴ Floors should be level, even and non-skid. Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections. Appropriate shields, guards or railings must be installed and maintained to eliminate human contact with moving parts or hot and cold items.</p> | <p>⁶Every dangerous part of any machinery, other than a prime mover and transmission machinery shall be securely fenced unless it is in a position or of such construction that it safe for every person employed or working on the premises as it would be if it were securely fenced.</p> | <p>Shield guards or guard railings should be installed and maintained to eliminate human contact with moving parts, or hot or cold items.</p> |
| Safety – General: prevention of falling injuries | <p>² Elevated platforms and walkways, and stairways and ramps should be equipped with handrails, toe boards and non-slip surfaces.</p> <p>⁴ Hand, knee and foot railings must be installed on stairs, fixed ladders, platforms, permanent and interim floor openings, loading bays, ramps etc. Openings must be sealed by gates or removable chains. Covers if feasible shall be installed to protect against falling items.</p> | <p>⁶The staircases on premises inside and outside a building shall have handrails and guard rails which, shall be properly maintained at all times.</p> | <p>Elevated platforms and walkways, and stairways and ramps should be equipped with handrails, toe boards and non-slip surfaces.</p> |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|---|---|---|---|
| Safety – General: prevention of electrocution by electrical equipment | <p>² Electrical equipment should be grounded, well insulated and conform with applicable codes.</p> <p>⁴ Electrical installations must be designed, constructed and maintained to eliminate fire or explosion hazards and risks to employees.</p> | <p>⁶All electrical apparatus, fittings and conductors shall be sufficient in size and power for the work they are meant for and shall be constructed, installed, protected worked and maintained to prevent danger, as far as is reasonably practical.</p> | <p>Electrical equipment should be grounded, well insulated and conform with applicable codes.</p> |
| Safety – General: protection from dust and hazardous materials | <p>² Personnel should use special footwear, masks and clothing for work in areas with high dust levels or contaminated with hazardous materials.</p> <p>⁴ Precautions must be taken to keep the risk of exposure as low as possible. Work processes, engineering and administrative control measures must be designed, maintained and operated to avoid or minimise the release of hazardous substances to the working environment. The employer must ensure adequate and competent supervision of the work, work practices and the appropriate use of PPE.</p> | <p>⁶In a case where toxic materials or substances are manufactured, handled, used or stored the Commissioner may serve upon an occupier or employer, a notice requiring him or her to provide additional bathing facilities including showers, where practical; arrange for periodical medical examinations and, provide additional protective clothing.</p> | <p>Personnel should use special footwear, masks and clothing for work in areas with high dust levels or contaminated with hazardous materials.</p> |
| Safety – General: high temperature materials | <p>⁴ Appropriate shields, guards or railings must be installed and maintained to eliminate human contact with moving parts or hot and cold items.</p> | <p>None stated</p> | <p>Appropriate shields, guards or railings must be installed and maintained to eliminate human contact with moving parts or hot and cold items.</p> |
| Safety – General: eye protection | <p>² Eye protection should be worn by personnel when in areas where there is a risk of flying chips or sparks, or where intense light is generated.</p> <p>⁴ The employer shall identify and provide appropriate personal protective equipment (PPE) that will offer adequate protection to the worker, co-workers and occasional visitors without incurring unnecessary inconvenience.</p> | <p>⁶In the case of any processes, suitable goggles or effective screens shall be provided, to protect the eyes of the persons employed in the process.</p> | <p>Eye protection should be worn by personnel when in areas where there is a risk of flying chips or sparks, or where intense light is generated.</p> |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|---|---|--|---|
| Safety – General: protection from dangerous materials | <p>³ Procedures should be produced for the use of hazmats during each operation phase including initial start-up, normal operations, temporary operations, emergency shutdown, emergency operations, normal shutdown, and start up following a normal or emergency shutdown or major change.</p> <p>⁴ The employer shall identify and provide appropriate PPE that will offer adequate protection to the worker, co-workers and occasional visitors without incurring unnecessary inconvenience.</p> | <p>⁶Where any process carried out in a workplace is likely to cause bodily injury which cannot be prevented by other means, every worker involved in that process, who is liable to bodily injury shall be provided with suitable and appropriate PPE and clothing to prevent him or her from risk or injury.</p> | <p>The employer shall identify and provide appropriate PPE that will offer adequate protection to the worker, co-workers and occasional visitors without incurring unnecessary inconvenience.</p> |
| Safety – General: eyewashes. | <p>³ All employees working with hazmats should be provided with suitable PPE, emergency eyewash and shower stations, ventilation systems, sanitary facilities, pre employment and scheduled periodic medical examinations.</p> <p>⁴ Eye wash stations and/or emergency showers shall be provided close to all workstations where the recommended first aid is immediate flushing with water.</p> | <p>⁶Where dangerous or corrosive liquids are used there shall be provided and maintained for use in the case of emergency sufficient and suitable means of flushing or irrigating the eyes conveniently located and clearly indicated by a distinctive sign which is clearly visible at all times.</p> | <p>Eye wash stations and/or emergency showers shall be provided close to all workstations where the recommended first aid is immediate flushing with water.</p> |
| Safety – General: safety programme. | <p>² A safety programme should be established for construction and maintenance work.</p> <p>³ All employees working with hazmats should be provided with suitable PPE, emergency eyewash and shower stations, ventilation systems, sanitary facilities, pre employment and scheduled periodic medical examinations. Periodic monitoring of workplace air contaminants relative to worker tasks and plant operations is required. Workplace air quality monitoring equipment should be well maintained.</p> <p>⁴ The employer is responsible for planning, implementing and monitoring programmes and systems required to ensure OHS on its premises.</p> | <p>⁶It is the responsibility of an employer to take as far as is reasonably practical, all measures for the protection of his or her workers and the general public from the dangerous aspects of an employers undertaking at his or her cost.</p> | <p>A safety programme should be established for construction and maintenance work.</p> |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|---|---|---|--|
| Safety – General: fire prevention and fire safety programme | <p>² A fire prevention and fire safety programme should be implemented and include regular drills.</p> <p>³ Project companies must design construct and operate all buildings and plants financed by IFC in full compliance with local building codes, local fire department regulations, local/legal insurance requirements and in accordance with internationally accepted life and fire safety standards.</p> <p>⁴ The workplace must be equipped with fire detectors, alarm systems and fire fighting equipment. Fire and emergency alarms systems shall be audible and visible.</p> | <p>⁶All premises shall have means of escape from fire for workers as may be reasonably be required in the circumstance and in determining what is required by way of escape.</p> | <p>A fire prevention and fire safety programme should be implemented and include regular drills.</p> |
| Safety – General: climbing towers | <p>² Employees involved in climbing towers must be provided with non-slip footwear, gloves, helmets, face protection, leggings and other necessary protective equipment.</p> <p>⁴ Hand, knee and foot railings must be installed on stairs, fixed ladders, platforms, permanent and interim floor openings, loading bays, ramps etc. Openings must be sealed by gates or removable chains. Covers if feasible shall be installed to protect against falling items.</p> | <p>⁶The staircases on premises inside and outside a building shall have handrails and guard rails which, shall be properly maintained at all times.</p> | <p>Employees involved in climbing towers must be provided with non-slip footwear, gloves, helmets, face protection, leggings and other necessary protective equipment.</p> |
| Site Drinking Water | <p>⁴ Water supplied to areas of food preparation or for the purpose of personal hygiene must meet drinking water quality standards.</p> | <p>⁶An adequate supply of wholesome drinking water shall be provided and maintained at suitable points in a workplace, conveniently accessible to all workers.</p> | <p>Water supplied to areas of food preparation or for the purpose of personal hygiene must meet drinking water quality standards.</p> |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|---------------------------------------|---|---|---|
| Training | | | |
| Training: harmful materials | <p>² Employees should be trained on the hazards, precautions and procedures for the safe storage, handling and use of all potentially harmful materials relevant to each employee’s task and work area.</p> <p>³ All employees working with hazmats should be trained in hazard identification, safe operating procedures, appropriate materials handling procedures special hazard unique to their job.</p> <p>⁴ The employer shall ensure that workers prior to commencement of new assignments have received adequate training and information enabling them to understand the hazards of the work and to protect their health from hazardous ambient factors that may be present. The training must adequately cover: a) knowledge of materials, equipment and tools; b) known hazards in the operations and how they are controlled; c) potential risks to health; d) precautions to prevent exposure, and; e) hygiene requirement; f) wearing and the use of protective equipment and clothing; and g) appropriate response to operation extremes incidents and accidents.</p> | <p>⁶The provision of adequate and appropriate information, instructions, supervision and training necessary to ensure as far as is reasonably practical, the safety and health of the employees, and that the application and use of occupational safety and health measures, taking into account the functions and capabilities of different categories of workers in an undertaking.</p> | <p>Employees should be trained on the hazards, precautions and procedures for the safe storage, handling and use of all potentially harmful materials relevant to each employee’s task and work area.</p> |
| Training: Material Safety Data Sheets | <p>² Training should incorporate information from the Material Safety Data Sheets (MSDSs) for potentially harmful materials.</p> <p>³ Training should incorporate information from MSDSs for hazmats being handled. The sponsor must produce an Emergency Preparedness and Response Plan.</p> <p>⁴ The employer shall ensure that workers prior to commencement of new assignments have received adequate training and information enabling them to understand the hazards of the work and to protect their health from hazardous ambient factors that may be present. The training must adequately cover: a) knowledge of materials, equipment and tools;</p> | <p>⁶The provision of adequate and appropriate information, instructions, supervision and training necessary to ensure as far as is reasonably practical, the safety and health of the employees, and that the application and use of occupational safety and health measures, taking into account the functions and capabilities of different categories of workers in an undertaking.</p> | <p>Training should incorporate information from the Material Safety Data Sheets (MSDSs) for potentially harmful materials.</p> |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|---|---|---|--|
| Training: environmental health and safety | <p>² Personnel should be trained in environmental, health and safety matters including accident prevention, safe lifting practices, the use of MSDSs, safe chemical handling practices, and proper control and maintenance of equipment and facilities.</p> <p>³ Training should incorporate information from MSDSs for hazmats being handled. The sponsor must produce an Emergency Preparedness and Response Plan.</p> <p>⁴ The employer shall ensure that workers prior to commencement of new assignments have received adequate training and information enabling them to understand the hazards of the work and to protect their health from hazardous ambient factors that may be present. The training must adequately cover: a) knowledge of materials, equipment and tools; b) known hazards in the operations and how they are controlled; c) potential risks to health; d) precautions to prevent exposure, and; e) hygiene requirement; f) wearing and the use of protective equipment and clothing; and g) appropriate response to operation extremes incidents and accidents.</p> | <p>⁶The provision of adequate and appropriate information, instructions, supervision and training necessary to ensure as far as is reasonably practical, the safety and health of the employees, and that the application and use of occupational safety and health measures, taking into account the functions and capabilities of different categories of workers in an undertaking.</p> | <p>Personnel should be trained in environmental, health and safety matters including accident prevention, safe lifting practices, the use of MSDSs, safe chemical handling practices, and proper control and maintenance of equipment and facilities.</p> |
| Training: emergency response | <p>² Training should also include emergency response, including the location and proper use of emergency equipment, use of personal protective equipment, procedures for raising the alarm and notifying emergency response teams, including local and regional hospitals, and proper response actions for each foreseeable emergency situation.</p> <p>³ The sponsor must produce an Emergency Preparedness and Response Plan.</p> <p>⁴ The employer shall ensure that workers prior to commencement of new assignments have received adequate training and information enabling them to understand the hazards of the work and to protect their health from hazardous ambient factors that may be present. The training must adequately cover: g) appropriate response to operation extremes incidents and accidents.</p> | <p>⁶The provision of adequate and appropriate information, instructions, supervision and training necessary to ensure as far as is reasonably practical, the safety and health of the employees, and that the application and use of occupational safety and health measures, taking into account the functions and capabilities of different categories of workers in an undertaking.</p> | <p>Training should also include emergency response, including the location and proper use of emergency equipment, use of personal protective equipment, procedures for raising the alarm and notifying emergency response teams, including local and regional hospitals, and proper response actions for each foreseeable emergency situation.</p> |

| Parameter | WBG/IFC Guidelines ¹ | GOU Standard ² | Project Standard or Requirement |
|--|--|--|--|
| Record Keeping and Reporting | | | |
| Occupational health and safety monitoring | <p>¹ The project sponsor is required to maintain a record of air emissions, effluents, and hazardous wastes sent off site, as well as significant environmental events such as spills, fires, and other emergencies that may have an impact on the environment. The information should be reviewed and evaluated to improve the effectiveness of the environmental protection plan.</p> <p>³ Measuring and monitoring records must be made available to employees handling hazmats and their representatives as appropriate. Records should be kept for IFC review and reports on hazmat management should be submitted regularly to IFC – at least one a year as part of the sponsors Annual Monitoring Report (AMR).</p> <p>⁴ Safety features, ambient working environments and OHS indicators are subject to regular monitoring and review. The information collected shall be processed and findings reported to national authorities as required. The compiled information and any corrective measures taken shall be applied in a continuous process to improve the OHS management system.</p> | <p>⁶It is the duty of an employer to keep and maintain of the medical examination information in a format and for a period prescribed by the Minister and to avail these records for epidemiological and other research.</p> | <p>Safety features, ambient working environments and OHS indicators are subject to regular monitoring and review. The information collected shall be processed and findings reported to national authorities as required. The compiled information and any corrective measures taken shall be applied in a continuous process to improve the OHS management system.</p> |
| Environmental/ occupational health and safety records and reporting. | <p>¹ The project sponsor is required to maintain a record of air emissions, effluents, and hazardous wastes sent off site, as well as significant environmental events such as spills, fires, and other emergencies that may have an impact on the environment. The information should be reviewed and evaluated to improve the effectiveness of the environmental protection plan.</p> <p>² The sponsor should maintain records of significant environmental matters, including monitoring data, accidents and occupational illnesses, and spills, fires and other emergencies. This information should be reviewed and evaluated to improve the effectiveness of the environmental, health and safety programme. An annual summary of the above information should be provided to IFC.</p> <p>³ Measuring and monitoring records must be made available to employees handling hazmats and their representatives as appropriate. Records should be kept for IFC review and reports on hazmat management should be submitted regularly to IFC – at least one a year as part of the sponsors Annual Monitoring Report (AMR).</p> <p>⁴ An annual report adequately presenting performance and achievements in regard to OHS shall be submitted to IFC. Employee monitoring data (originals) must be saved for a period of 5 years or longer if required by national regulations.</p> | <p>⁶There shall be kept available for inspection in every workplace, in the prescribed form, a General Register. The General Register and any other register or record shall be preserved and kept available for at least five years or such other period as may be prescribed for any other class or description of register or record after the date of the last entry in the register or record.</p> | <p>The sponsor should maintain records of significant environmental matters, including monitoring data, accidents and occupational illnesses, and spills, fires and other emergencies. This information should be reviewed and evaluated to improve the effectiveness of the environmental, health and safety programme. An annual summary of the above information should be provided to IFC.</p> |

3.0 Existing Environmental and Social Conditions

3.1 Project Setting

The Bujagali IP is located within the rolling landscape north of Lake Victoria, in Uganda. This region is characterised by a pattern of low but often steep hills, which are generally highest towards the south, closer to Lake Victoria. The general level of the land falls away gradually northwards. Altitude ranges from 1,100 - 1,300 m AMSL. The broad valleys are overlain by abundant fluvial deposit.

Jinja town, located on the east side of the river near Nalubaale is the closest large community to the eastern end of the IP. The city developed starting in the 50's when power for industry became available from the Owen Falls project. Kampala, Uganda's largest city is located about 70 km to the west.

The majority of the study area for the IP is rural, with estate and small-scale or subsistence agriculture being the predominant land uses. Agricultural activity is primarily a labour-intensive, intercropping system with both cash and subsistence crops following the seasonal changes. The main cash crops are coffee and sugar cane, coupled with more recent cropping of vanilla. Subsistence food crops include bananas, cassava, sweet potatoes, maize, beans, millet, and yams. Where the transmission system approaches Kampala, the landscape becomes increasingly populated and peri-urban in nature.

The hilly landform determines the drainage pattern for the region. Only short local streams and the lakeside marshes discharge into Lake Victoria, with all larger watercourses, including the valley marshland around the northern side of Kampala, flowing generally northwards towards Lake Kyoga or the Lugogo River. Mabira CFR (FR) occupies a large portion of the transmission system wayleave area between Kampala and Jinja, providing a distinctive and enclosed contrast to the more highly populated farmland of its surroundings. There are many large estates, usually tea or sugar plantations, around the periphery of Mabira FR and to the south, which provide an open, rolling landscape with distant views.

Historically, the Basoga inhabited the areas of southern Uganda east of the Nile. Buganda is the Kingdom of the Baganda people, who historically inhabited the areas west of the Nile. This is still largely the case, although Basogans and Bangandans live on both banks of the river, today. Although the Basoga and Buganda languages vary, they are similar to one another and mutually understandable. Many people still practice traditional religions, although they are often practised in concert with Christianity and Islam. Several people have *amasabo* (roughly translated as shrines) on their properties where they can pay respect to their ancestors and commune with spirits.

3.2 Project Area of Influence

The IFC's Performance Standard 1 (April 30 2006) specifies that risks and impacts associated with a project will be analyzed in the context of the project's area of influence. Table 3.1 summarises the area of influence for the IP according to the definition provided by IFC, including areas affected by: (i) the primary project site, (ii) associated facilities; (iii) cumulative effects, and (iv) unplanned but predictable developments. Effects on primary project site are addressed in the IP SEA Report, while effects on associated facilities are addressed in the SEA Report being prepared for the Hydropower Project. Cumulative impacts and the effects of unplanned but predictable developments associated with the IP are addressed, where relevant, in the IP SEA documents.

Table 3.1: Bujagali Hydropower Project Area of Influence

| | |
|--|--|
| Primary Project Sites (Interconnection Project SEA Report) | |
| 1. | Land for these Transmission line wayleaves: i) Bujagali substation to Tororo cut-off (x2); ii) Bujagali substation to Kawanda substation; iii) Kawanda substation to Mutundwe substation |
| 2. | Land for Kawanda substation site |
| 3. | Land for resettlers' houses & livelihoods, as specified in RAP documentation |
| 4. | Resettlers' houses, if any, for #s 1 & 2 (above) |
| 5. | Off-site facilities (construction camps, quarries, storage, waste disposal, access roads), as specified |
| 6. | Air quality, EMF & noise effects radii (off-site) |
| 7. | Change in downstream water regime (water quality & flows), if any |
| 8. | Communities (including host communities) as specified in PCDP |
| 9. | Stakeholder groups (including vulnerable groups) as identified in PCDP |
| 10. | Project personnel when off-site in project vicinity/region |
| Associated Facilities (Hydropower Project SEA Report) | |
| 11. | Land/water areas for dam, its facilities & reservoir |
| 12. | Land for resettlers' houses & livelihoods, as specified, for # 11 (above) |
| 13. | Resettlers' houses, if any |
| 14. | Off-site facilities (quarries, storage, waste disposal, access roads), if any |
| 15. | Air quality & noise effects radii (off-site) |
| 16. | Upstream water areas (below Nalubaale/Kiira; mainly in Bujagali reservoir) & users |
| 17. | Downstream water regime (water quality & flows) |
| 18. | Communities (including host communities) as specified in PCDP |
| 19. | Stakeholder groups (including vulnerable groups) as identified in PCDP |
| 20. | Project personnel when off-site in project vicinity/region |
| Cumulative Impacts (Interconnection Project SEA Report) | |
| 21. | Other linear infrastructure (roads, T-lines, pipelines, rural electrification etc.) |
| Unplanned but Predictable Developments (Interconnection Project SEA Report) | |
| 22. | Project 'followers' offering various goods & services |
| 23. | Construction "boom & bust" (local & regional economic effects) |

3.3 Land Conditions

3.3.1 Topography, Geology and Soils

The Lake Victoria basin, in which the Bujagali Interconnection Project is located, is predominantly lowland, interspersed with remnants of upland surface typical of a landscape still undergoing erosion. The region is characterised by a pattern of low but often steep hills, which are generally highest towards the south, closer to Lake Victoria. The general level of the land falls away gradually northwards. Altitude ranges from 1,100 -1,300 m AMSL. The broad valleys are overlain by abundant fluvial deposit.

The Lake Victoria basin's relief is developed on pre-Cambrian metamorphosed sedimentary rocks two billion years old (MacDonald, 1966). The parent igneous rock is medium-to coarse-grained granite with large feldspar crystals. Characteristic granitic boulders are found along the Nile River valley and surrounding riverbanks. The dominant lithology exposed in the Nile channel is amphibolitic and doleritic rocks interbanded to varying degrees with foliated metasedimentary shale, phyllitic shales and schists (Knight Piesold/Merz & McLellan, 1998a). Within the Mabira Central Forest Reserve (CFR) area, the underlying rocks are composed of micaceous schists and shales of the Buganda-Toro system with ridges of quartzite and amphibolite. A detailed description of soil catenas is included in Appendix B.1.

The hilly landform determines the drainage pattern for the region. Only short local streams and the lakeside marshes discharge into Lake Victoria, with all larger watercourses, including the valley marshland around the northern side of Kampala, flowing generally northwards towards Lake Kyoga or the Lugogo River.

Mabira CFR occupies approximately 18 percent of the interconnection system wayleave length between Kampala and Jinja, providing a distinctive and enclosed contrast to the more highly populated farmland of its surroundings. There are many large estates, mainly tea or sugar plantations, around the periphery of Mabira CFR and to the south, which provide an open, rolling landscape with distant views.

3.3.2 Landscape Units

The landscape along the proposed transmission line can be divided into eight areas of relatively distinct landforms, land use and vegetation patterns moving from west to east (refer to Figure 3.1). Photographs presented in Figure 3.2 are illustrative of each landscape unit, described below.

- **Natete** -A densely developed suburban centre around the junction of Masaka Road and Natete Road/Old Masaka Road near the Mutundwe substation. There is a bustling market area around the junction, with various commercial and

industrial uses filling the low ground across the head of the Lubigi Swamp. The roads are largely developed along both sides of the swamp and there is a distinctive group of buildings at the Martyrs Memorial, school, church and cultural centre to the south of Masaka Road. The area to the south of the railway line is slightly more rural in character, although here the converging electricity transmission lines have a strong visual influence. The Mutundwe substation site is set at approximately 1,180 m AMSL on the north-facing slope of a distinctive hill that rises to over 1,300 m AMSL.

- **Lubigi** -The distinctive open expanse of the Lubigi Swamp, located at approximately 1,160 m AMSL, is surrounded by low, rounded hills along its western and eastern boundaries that rise to 1,220 and 1,280 m AMSL. The uniform appearance of the papyrus swamp is broken by scattered road crossings and by a small island near the Masaka Road crossing. Suburban development has spread over most of the slopes along the Kampala (eastern) side of the swamp, especially at Namungona by the Hoima Road, although there are still some areas of farmland between the suburbs, particularly near the swamp fringes. The western side of the swamp is still relatively rural in character with extensive areas of small-scale agriculture.
- **Kawanda** -A pattern of moderate hills rising to 1,230-1,290 m AMSL separated by moist valleys situated at 1,140-1,170 m AMSL. The higher ground at Nansana and Jinja-Kawenpe is heavily developed, particularly along the main roads out of Kampala, but the hills further north are less populated and visually more attractive. The valleys contain a mixture of small-scale farming, marsh and remnant areas of forest. The Kawanda Agricultural Station creates a distinctive landscape, with its large-scale cultivation, institutional buildings and formal tree planting. The Namalere Agricultural Station to the north-east provides a similar landscape on a smaller scale.
- **Northern Kampala Farmland** -An area of relatively low relief to the north of Kampala, with ridges generally rising to 1,180-1,200 m AMSL between valleys at 1,140 m AMSL. A hill at Misindye rises to 1,260 m AMSL. Small-scale agriculture is the main land-use and determines the vegetation character and the limited extent of most views. Villages extend along most of the roads and tracks. The valley bottoms become drier towards the east and are usually farmed or contain remnants of forest. There are some larger dairy farms, mostly near Nyenje, and the large District Farm Institute to the south. Just to the west, near Namyoya, is part of the Namyoya CFR, with small areas of degraded forest on the ridge and larger areas of timber plantations. A small tea plantation lies between the forest and the farms.

Figure 3.1 Biophysical Features

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Figure 3.2 Photographs of Landscape Units

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- **Sezibwa Farmland** -This area extends eastwards from the narrow band of the Kifu CFR towards the fringes of the Mabira Forest. The hills are more prominent, rising to 1,200 m AMSL at Kifu and 1,160 m AMSL elsewhere. The Sezibwa is the main river flowing north through the area. The usual pattern of small-scale farms is broken up by several large sugar and tea estates, large farms, and areas of remnant forest outside the reserves.
- **Mabira Fringes** -This contains the highest land along the route, with crests rising to 1,330 m AMSL. There are steep slopes near the crests of the ridges; these become increasingly rough and rocky, with a covering of scrub or thin woodland where not cultivated. The slopes range from 1:2.5 to 1:4. There are several tea and sugar estates along or close to the route, where the open landscape contrasts with the Mabira Forest. There are limited areas of small-scale farming, mostly around the forest edge. Wide-ranging views from the open high ground are common.
- **Mabira Forest** – The Mabira CFR, which covers an area of 29,974 ha (Forestry Department, undated), is generally high ground, with hilltops at 1,300 m AMSL in the west and 1,260 m AMSL in the east and valleys at 1,140 m AMSL. The forest cover is discontinuous but relatively dense, with numerous plantain plantations. Views are limited, apart from those along the existing transmission line. There are two areas where settlement and cultivation extend in as far as the transmission line at Sseso and Nkaga.
- **Eastern Farmland** -The landform east of the forest is relatively open, with hills rising to 1,350 m AMSL to the southeast and to 1,200 m AMSL to the north. Sugar and tea estates cover much of the higher ground and the area immediately east of the forest. Small-scale farming occupies most of the rest of the land east towards the Nile valley, with a high proportion of tree crops, which tend to reduce views of the surroundings, especially near the river. The Nile is deeply incised between steep banks in this section of the study area. Small settlements are frequent in the area and extend along almost the entire Njeru-Kayunga Road, between Njeru and Kangalumira.

Figure 3.1 also shows the location of existing transmission lines within the region. A double circuit line runs northwest from Jinja towards Kampala through the Mabira CFR and ends at the Kampala North substation. This “northern line” was built in the 1950s to evacuate power from the Owen Falls hydropower station. A second double circuit line was financed by DANIDA and completed in 1993. Referred to locally as the “DANIDA line”, it runs southwest from Jinja to Lugogo substation, located east of Kampala. An additional transmission corridor also exists between Jinja and Kampala that is strung with a single-circuit 66 kV line between Nalubaale (Owen Falls) substation and the Town of Lugazi and a single-circuit 33 kV line between

Lugogo substation and the Town of Mukono. Between Lugazi and Mukono, there are no conductors.

3.3.3 Hydrology, Drainage and Wetlands

The entire area of the alignment is dominated by the Lake Victoria Basin, formed by tectonic movements that started during the Miocene period (about 25 million years ago) and culminated in the formation of the East African Rift Valley. There are two main hydrological features on the proposed transmission line route: the River Nile to the east, and the Lubigi swamp to the west. The hydrological, physical and biological characteristics of the upper reaches of the River Nile have been reviewed in detail in the EIS for the hydropower component of the Bujagali project (WS Atkins, 1999).

To the north of Kampala, in the area of Kawanda, the transmission line will cross a number of poorly drained areas with resulting seasonal swamps, in particular the Mayanja swamp immediately south of the Kawanda Agricultural Station. Given the relatively small size of these swamps no towers will have to be sited within the swamps themselves. The conductor will span the swamp between towers on high ground adjacent to the swamp. Seasonal swamps are avoided since construction is more difficult than on dry sites. The swamps are also important breeding grounds for a number of bird species, including the crested crane, Uganda's national symbol.

The Lubigi swamp, which lies approximately 8 km west of central Kampala, is a large permanent wetland area. The proposed alignment, which has been optimised to minimise disturbance to the swamp, follows the western and southern sides of the Lubigi swamp for a distance of approximately 6 and 3 km, respectively. Of the total 9 km length, approximately 1.2 km of the proposed transmission line will run adjacent to, and immediately south of, a railway line which itself runs through the swamp, while another 2 km will cut across the swamp itself. Where the proposed transmission line is located on land adjacent to the swamp, the proposed towers vary from approximately 50 m to 200 m from the edge of the swamp.

In addition to the above features, the transmission line will traverse smaller watercourses that generally drain from south to north, despite the presence of Lake Victoria only a few kilometres to the south. These watercourses include a few permanent and seasonal streams within the Mabira and Kifu CFRs, which form ecologically important riverine corridor habitats, as well as drinking water sources for forest animals. Of these, the largest are the Musamya and Mobugwe (intermittent) and the Sezibwa (permanent) Rivers, which rise in the hills to the south of Mabira, around Seta and Buikwe, and eventually flow into Lake Kyoga.

3.3.4 Seismicity

The transmission system routes proposed for the Bujagali project areas are located in a relatively aseismic region, midway between the eastern and western sections of the

African Rift System (Knight Piesold/Merz & McLellan, 1998). Details of seismicity in the transmission system route can be found in *Bujagali Hydropower Project Feasibility Study, Volume 1 – Main Report, 1998* (Knight Piesold/Merz & McLellan, 1998). Additional seismic hazard analysis will be carried out under the Engineering, Procurement and Construction (EPC) contract. Figures derived by the EPC contractor will be subject to review and acceptance by UETCL, as well as review by the project's main lenders.

3.4 Atmospheric Conditions

3.4.1 Climate

The project area belongs to the Lake Victoria Climatic Zone. The zone is characterised by small temperature variations throughout the year.

Rainfall is influenced by Lake Victoria, the Mabira CFR and Lake Kyoga. The rainfall pattern is distinctly bimodal, with peaks occurring in March-May and again in September-November. Average annual rainfall is in the range of 1,200 mm to 1,500+ mm, depending upon the location. A dry spell occurs in December-February and a less pronounced one in June-August, when potential evapotranspiration is greater than rainfall. A summary of rainfall and evapotranspiration data collected in Mukono District (in which much of the transmission system is located) is included in Appendix B.2.

Mean annual temperatures recorded throughout Mukono District range from 23.5°C to 24.1°C. Mean maximum temperatures recorded range from 25.1°C in July to 27.5°C in January, while the minimum mean recorded temperatures range from 14.2°C in August to 16.0°C in April. At the extremes, the highest temperature recorded is 32.2°C in January and the lowest is 8.3°C in August. Meteorological measurements taken at Kizuza Agricultural Research Station are included in Appendix B.2.

3.4.2 Wind

Wind speed and direction data were obtained from the Department of Meteorology for their Jinja-Kimaka meteorological station. The data covered the period January 1999 to June 2000. Measurements were made four times a day at 06:00, 09:00, 12:00 and 15:00 hours. The full year from July 1999 to June 2000 was analysed. Detailed data are included in Appendix B.2.

The local meteorology is characterised by a very high frequency of southerly winds. Prevailing southerly winds occur for over 30 percent of the year. Winds from the west-northwest to the east are very infrequent.

Wind speeds between 5 to 7 knots occur most frequently, and between 7 and 9 knots half as often. Southerly winds in these speed ranges occur for over 20 percent of the year. This is also the only direction from which higher winds (9+ knots) arise to any significant extent.

Given the recorded conditions at Jinja, wind erosion of exposed ground is unlikely to be a significant source of airborne dust. Dust generated by mechanical disturbance of soil most probably would affect an area limited to the north and northwest of the source.

3.4.3 Ambient Noise

During the field surveys undertaken for the transmission system route, observations regarding existing noise were made, although no instrumental noise measurements were made. Noise levels along the route are expected to be consistent with typical rural areas found in developing countries (Jackson and Leventhall, 1985). From the field surveys that have been carried out for other aspects of project health and safety, it is noted that there are currently no significant sources of noise in the rural and Mabira Forest areas. Such conditions extend for the majority of the route from Bujagali, through the Mabira CFR, and westwards to the proposed substation at Kawanda, as well as the sections through Lubigi Swamp. Levels observed are believed to be consistent with the World Health Organisation recommendation that external noise levels should be less than 45 dBL_{Aeq} (WHO, 1980).

Where the line crosses more densely settled areas, i.e., western Kampala and/or areas with industry (e.g. brick works at Naalya), ambient noise levels are expected to be higher than in the more rural areas. Nevertheless, due to the work and social patterns of the local residents, noise levels at night fall significantly, although not as low as typical rural areas.

The situation changes dramatically as the route swings east towards Natete and the sub-station at Mutundwe. Natete in particular is a thriving, busy township area, with significant human activity, industry, markets, heavily trafficked with matatus, buses and heavy goods vehicles (HGVs). Consequently, the daytime noise levels are likely to exceed 65 dBL_{Aeq} for most of the day, and potentially well after dusk. Although no measurements have been made in the area, it is assumed that noise levels at night will exceed those experienced elsewhere, and be in the region of 40-45 dBL_{Aeq}. Monitoring of noise levels is discussed in Chapters 7 and 8.

3.5 Biological Conditions

The proposed transmission line will traverse four ecologically significant areas: Mabira CFR, two smaller CFRs, Kifu and Namyoya (the latter also known as Mwola) and Lubigi Swamp. In addition to a review of the literature on the flora and fauna of these areas, plant, bird and mammal surveys were carried out in the Mabira, Kifu and

Namyoya CFRs during January 1999 and November 2000. This survey work was repeated in 2006. The 2006 work included additional surveys of the invertebrate, reptile and amphibian fauna of the forest areas as well as plant, invertebrate, reptile, amphibian, bird and mammal surveys of the Lubigi Swamp. Detailed information from these surveys is included in Appendix B.3. Refer to Figure 3.1 for the location of these survey areas.

The national forest estate comprises 721 CFRs encompassing 71 percent of Uganda's 94 recognised vegetation communities across the forest and savannah zones of the country, totalling 15,000 km². Within the country's CFRs, 20 percent of the forest estate is dedicated to biodiversity preservation (classified as Nature Reserves), 30 percent to environmental protection allowing some low-impact uses, and 50 percent is managed for sustainable timber production. Within each forest, a totally protected 'core' area is managed as a Nature Reserve and is surrounded by a buffer zone where low-impact uses are permitted. Sustainable timber production is undertaken in areas closer to the reserve boundary (Forest Department, 1999).

The 65 principal forests within Uganda were ranked in terms of their biological importance (out of a total of 721 forests countrywide) (Forestry Department, 1999). Mabira CFR ranked 27th out of the 65 principal forests. It scored 6.4 out of 10 on species diversity, 6.7 out of 10 on rarity value, and 13 out of a maximum of 20 on biodiversity importance. Although Kifu and Namyoya are also CFRs, they have not received the same level of management by the Forest Department (now the National Forest Authority, or NFA) as Mabira CFR, nor have they been scored in the same way.

3.5.1 Mabira CFR

Mabira CFR is the largest natural high CFR in the biogeographical zone of Lake Victoria Crescent (Forest Department, undated). Its boundaries are shown in Figure 3.3. It can also clearly be seen in the satellite image provided as Figure 4.4.

Mabira Forest has been, and remains, an important source of forest products. From a production point of view, the forest is less valuable today than in the past. The reserve has suffered significant destruction through illegal removal of forest products and agricultural encroachment that have threatened the forest's flora and fauna, in particular during the politically turbulent 1970s and 1980s. Illegal pitsawing (banned in reserves since 1992) and charcoal production continues to be a problem. Due to its

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Figure 3.3 Mabira Forest Reserve

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proximity to population centres such as Kampala, Mukono, Lugazi and Jinja, its role as a recreational centre is important. Thus, the management of Mabira is based on the productive, conservation and recreational functions of the forest (Forest Department, undated).

3.5.1.1 Establishment of CFR

Mabira CFR Forest Reserve was established in 1900 under the Buganda Agreement. It was first gazetted as a Central Forest Reserve, together with Namakupa CFR, in 1932. The two reserves were regazetted in 1948 with an area of 30,003 ha. A number of leases were granted over some parts of the forest and, considering the length of the leases before their expiry, the government decided to excise these leases from the main body of the reserve. Under legal notice No. 78 of 1962, Mabira CFR was regazetted with an area of 29,974 ha. The reserve is subject to the provisions of the Forest Act with its control vested in the NFA (Forest Department, undated).

3.5.1.2 Forest Cover

The vegetation of Mabira CFR is classified as “medium altitude moist semi-deciduous” (Langdale-Brown, 1964). However, the forest has been greatly influenced by human activities, including timber harvesting, cultivation and grazing, for such a long time that it is regarded as secondary forest resulting from, and constantly being influenced by, human activities. The reserve is characteristic of vegetation types representing sub-climax or human-altered plant communities. Three vegetation sub-types are recognised: young or colonising forest; mature mixed forest; and, *Celtis* mixed forest.

In the past, the forest consisted of three forest types. The youngest of these was dominated by the colonising tree *Maesopsis eminii* that was associated with *Albizia* spp., *Markhamia lutea*, *Sapium ellipticum* and *Celtis* spp. This association covered about 25% of the reserve’s area. The second forest type was classified as a young mix of *Celtis-Holoptelea* forest which together formed 59 percent of the CFR. The final community was a poor mixed forest of wet valley bottom sites, dominated by *Baikiaea insignis*, which until recently covered about 15 percent of the reserve.

However, in the 1950s-1960s mechanical logging took its toll on trees. The largest trees were harvested and destruction was at its greatest because of the uncontrolled harvesting. This was followed by charcoal burning and encroachers who began to settle in the forest. In the 1960s, some silvicultural operations were undertaken, including the replanting of *Maesopsis eminii* at the forest edges to minimise the encroachment by settlers and to enrich the forest. During the 1970s and 1980s, the forest was essentially depleted of all high economic value tree species and encroachment took place on an even larger scale. In 1992, the encroachers were evicted and the affected areas replanted with paper mulberry, especially on the

southern side of the existing transmission line. Today, only 0.06 percent of all trees are high economic value species, while 47.5 percent are moderate value tree species. The remaining 52.4 percent of the growing stock consists of tree species of low economic value (Davenport *et al*, 1996).

Since 1990, the Forest Department/NFA has received support from the European Union. The EU-financed Natural Forest Management and Conservation Project has enabled the re-demarcating and planting of live markers (e.g. tree seedlings) along parts of the Mabira CFR boundary and the establishment of an ecotourism project (Forest Department, undated).

3.5.1.3 Biodiversity

Biodiversity is valued on the basis of two distinct attributes: ‘richness’ (expressed in terms of species numbers) and ‘rarity’. Since these two attributes are rarely maximised in the same place, each of these attributes was considered separately when the Forest Department conducted its biodiversity survey in 1996. Mabira CFR ranked as above average for birds and butterflies, average for other taxa and has 81 restricted range species (refer to Table 3.2 below). Three hundred and twelve (312) tree species have been recorded in Mabira CFR, of which nine species are of restricted range, and one (*Caesalpinia volkensii*) is not known elsewhere in Uganda. Howard (1991) reported seven rare tree species that occur there as part of a limited range in Uganda, and five species are listed as endangered. No tree species is endemic to the country. Fauna in Mabira CFR include 287 bird species, of which 37 are of restricted range, nine are uncommon and one, Tit Hylia (*Pholidornis ruficauda*), is unique to Mabira CFR in the East African part of its range. Other faunal species unique to this forest include six butterflies out of the 218 species recorded, and one moth.

Table 3.2: Summary of Biodiversity and Conservation Importance of the Five Indicator Taxa Surveyed in Mabira CFR

| Number of Species Known Within the Forest | Trees & Shrubs | Birds | Small Mammals | Butterflies | Large Moths |
|---|----------------|-------|---------------|-------------|-------------|
| | 312 | 287 | 23 | 218 | 97 |
| No. of restricted range species known from <5 forests | 9 | 37 | 1 | 27 | 7 |
| No. of regional endemics | - | 0 | 1 | 0 | 0 |
| No. recorded in 1996 inventory | 284 | 107 | 16 | 199 | 97 |
| Species diversity | ** | *** | ** | *** | ** |
| Species conservation value | ** | *** | ** | *** | ** |

Key: Star ratings indicate values relative to other 64 Uganda forests investigated under the survey programme:

*** Site is within top 10% of sites ** Site is within top 11-25% of site Source: Biodiversity Report (Davenport *et al*, 1996).

None of the large mammals found within Mabira CFR are endemic to Mabira CFR or considered to be threatened. Despite the fact that Mabira CFR is regarded ecologically as a secondary forest, owing to prolonged human impact, it still retains a substantial number of small mammals (including rodents and elephant shrews) and some large ones like blue and red tail monkeys (*Cercopithecus* spp.), bush pigs (*Potamochoerus larvatus*), bush bucks (*Tragelaphus scriptus*) and forest duikers (*Cephalophus* spp.) (Davenport *et al.*, 1996).

Mitigation measures to be taken to minimise the impact of the wayleave through Mabira CFR (as a result of the proposed transmission line being sited immediately adjacent to, and parallel to, the existing 132 kV line) are addressed in Chapter 7, Section 7.3.2.3.

3.5.1.4 Forestry Nature Conservation Master Plan and the 1997-2007 Forest Management Plan

In late 1998, the Forest Department published its Forestry Nature Conservation Master Plan. This was finalised by the NFA in 2002, and excerpts from this version which relate to Mabira CFR are included in Appendix B.4. As stated in the Forestry Nature Conservation Master Plan, Mabira CFR is designated a CORE conservation forest in recognition of its biodiversity importance, in particular because:

- The site contributes more than 1% of the national protected area system complement;
- The site supports at least one unique tree species that is of conservation importance; and,
- The site supports the only example of medium altitude moist semi-deciduous forest type D1 in the country's protected area system (Langdale Brown *et al.*, 1964; Forestry Nature Conservation Master Plan, 1999).

Although the number of tree and shrub species known from Mabira is quite high, the reserve is poor in restricted-range species, and only one species is unique to this forest (*Caesalpinia volkensii*) (Davenport *et al.*, 1996). These authors therefore consider that Mabira CFR is a forest of low importance for the conservation of known rare tree and shrub species, but emphasise that inventories to date are incomplete and the possibility of some rare species being missed cannot be ruled out.

A forest management plan (FMP) for Mabira CFR was completed, and covers the period 1997 to 2007. This is due for review and updating by June 30, 2007. In addition to Mabira CFR, this Forest Management Plan includes Namakupa, Nadagi, Kalagala Falls, Namawanyi and Namananga CFRs – small reserves varying from 104 ha to 479 ha (Forest Department, undated). The FMP for Mabira CFR states that the management objectives are to:

- Conserve the forest biodiversity and ecological conditions;
- Produce timber and non-timber forest products (NTFPs) on a sustainable yield basis using the most efficient methods, i.e., without compromising the capability of the forest to provide environmental services;
- Integrate the communities within the forest enclaves and parishes surrounding the CFR into the management of the forest;
- Provide recreational facilities for the people of Uganda, visitors and tourists; and,
- Carry out research aimed at obtaining information on various aspects of forest ecosystem dynamics for the improvement of the management of Mabira Forest in particular, and other forests in general (Forest Department, undated).

The zonation for Mabira CFR in the vicinity of the transmission line is presented in Figure 3.3, and in its entirety in Appendix B.5. The existing 132 kV transmission line from Nalubaale to Kampala passes through areas of “Recreation/Buffer”, Production “High Impact” and Production “Low Impact” zonation within the CFR. In addition, the line passes adjacent to 1.8 km and 2.0 km of cleared settled area (village enclave) on the north and south respectively.

The *Strict Nature Reserve Zone*, which lies immediately north of the *Recreation/Buffer Zone*, is 2.4 km away from the existing transmission line at its closest point. The objective of the *Strict Nature Reserve* is to protect and conserve a viable area of semi-deciduous forest type D1 for biodiversity preservation, wilderness protection, scientific research and environmental services. The adjacent *Recreation/Buffer Zone* to the south and southwest of the core is intended to enhance the long-term viability of the core area, while allowing controlled access for recreational activities centred around Najjembe and the Musamya River.

3.5.1.5 Tourism Within Mabira CFR and Surrounding Area

According to the 1997-2007 Forest Management Plan for Mabira CFR, an area south of the existing transmission line has been designated for recreational purposes. The Forest Department developed infrastructure at Najjembe station with assistance from the EU in accordance with its tourism development policy. Facilities include a visitors’ reception and office, two *bandas* (simple guesthouses), a picnic area, campsite and a trail network. By mid-2000, these facilities had deteriorated to the extent that visitor usage was declining (Roberts, 2000). Currently the NFA is moving towards implementing a proposal to improve the tourism infrastructure (Analysis of Future Options for Forest Department Eco-Tourism Development (Roberts, 2000)). It is proposed that the tourism infrastructure be moved further north to reduce the impact of noise from the main Kampala-Jinja Road, and to extend the network of forest trails, possibly creating a loop trail extending as far north as Kalagala Falls. Kalagala Falls CFR would also be developed to include campsites and *bandas*.

An important new development is the imminent opening of a luxury ‘eco-friendly’ lodge project located deep within the Mabira CFR some 25 km from Jinja. This

development of 15 lodges is a joint venture between Inns of Uganda, a local up-market lodge operator with two existing lodges in two of the major wildlife parks in western Uganda and a Dutch eco-tourism/wildlife, specialist lodge operator with existing operations in Surinam and elsewhere in Africa.

3.5.1.6 Current Land Uses Within the Forest

The wayleave of the existing 132 kV corridor is generally 30 m wide in order to avoid the risk of trees falling onto the line. A field survey was undertaken in November 2000 to determine the level of cultivation being undertaken along the existing wayleave through Mabira CFR, as well as immediately outside the boundary of the reserve. The survey findings indicate that much of the wayleave outside the CFR, as well as inside the community enclaves, was being cultivated. In addition, several transects had semi-permanent or temporary dwellings within the wayleave. Several communities were present in this area before Mabira CFR was gazetted. These community enclaves were formally recognised and were excluded when the forest was gazetted. Based on the results of the field survey, it appeared that these settlers generally recognised forest regulations and avoided cultivating within the gazetted forest, but that they cultivated within the wayleave itself.

Field surveys in 2006 have shown that UETCL now maintains the wayleave as a ‘no-cultivation’ area more strictly than UEB did in 2000. This can be seen from the photographs in Figure 3.4. Very little plant growth above knee height was seen, and no crops were seen in the wayleave.

3.5.1.7 Access Within the CFR

During the 2000 field survey, large portions of the wayleave were not accessible by foot or vehicle due to excessive scrub growth and collapsed bridges and culverts. The wayleave is now better maintained by UETCL, and since 2000, all of the culverts and bridges appear to have been upgraded (see Figure 3.4B). Combined with a graded access track along the wayleave, and regular removal of scrub (and possibly crops), the length of the wayleave is now easily accessible by 4WD vehicle. (refer to Figure 3.4A for photos taken along the wayleave).

Numerous tracks (seasonably accessible) currently provide access to and through Mabira CFR and are described in more detail in Section 3.5.1.7. No new access roads will be constructed in Mabira CFR for erection of the new transmission system. Existing access tracks will be used for construction access, with spurs made to tower locations, rather than a new access track being constructed along the length of the new wayleave. Access may be controlled during and after construction, in collaboration with the NFA. Additional details are provided in Chapters 5 and 7 of this report.

Figure 3.4A Photographs of Wayleave Within Mabira Forest Reserve

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Figure 3.4B Photographs of Wayleave Within Mabira Forest Reserve

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3.5.1.8 Ecological Surveys Conducted Within Mabira CFR

Vegetation surveys conducted in 2000 and again in 2006 (MUIENR, 2000 & 2006) along the existing transmission line through Mabira CFR indicate that there is a distinction between the state of the forest north and south of the existing transmission line, and between the eastern portion of the CFR versus the more westerly portion. Refer to Table 3.3, below, and Figure 3.1 for locations of transects. Complete records for all of the species encountered during both the 2000 and 2006 surveys is included in AESNP (2001) Appendices C.6 to C.8, and in Appendix B.3 to this SEA Report.

Table 3.3: Locations of Transect Sites Used for Ecological Survey Within Mabira CFR

| Site | Tower No. |
|-----------------------------|--|
| Site 1 | Tower 179 |
| Site 2 | Tower 174 |
| Site 3 | River Waliga (between Towers 169 and 170) |
| Site 4 | Tower 164 |
| Site 5 | Tower 158 |
| Site 6 | Tower 154 |
| Site 7 | Tower 149 |
| Site 8 | Tower 144 |
| Site 9 (Within Kifu CFR) | Tower 66 |

The 2000 survey identified that the section north of the existing transmission line was characterised by gaps in the upper-storey canopy, as indicated by the presence of light-demanding pioneer species such as *Alstonia boonei*, *Canarium schweinfurthii*, *Margaritaria*, *Zanthoxylum*, *Costus* and *Palisota* interspersed in a fairly mature mixed forest of mainly *Celtis* and to a lesser extent *Holoptelea*. Shade bearers included *Memecylon*, *Rinorea* and *Trichilia*. The 2006 survey identified a relatively intact forest community on the northern side of the transmission line, particularly along Transects 5 to 8. This area was characterised by larger forest trees with a sparse undergrowth.

In 2000, the section south of the existing transmission line was mainly in the colonisation stage characterised by pioneer invasive species (Swaine and Whitmore, 1988) such as the introduced *Broussonetia papyrifera* and colonising species such as *Lantana camara* and *Solanum mauritanium*. There were also immature tree species that are light demanders e.g. *Celtis*, *Albizia* and *Lasciodiscus*. Corridors appear with fairly different vegetation consisting mainly of *Strombosia schefflera*, a rare species countrywide, interspersed with *Chrysopyllum* and *Celtis*. In 2006 the southern area from Transect 5 to 8 was characterised by a similar range of species as described

above with climbers such as *Agelaea ugandensis* and *Acacia pentagona* being more dominant.

Resilient species, which are able to stand the ‘pressures’ of ingress to the existing wayleave by humans and grazing animals, tend to colonise and dominate the 12.5 m on either side of the transmission line and include *Ocimum grattisimum*, *Solanum mauritianum*, *Lantana camara*, *Broussonetia papyrifera*, *Tithonia diversifolia* and *Cynodon dactylon*.

The northern side of the existing transmission line, starting from about transect site 3 (between towers 169 and 170 following River Waliga) to the western end of the forest is relatively more intact than the southern side. The southern side (mostly between transect sites 1 and 5) was adversely affected by human activities until about 14 years ago when encroachers were evicted. This area is now covered by secondary regrowth with sparse upper canopy cover. Vegetation surveys indicated that the eastern portion of the reserve is predominantly degraded forest with remnants of high rainforest species encountered, or secondary forest dominated by *Lantana camara* with some saplings of forest species. The riverine habitat along the River Waliga (located between Towers 169 and 170) has been less impacted to the north of the existing transmission line (65 percent upper canopy cover) than to the south (50 percent upper canopy cover). Lightly logged mature mixed forest tended to dominate north of the existing transmission line in 2002 while the invasive *Broussonetia papyrifera* tended to dominate this area in the 2006. *Chrysophyllum prunifomes*, a rare plant species, was recorded on this transect in 2002.

Mahogany species, namely *Entandrophrama cylindricum*, *Etandrophragma angolense* and *Khaya anthotheca* were rare in both 2000 and 2006 surveys. These species are listed as globally threatened species and are categorised as Vulnerable (IUCN, 2000).

A total of 17 species of odonata and 165 species of butterfly were recorded within the Mabira CFR during the 2006 survey. Odonata species identified included the *Orthetrum macrostigma*, which was only previously known to occur in Bwindi Forest, and the Uganda endemic species *Chlorocypha trifaria*. Two restricted range forest dependant species of butterfly were identified in the Mabira CFR including *Neptis trigonophora*, *Acraea rogersi*.

The Mabira CFR area was included in a survey of amphibian and reptile fauna in 2006. No species of particular conservation concern falling under the IUCN red list categories were encountered or recorded. One amphibian, *Artholeptis adolfriederici*, was recorded for the first time in the Mabira CFR.

Despite a drop in forest bird species numbers between 2000 and 2006, almost as many of the species of conservation concern were recorded. Eight species of

conservation concern were recorded in the earlier year, while seven species of conservation concern were recorded in 2006, including two that are globally-listed (Table 3.4).

Table 3.4: Globally and Regionally Threatened Species Recorded in Mabira Forest in 2006

| Atlas No. | Species | Forest Category | IUCN Red List Category |
|-----------|---|-----------------|--|
| 86 | BROWN SNAKE-EAGLE <i>Circaetus cinereus</i> | | Regionally Near Threatened (R-NT) |
| 124 | CROWNED EAGLE <i>Stephanoaetus coronatus</i> | FF | Regionally Vulnerable (R-VU) |
| 156 | NAHAN'S FRANCOLIN <i>Francolinus nahani</i> | FF | Globally Endangered/Regionally Vulnerable (G-EN, R-VU) |
| 290 | GREY PARROT <i>Psittacus erithacus</i> | FF | Regionally Near Threatened (R-NT) |
| 498 | WHITE-HEADED SAW-WING <i>Psalidoprocne albiceps</i> | F | Regionally Near Threatened (R-RR) |
| 551 | TORO OLIVE GREENBUL <i>Phyllastrephus hypochloris</i> | FF | Regionally Vulnerable/Regionally Near Threatened (R-VU/RR) |
| 559 | GREEN-TAILED BRISTLEBILL <i>Bleda eximia</i> | FF | Globally Vulnerable (G-VU) |

In total 35 species of mammals were recorded in the 2006 ecological survey of Mabira forest, distributed in varying levels of species richness in the different transect locations. The lowest species richness was recorded along transect 1, near the eastern edge of Mabira, which is largely dominated by *Broussonetia papyrifera* and has a very poor and sparse understorey. Although several of the mammal species recorded during these surveys (*A. paludinosus*, *M. longipes* and *D. ferrugineous*) appear in the IUCN records of assessed mammals (IUCN 2006), none of them has a high category threat level.

3.5.2 Namyoya CFR (also known as Mwola CFR)

Although Namyoya CFR is shown on the 1:50,000 mapsheets as Mwola CFR, the Forest Department has confirmed that the CFR is actually named Namyoya CFR, with Mwola CFR located adjacent to Lake Victoria (Forest Department, 2000).

Namyoya CFR was established in the 1960s as a Natural Forest Reserve. Prior to 1996, the reserve was managed for production and environmental benefits. However, the reserve is located in a densely settled area and was severely degraded due to encroachment.

A private woodlot farming programme was introduced into this 389 ha CFR in 1996. Under this scheme, individuals, institutions and companies with interest and the resources to invest in tree planting were encouraged to apply to the Commissioner for Forestry through their respective District Forest Officers for CFR land. The investor is required to pay ground rent and may plant only trees. The CFR land remains the property of the government but the trees planted belong to the investor who is free to use or sell them for income. In 1996, 189 ha were given out to private tree farmers through permits with the remaining 200 ha given out in 2000. The majority of trees planted to date have been Eucalyptus, although *Cupressus lusitanica* (cypress), pines and *Maesopsis eminii* (musizi) have also been planted (Oluka-Akileng, 2000).

The transmission line was originally proposed to run immediately adjacent to, and north of, the existing 132 kV line (WS Atkins 1999b). However, in order to avoid a school and church at Nyenje (UTM 36N 4700440), Carl Bro (2000) recommended that the proposed line be moved to the north. The transmission line now avoids the school and church by 800 m. The line was also shifted so as to cross the Namyoya CFR at its narrowest point. The line as now proposed will cross through 350 m of the reserve, approximately 1.8 km to the north of the existing line. Specific mitigation measures that will be undertaken by UETCL to minimise disturbance to Namyoya CFR are detailed in Chapter 7.

Flora and fauna data were collected along the existing transmission line that cuts through the southern portion of the reserve, as well as along the proposed transmission route that passes through the northern section.

By 2000, the southern section of Namyoya CFR had been converted to *Eucalyptus saligna* plantations. A few coppiced stumps of *Lovoa*, *Celtis* and *Albizia* were present among the *Eucalyptus saligna*. Gardens of cassava, sweet potatoes and maize were established along the existing transmission line between Towers 51 and 52 and extended beyond the official 30 m wide wayleave. The degraded natural forest, which had very few trees larger than 3 cm dbh, was in the process of being cut down and converted to *Eucalyptus* plantation. By the time of the 2006 survey, this plantation was well established.

Of the three CFRs situated along the existing transmission route, Namyoya CFR has the lowest proportion of forest specialist bird species, an indication that the forest cover is either very scattered or is composed of a limited variety of species. Namyoya CFR, both in the northern and southern sections, has fewer bird species than Mabira CFR. Two regionally near-threatened species were recorded along the proposed transmission line: Shrike Flycatcher (*Megabyas flammulata*) and Brown Snake Eagle (*C. cinereus*). Four regionally near-threatened species were recorded along the existing transmission line: Grey Crowned Crane (*Balearica pavonina*), Grey Parrot (*Psittacus erithacus*) as well as the Shrike Flycatcher and Brown Snake Eagle (Kityo and Pomeroy, 2000).

Field surveys and interviews with local people in 2000 revealed that some larger mammals ranged into the CFR, including vervet monkeys (*Cercopithecus aethiops* and *C. ascanius*), bush pigs (*Potamochoerus larvatus*) and bush bucks (*Tragelaphus scriptus*). By 2006, the reserve did not retain much importance for forest interior mammals. The only forest interior mammals that were recorded in this area were Red Tailed Monkeys. Given that the forest is now converted for growing Eucalyptus, it is not likely that this species will survive in this area for a very long time. All other mammals recorded for this area are those of wide spread occurrence for which Namyoya is not a significant part of their range and/or for their conservation.

Additional details on the ecological surveys undertaken are included in Appendix B.3 to this report, and Appendix C to AESNP (2001).

3.5.3 Kifu CFR

Kifu CFR to the south of the existing transmission line is in a secondary growth state with thick undergrowth of *Maesopsis emini*. The sections of the forest to the North of the transmission line are currently under plantation forests; the same is the case in Namyoya. The two are however under different management regimes, with Kifu still under the direct control and management by the National Forestry Authority (NFA) while Namyoya was leased out to individual holders to grow trees. At the time of the 2006 surveys, all plots visited had Eucalyptus either growing or recently harvested.

Plantation habitat does not provide complex undergrowth, and thus is poor habitat for forest interior mammals. The undergrowth is important because it provides among other things:

- Cover for the mammals;
- A source of food both for themselves and the other organisms they feed on; and,
- Maintains ambient environmental conditions for forest interior species.

More details on the flora and fauna surveys undertaken are included in Appendix B.3 to this report, and Appendix C to AESNP (2001).

3.5.4 Wetlands

The National Wetlands Programme (NWP) started in 1989, as a collaboration between the Government of Uganda, the Government of Norway and IUCN. In 1992, the Government of the Netherlands became involved. Over the years, the importance of the Programme for the management of wetlands and the livelihoods of communities has increased. Now, the NWP is institutionally embedded within the Wetlands Inspection Division of the Ugandan Ministry of Water and Environment.

The Ugandan Constitution contains a clause '*Wetlands should be held in trust by the Government for the benefit of all the people*'. The incorporation of the NWP into the Government system is an expression of that commitment to wisely manage wetlands for the future benefit of the Ugandan people.

The Lubigi Swamp is the only permanent wetland area within the proposed transmission system. It is situated to the west of Kampala and north of the Mutundwe substation (see Figure 3.1). The swamp represents a typical papyrus swamp vegetation type found throughout Uganda. In 1998, NWP personnel acknowledged that some future encroachment into Lubigi Swamp is likely inevitable due to the swamp's proximity to the Kampala urban area (Dr. M Litterick, pers. comm., 1998). Observations made in 2006 confirmed that such encroachment is taking place. The conservation status is well below that accorded to the important wetlands around Murchison Bay to the southeast of Kampala (Dr. M Litterick, pers. comm., 1998).

Although Lubigi Swamp is situated within 15 km of Lake Victoria, it forms the headwaters of a continuous flooded valley system that eventually drains into Lake Kyoga. It is a flat valley through which the Lubigi River runs. The valley bottom is primarily papyrus swamp, part of which is seasonally dry. The main area of the swamp extends in a westerly direction from Mutundwe, but a principal arm extends for some 7 km northeast towards the northern outskirts of Kampala. This arm has a maximum width of about 650 m, and comprises dense papyrus vegetation transitioning into reed swamp at its northern extremity. The seasonal variation in water level, and hence the area of the wetland is not recorded, but the NWP reports that seasonal flooding can be extensive in the area (Dr. M Litterick, pers. comm., 1998). In times of high water levels, there may be areas inundated, over and above what is indicated on the mapsheets in Figure 3.1 map 1 of 3, in particular a 2 km stretch north of Lubigi Swamp and a low-lying area south of Kawanda Agricultural Station.

Until recently, the swamp supported populations of Sitatunga (*Tragelaphus spekei*), an antelope adapted to living in swamps that is widespread in tropical Africa. In recent years, individuals have been reported here several times. Lubigi Swamp is dominated by *Cyperus papyrus*, which is commonly found throughout Uganda, as well as many other plant species. Small-scale harvesting of papyrus is carried out on both the western and eastern margins of the Lubigi Swamp and cattle grazing takes place on the marginal grasslands. The grass species *Paspalum vaginatum*, which is found in Lubigi swamp, is a rare perennial grass that, grows up to 0.6 m high in swampy, saline and alkaline soils. This species is preferred by Sitatunga for grazing.

Bird surveys were carried out in Lubigi Swamp during July 2006, during which ninety-five bird species were recorded, but the majority were not strictly waterbirds, their presence being due either to their being generalists, such as the Common Bulbul, or to the fact that there were many trees in and near to the swamp.

The only species to occur at all six sites was the Grey-capped Warbler. The next commonest species were the Papyrus Gonolek and Winding Cisticola. A Jack-knife estimate for total species richness obtained a figure of 131, which is moderately high. So, it is evident that the swamp, despite its closeness to Kampala, and levels of human disturbance, still has notable numbers of birds, of great variety and in good numbers. There were few species of conservation concern, but the high diversity is in itself a measure of the importance of these swamps.

Mammal species recorded in the Lubigi swamp are outlined in Table 3.5 below.

Table 3.5: Mammals Recorded in Lubigi Swamp, July 2006

| Species | Sampling Locations Along Lubigi Swamp | | | | | | General Swamp Records |
|---|---------------------------------------|---|---|---|---|---|-----------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| Insectivora | | | | | | | |
| Northern Giant Musk Shrew (<i>Crocidura olivieri</i>) | √ | | | | | | |
| Shrew (<i>Crocidura</i>) | √ | | | | | | |
| Primates | | | | | | | |
| Vervet Monkeys (<i>Cercopithecus eathiops</i>) | √ | | | √ | √ | | √ |
| Artiodactyla | | | | | | | |
| Bush Buck (<i>Tragelaphus scriptus</i>) | | √ | | | | | |
| Sitatunga (<i>Tragelaphus spekii</i>) | √ | √ | √ | √ | √ | √ | √ |
| Common Duiker (<i>Sylvicapra grimmia</i>) | | √ | | | | | |
| Carnivora | | | | | | | |
| Marsh Mongoose (<i>Atilax palludinosus</i>) | √ | | √ | √ | √ | | √ |
| Slender Mongoose (<i>Herpestes sanguineus</i>) | | √ | | √ | √ | √ | √ |
| Rodentia | | | | | | | |
| (<i>Aethomys kaiseri</i>) | √ | | √ | √ | √ | | |
| Nile Grass rat (<i>Arvicanthis niloticus</i>) | √ | | √ | √ | | | |
| Shaggy Swamp rat (<i>Dasymys incomtus</i>) | √ | √ | √ | √ | | | |
| Stripped Grass Mouse (<i>Lemniscomys striatus</i>) | | √ | √ | | | | |
| Brush furred Mouse (<i>Lophuromys flavopunctatus</i>) | √ | √ | √ | √ | √ | √ | |
| Brush furred Mouse (<i>Lophuromys sikapusi</i>) | √ | √ | √ | √ | √ | √ | |
| Lesser cane Rat (<i>Thryonomys gregorianus</i>) | √ | | √ | | √ | | |
| Stripped Ground Squirrel (<i>Xerus</i>) | √ | √ | | | | | √ |

| Species | Sampling Locations Along Lubigi Swamp | | | | | | General Swamp Records |
|---------------------|---------------------------------------|---|---|---|---|---|-----------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| <i>erythropus</i>) | | | | | | | |

3.6 Socio-Economic Conditions

The 2002 population census indicated that Uganda had a total population of 24.4 million with an estimated annual growth of some 3.3 percent per annum between 1991 and 2002. The Statistics Department projected in 2002 that the population in the year 2005 would reach 26.7 million (Government of Uganda, Statistical Abstract, 2002).

In 2002, approximately 49 percent of the population was under the age of 15 years. Approximately 88 percent of the population was living in the rural areas with 12 percent in towns and cities. Average population density was 124 persons per square kilometre, or slightly more than one person per hectare.

About 55 percent of the population is estimated to be living below the poverty line. The economy is predominantly agricultural, with over 90 percent of the population dependent on subsistence farming and light agro-based industries. Literacy rates are 45 percent for females and 65 percent for males. Average annual population growth rate between 1969 and 1991 was about 2.6 percent per annum (Government of Uganda, 1992), although this growth rate can be considered low due to the internal political unrest that existed in Uganda during that period.

From the social surveys that were undertaken as part of the Interconnection Project RAP, 39 percent of the household heads affected by the proposed transmission line declared themselves peasant farmers. The other major occupations reported by the affected persons include: business person (28 percent); student; driver; builder; teacher; casual labour; and, other (15 percent). Sixty-four percent of the affected household heads are tenants, while 11 percent are licensees and 25 percent are landowners.

Thirty-seven percent of all affected household heads are women. The average affected household size is 2.66 individuals.

3.6.1 Administrative Boundaries

For the study area of the Bujagali project transmission system, administrative boundaries are shown in Figure 3.5. The proposed transmission system corridor passes through Mukono, Wakiso and Kampala Districts. Districts are further divided into counties, sub-counties, parishes and villages. Civil servants and local chiefs administer the decentralised system, from district down to village level. This hierarchy runs parallel to the elected local councils (LC) hierarchy from LC5 Chairman at the district level down to LC1 Chairman at village level. Local Councils are responsible for policies, resolving local conflicts and providing orderly leadership and overseeing

Figure 3.5 Socio-Economic Conditions Along Proposed Transmission System Route

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democratic practices at the grassroots level in their respective areas. The list of LC3s and LC1s, and the villages they represent, that were consulted during the planning of the transmission line route are summarised in Chapter 6.

3.6.2 Land-Use and Settlement Patterns

The 2002 Uganda Housing and Population census provides demographic data for the three affected Districts.

Comparing the two rural districts within the study area, the population density is generally lower in Mukono than in Wakiso, particularly in the central part of the District as shown in Table 3.6. This is primarily due to the presence of the Mabira Forest and a number of large agricultural plantations. Within the part of Kampala District relevant to the proposed Bujagali interconnection system, densities are fairly consistent and are about twelve times those of Wakiso District and thirty times those of Mukono District.

Table 3.6: Population Distribution and Density (2002)

| District | Total Population | Population Density (persons/km ²) | Annual Growth Rate (%) |
|----------|------------------|---|------------------------|
| Kampala | 1,208,544 | 7,378 | 4 |
| Mukono | 807,923 | 264 | 3 |
| Wakiso | 957,280 | 513 | 5 |

Source: The 2002 Population and Housing Census (Uganda Bureau of Statistics – www.ubos.org)

Under the Kampala District Plan, the predominant land use proposed is residential, although the swampy areas on the western fringes of the city are designated ‘environmental areas’ where the policy is the protection and preservation of open space. Commercial and service uses are to be concentrated in Natete sub-centre and to a lesser extent at the Busega/Masaka road junction where a new hospital is planned. A northern bypass for the city of Kampala is planned extending from the Busega/Masaka road junction in a north easterly direction across Rubaga Division and thence north around the city to join the Jinja road on the east side of Kampala.

The broad land use characteristics and settlement pattern along the route of the proposed transmission system are shown in Figure 3.5 and summarised in Table 3.7 below.

Table 3.7: Land Use along Route Corridor (km)

| Land Use Category | Bujagali to Tororo Line | Bujagali to Namyoya | Namyoya to Kawanda | Kawanda to Mutundwe | TOTAL |
|----------------------|-------------------------|---------------------|--------------------|---------------------|-------|
| Small scale farming | 5 | 20 | 11 | 9 | 45 |
| Plantations | - | 8 | 4 | 1 | 13 |
| Tropical High Forest | - | 11 | - | - | 11 |
| Degraded Forest | - | 9 | 8 | 2 | 19 |
| Woodland | - | 2 | - | - | 2 |
| Bushland | - | 2 | 3 | - | 5 |
| Grassland | - | - | - | - | - |
| Wetland | - | - | - | 4 | 4 |
| Built-up area | - | - | - | 1 | 1 |
| TOTAL | 5 | 52 | 26 | 17 | 100 |

Source: National Biomass Study, 1996, updated by WS Atkins 1999b Figures rounded

3.6.3 Transportation

Five all-weather roads run in a roughly north-south direction and will be crossed by the proposed Mutundwe – Kawanda transmission line (refer to Figure 3.5):

- The Old Masaka Road runs southwest from Kampala to Masaka and passes to the east of the preferred substation site at Mutundwe. The proposed transmission line crosses this road three times;
- The Masaka Road runs southwest from Kampala towards Masaka and is crossed once by the proposed transmission line;
- The Mityana Road runs west-northwest from Kampala towards Mityana and is crossed twice by the proposed transmission line;
- Hoima Road runs northwest from Kampala to Hoima and Kiboga. The proposed transmission line crosses the road once; and,
- The Bombo Road runs north-northwest from Kampala towards Bombo and crosses the existing transmission line immediately east of Kifu CFR.

On the proposed Kawanda – Bujagali transmission line:

- The Kampala-Kasangati Road is proposed to be crossed once;
- The road running north from Seta, west of Kifu CFR to Kayunga, will be crossed once; and,
- The Mukono-Kayunga Road will be crossed once.

The area between Bujagali and Nalubaale is well serviced by a good quality Class I bitumen road, locally referred to as the Njeru to Kayunga Road.

As with all the main roads in this area, a large number of local tracks branch off of them, providing access to numerous small settlements and agricultural areas. Given

the abundance of roads and trails throughout the area, it is not anticipated that any new access road will need to be created as part of this project.

The only area along the proposed transmission line that does not have good all-weather access is the Mabira CFR. However, there are several seasonal tracks that branch off of the Kampala-Lugazi-Njeru highway, as well as the Nyenga-Lujamag road and provide access to the eastern portion of the reserve. Tracks also extend into the east portion of the reserve via the large sugar cane plantations that border the reserve. A track that is accessible year-round by 4-wheel drive leaves the Kampala-Lugazi-Njeru highway at Najembe and runs northwest through Ssesse and Namanyama. In addition, the existing transmission line has a trail running alongside it that currently provides access for maintenance vehicles.

3.6.4 Agricultural Development

The general landscape of the region through which the proposed transmission system passes is comprised of flat or round-topped hills, valleys incised into the plateau with farmlands and occasional swamps. The area lies to the north and west of Lake Victoria, commonly referred to as the banana-coffee belt. Minimum annual rainfall is over 760 mm and most of the area has over 1,000 mm, well distributed throughout the year. Most of the original rainforest vegetation has been cleared for the growing of sugarcane, tea, bananas and coffee. Elephant grass and thicket grow when the land is left fallow.

In the eastern portion of the proposed Bujagali transmission system, agricultural activities are characterised by small-scale coffee banana based inter-cropping or intermixed systems (known as the “Buganda” agricultural system) in the Victoria Nile area and large-scale sugarcane production both to the east and west of the Mabira Forest. More small-scale coffee-banana systems occur. The suburbs of Kampala have small-scale backyard farms consisting mainly of subsistence food crops. The average size of a holding along the alignment is about 0.8 ha (Andersen, 1994), which is adequate for support of a family unit at subsistence level with some cash surplus. Table 3.8 shows production statistics for some food crops in the districts of Mukono and Mpigi in 1997. The boundary of Mpigi District has since been modified, the data are generally representative of the newly-formed Wakiso District.

Table 3.8: 1997 Production Statistics for Food Crops in Mukono and Mpigi Districts

| Crop | Mukono | | Mpigi | |
|--------------|-----------|-----------|----------|-----------|
| | Area (ha) | Prod. (t) | Area Ha) | Prod. (t) |
| Banana | 60,603 | 370,089 | 62,862 | 347,470 |
| Beans | 15,506 | 5,386 | 10,822 | 3,759 |
| Cassava | 11,986 | 81,518 | 10,739 | 73,030 |
| Field Peas | 30 | 20 | - | - |
| Groundnuts | 1,782 | 785 | 1,282 | 565 |
| Irish Potato | 307 | 1,986 | 526 | 3,411 |
| Maize | 4,983 | 6,307 | 8,674 | 10,983 |
| Millet | 2,523 | 3,210 | 194 | 243 |
| Onion | 150 | 565 | 1,013 | 3,805 |
| Simsim | 254 | 107 | 16 | 6 |
| Sorghum | 1,465 | 1,582 | 1,248 | 1,348 |
| Soya beans | 177 | 209 | 750 | 883 |
| Sweet Potato | 17,535 | 62,777 | 8,532 | 30,545 |

Source: Ministry of Agriculture, Animal Industry and Fisheries Statistics, 1998

For this agricultural survey, most of the villages and farms along the alignment were visited and agricultural activities recorded.

3.6.5 Public Health

This section presents a brief overview of the current health situation in Uganda followed by more specific information that pertains to the transmission system area.

The top ten outpatient diagnoses for 1997-2001 for all ages, from 22 reporting districts in Uganda, are shown in Table 3.9 below. It is based on 5,517,344 Outpatients Department (OPD) diagnoses. Malaria and respiratory infections account for 50 percent of OPD diagnoses while the top ten diagnoses account for 84.8 percent of the total diagnoses.

Table 3.9: Proportional Morbidity for the Ten Major Causes of Illness in Out-Patients Departments (%) 1997-2001 Excluding HIV/AIDS in all Districts

| Diagnosis | 1997 | 1998 | 1999 | 2000 | 2001 |
|------------------------------|------------|------------|------------|------------|------------|
| Malaria | 28.5 | 32.2 | 31.6 | 33.9 | 39.1 |
| ARI-Not Pneumonia | 14.1 | 13.8 | 13.4 | 13 | 16.3 |
| Intestinal Worms | 9 | 8.4 | 8.5 | 8 | 8.1 |
| Diarrhoea | 7.1 | 6.3 | 6.4 | 6.5 | 4.9 |
| Trauma (Injuries and Wounds) | 6.6 | 6.5 | 5.8 | 5.6 | 4.8 |
| ARI- Pneumonia | 8.1 | 6.4 | 6.1 | 5.6 | 3 |
| Skin Diseases | 4.7 | 4 | 3.9 | 3.5 | 3 |
| Eye Diseases | 3.8 | 2.7 | 2.7 | 2.5 | 1.9 |
| Anaemia | 2.1 | 2.3 | 2.4 | 2.2 | 2 |
| Ear Diseases | 1.5 | 1.5 | 1.6 | 1.5 | 1 |
| Other | 14.5 | 15.9 | 17.6 | 17.8 | 15.9 |
| Total | 100 | 100 | 100 | 100 | 100 |

Source: Resource Centre Ministry of Health Kampala. ARI = Acute Respiratory Infection

HIV/AIDS

Uganda is one of the least urbanised countries in Africa, with over 80 percent of the population living in rural areas. About 40 percent of the population is below 15 years of age. In an estimated total population of 24 million, 1,050,555 million people living in Uganda are estimated to have HIV/AIDS. About 120,000 have developed AIDS. Nearly 80 percent of those infected with HIV are between the ages of 15-45 years, a most economically productive age group and often supporters of families. Adolescent girls between 15-19 years are 4-6 times more vulnerable than their male age mates. Children have felt a gruesome impact. About 2 million children of less than 18 years are orphans with one or both parents dead. They experience orphanhood at an age when parental guidance and socialisation is most desirable. The quality of care, education, nutrition and socialisation among these children is often poor.

A health facility inventory in the Ministry of Health revealed that HIV/AIDS related diseases occupied 55 percent of hospital beds. HIV/AIDS related illnesses were said to account for over 50 percent of all hospital admissions.

Data from HIV sentinel surveillance sites that have been declining over the last decade have begun to demonstrate a tendency towards stabilisation. The 2001 antenatal HIV infection rates across all the sites, both urban and rural, have significant overlap of the confidence intervals from 2000, indicating that the prevalence rates are not statistically significantly different from each other.

The overall antenatal prevalence rate in 2001 was 6.5 percent, closely resembling the 6.1 percent in 2000. The rates for urban and rural sites in 2001 were 8.8 percent and

4.2 percent respectively compared with 8.7 percent and 4.2 percent in 2000. New HIV cases in 2001 were estimated at 99,031; adults at 89,128 and children at 9,903. Female adult cases were at 49,092 and males at 40,533.

A cumulative total of 60,173 AIDS cases (children and adults) had been reported to the Ministry of Health AIDS Control Programme surveillance units by December 2001, up from 58,165 in 1999 as shown in Table 3.10. Of these 55,707 (92.5 percent) were adults and 4,466 (7.5 percent) were children aged 12 years and below. Of the total with sex recorded, 24,368 (44.9 percent) were males and 29,879 (55.1 percent) females. The overall mean age for adults with AIDS was 30.9 years.

Table 3.10: Cumulative Reported Cases of AIDS cases (1983-2001)

| Year | No. of cases | Cumulative Reported Cases per Year |
|---------|--------------|------------------------------------|
| 1983 | 17 | 17 |
| 1984 | 11 | 28 |
| 1985/86 | 882 | 910 |
| 1987 | 2,914 | 3,824 |
| 1988 | 3,425 | 7,249 |
| 1989 | 6,090 | 13,339 |
| 1990 | 6,616 | 19,955 |
| 1991 | 10,235 | 30,190 |
| 1992 | 6,362 | 36,552 |
| 1993 | 4,641 | 41,193 |
| 1994 | 4,927 | 46,120 |
| 1995 | 2,191 | 48,312 |
| 1996 | 3,032 | 51,344 |
| 1997 | 1,962 | 53,306 |
| 1998 | 1,406 | 54,712 |
| 1999 | 1,149 | 55,861 |
| 2000 | 2,303 | 58,165 |
| 2001 | 2,008 | 60,173 |

Source: Uganda AIDS Commission (HIV/ AIDS Epidemic prevalence and Impact)

The total overall estimated number of people living with HIV/AIDS at the end of December 2000 was 1,107,644, down from 1,438,000 in 1999. Of these, 996,880 were adults and 110,880 children of under 15 years. Aggregated by sex, 543,753 were women and 453,127 males. Uganda's cumulative number of AIDS deaths since the beginning of the epidemic is estimated at 947,552 (December 2001), up by 100,000 from 848,492 in 2000.

Of these, 852,797 were adults and 94,755 children. Adult female deaths were estimated at 427,153 and males at 425,644. With high numbers of AIDS-related deaths, Uganda records the highest proportion of AIDS orphans in the world. Paediatric AIDS case management and reporting remains a big challenge in care and support programmes in Uganda.

The overall mean age for children with AIDS was 2.3 years (December 2001), with no significant difference in the mean ages of males and females. The most common means of transmission of HIV still remains unprotected sex (84 percent) with an infected person. The high numbers of children living with HIV at the end of 2000 is evidence that mother-to-child transmission is a challenge.

In spite of the declines in HIV prevalence, the infection rates are still high. There is need for more concerted efforts to further reduce the prevalence and incidence rates and improve on existing HIV prevention and control strategies with more innovations.

Behavioural surveillance is increasingly becoming a major component of the surveillance systems for HIV/AIDS in the country, especially in the light of the declining HIV infection trends. Based on the baseline data included in the 1997 report and the subsequent reports made from population based KABP surveys it has been noted that there is a delay in the age at which young people were engaging in sex, increase in condom use and reduction in non-regular (casual) sexual relationships.

The government has conducted repeated population-based KABP surveys in most of the districts. Significant observations from these surveys included: very high levels of awareness, increase in levels of knowledge of protection from HIV/AIDS, increase in condom use and, and the sustainability of the increased age at first sex.

Health Profile for Mukono District

Table 3.11 shows recent summary health statistics for Mukono District, which encompasses the majority of the interconnection system.

Table 3.11: Outpatients Diagnoses for Mukono District July 2005 – June 2006

| Diagnoses | Under five years Old | | Five years and above | | All ages | |
|------------------------------|----------------------|----------|----------------------|----------|----------|----------|
| | Number | % of all | Number | % of all | Number | % of all |
| Malaria | 90,831 | 39 | 143,957 | 61 | 234,788 | 53.2 |
| ARI-Not Pneumonia | 29,376 | 39 | 45,575 | 61 | 74,951 | 17.0 |
| Diarrhoea | 1,685 | 51 | 1,645 | 49 | 3,330 | 0.8 |
| Intestinal Worms | 13,510 | 34 | 13172 | 66 | 40,245 | 9.1 |
| ARI- Pneumonia | 14,860 | 40 | 21,973 | 60 | 36,819 | 8.3 |
| Skin Diseases | 7,083 | 35 | 13,172 | 65 | 20,255 | 4.6 |
| Anaemia | 2,808 | 47 | 4,357 | 53 | 8,165 | 1.8 |
| Eye Diseases | 2,970 | 26 | 8,647 | 74 | 11,617 | 2.6 |
| Trauma (Injuries and Wounds) | 2,842 | 25 | 8,449 | 75 | 11,291 | 2.5 |
| Schistosomiasis | 6 | 2 | 284 | 98 | 290 | 0.1 |

Source: Directorate of Health Mukono District

3.7 Cultural Characteristics and Values

3.7.1 Cultural Property

Uganda is a multicultural society with several ethnic groups. The southern reach of the Victoria Nile, i.e., south of Lake Kyoga, is made up entirely of people of Bantu descent. In this area are the Baganda on the western side of the River Nile and the Basoga on the eastern side, both peoples of Bantu origin (Fountain Publishers Ltd., 1999).

While the official language in Uganda is English, there are over 30 languages spoken in the country (CIA, 1999). Along the Victoria Nile, Luganda (west of the river) and Lusoga (east of the river) are the languages that predominate south of Lake Kyoga. These languages are very similar to one another and are mutually understandable.

Religious beliefs are divided in Uganda: 33 percent are Roman Catholic, 33 percent are Protestant, 16 percent are Muslim, and 18 percent practice indigenous beliefs (CIA, 1999). For the social survey undertaken by AESNP for their Transmission System RAP, 37 percent of households within the study area were Protestant, 36 percent were Catholic, 23 percent were Muslim and 4 percent observed other beliefs.

No significant cultural properties are known to occur within the proposed transmission corridor. Consultations for the Transmission System were held at the AESNP Scoping Stage (late 1998) and during preparation of the AESNP EIA Report (1999-2001), and again during 2006, as set out in Chapter 6.

Interviews were held with representatives for the Ministry of Tourism, Wildlife and Antiquities and the Uganda Tourist Board. No cultural properties were identified

within the proposed transmission corridor. The Commissioner for Antiquities and Museums was sent a letter with a map of the alternative transmission routes being considered. No sensitive areas were identified by his office.

There are three cultural sites of national importance located on the western edge of Kampala city, outside of the proposed transmission corridor (refer to Figure 3.5). All three sites are located on hilltops. They are:

- The Kasubi Tombs (Kampala mapsheet 36N 4502366), an important tourist attraction, located 3.1 km from the proposed transmission line;
- Kiwewa Tombs (Kampala mapsheet 36N 4479371), located 1.1 km from the proposed transmission line; and,
- Wamala Tombs, the tombs of former Buganda kings (Kampala mapsheet 36N 4471436) (Dr. Kamuhangire, pers. Comm., Nov. 1998).

The Uganda Martyrs' site at Namugongo, northeast of Kampala (Kampala mapsheet 36N 4611430), is a cultural site of national importance. This site is located 2.6 km south of the preferred route and will not be impacted by the transmission system.

There are a number of personal household graves known to be located in the general vicinity of the proposed Kawanda substation site. There are 50 graves to the southeast and 10 graves to the northeast of the proposed site, discussed in more detail in Chapter 4 of this report. The shortest distance between a grave and the proposed substation site is approximately 20 m. Households were specifically asked during the socio-economic survey carried out for this project whether they had members of their family buried on their land and/or places of offerings (*amasabo*), and if so, whether or not they wanted these relocated should they be affected by the project.

An archaeological assessment conducted at the proposed Kawanda substation site in 2006 indicated that archaeologically the site has few cultural deposits and that no historical or archaeological resource would be threatened by project activities. The archaeological report is provided as Appendix B.6 of the SEA documentation. Details and plans for managing any potential project effects to *amasambos* and graves are provided in Section 7 of the Transmission System RCDAP (Appendix G).

A qualified archaeologist will walk the transmission system after the EIA has been approved and prior to construction taking place, to complete test pits for archaeological features where soil will be excavated e.g. tower foundations. If archaeological sites are located, including during construction, mitigative measures will be implemented in collaboration with the Ministry of Tourism, Wildlife and Antiquities. Refer to Chapter 7 for details.

3.7.2 Aesthetic Values

The part of the existing line from Nalubaale to Kampala that would be followed by the proposed 220 kV line for the Bujagali project runs in a more-or-less straight line across the landscape from Namyoya to the SCOUL Estate east of Mabira Forest (existing tower 181). It runs across a varied sequence of hills and valleys, varying from 1,080 m AMSL at the River Sezibwa to over 1,320 m AMSL at Kito and also near Sseese, on the fringes of Mabira Forest.

The visual effect of the existing line on its surroundings, varies mostly according to the land use and the resulting vegetation. Through the farmland and the estates, clearance is usually limited to the width of the access track and the towers, with the appearance of the track often being absorbed onto the pattern of other farm tracks. The larger estates and some other steep ridges provide viewpoints from which long lengths can be seen, when the succession of towers may be intrusive aesthetically. The line does not follow ridgelines for any great distance, so it is rarely perceived as running along the skyline, except from nearby viewpoints. The highest part of the route, from Ndeeba to Waswa (west of Mabira CFR), runs just to the north of the top of a ridge, which helps to mask the prominence of the line. The forest completely encloses the line from outside view, although there are often long views along the route for anyone crossing the line or living alongside it, with the width of forest clearance clearly evident across successive ridges.

The existing lines entering the Mutundwe substation have a significant effect on the visual character of the Natete area and on local property, especially the route from the north, which passes directly over the busy commercial and market area.

Two parallel 132 kV lines will run approximately 5 km along the west bank of the Nile between the hydropower station and the existing lines connecting Nalubaale with Tororo. This section of the route runs across gently undulating landscape in which tributaries drain into the River Nile that is deeply incised at this point. The area above the river is characterised almost entirely by smallholder farming. This has created a landscape of fairly dense vegetation from ground level up to medium height trees with the canopies of taller trees occasionally rising above. Lines of view are short, except across larger fields.

3.8 Recreation and Tourism

At Namugongo, the burial place of the Uganda Martyrs contains a number of churches and shrines (refer to Figure 3.5). This is a key location for celebrations on Uganda Martyrs Day (June 3), when large numbers of people flock to the site for remembrance ceremonies. This site is located 2.5 km from the proposed transmission line (Kampala mapsheet 36N 611431 and 628441).

According to the Uganda Tourist Board, the only area of tourism value within the study area is located within Mabira CFR. Tourism within Mabira CFR and the surrounding area has been addressed in Section 3.5.1.5.

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4.0 Alternatives Analysis

4.1 Existing Electricity System in Uganda

The existing electricity generation and transmission system for Uganda is shown on the system plan developed by the Uganda Electricity Board and provided herein as Figure 4.1.

Although the system plan shows several generating plants in the country, historically virtually all (99 percent) of Uganda's electricity has been generated at the Nalubaale and Kira hydropower facilities that are located at Jinja (Energy Information Administration, 2004). The system plan also does not show the locations where the Government is planning to install 100 to 150 MW of thermal generation to address severe power shortages in the Country.

Energy generated by the Nalubaale (formerly Owen Falls) and the Kiira (formerly Owen Falls Extension Project) hydropower stations, is transmitted from the substation at Nalubaale to three substations around Kampala, which is the main load centre of Uganda (Kampala North, Lugogo³ and Mutundwe), and to an existing substation in Tororo. This power is transmitted primarily via the following transmission lines, which are also shown schematically as Diagram 1, Figure 4.2:

- Nalubaale to Kampala North – this is a single circuit 132 kV line running northwest of Jinja towards Kampala, passing through mainly plantation lands and forest. This “northern” route follows the route of the original transmission line built in the 1950's to evacuate power from the Owen Falls hydropower station (the line has subsequently been upgraded and rehabilitated and remains in service);
- Nalubaale to Lugogo – this is a double circuit 132 kV line financed by the Danish International Development Agency (DANIDA) and completed in 1994 on a route proceeding southwest from Jinja. The route for this “southern line” was selected through an environmental assessment study process (Ornis Consult, 1994) and passes through a number of settlements on its way to Lugogo substation, east of Kampala;
- Between Lugogo and Mutundwe substations, a single circuit 132 kV line;
- A double circuit 132 kV line exists between the substations at Kampala North and Lugogo and between Kampala North and Mutundwe, although these lines each have one circuit operating at 33 kV;
- A double circuit 33 kV line exists between Lugogo and Kampala North;
- A single circuit 33 kV line exists between Kampala North and Mutundwe; and,

³ The Lugogo substation is not shown on the UETCL System Plan provided as figure 4.1. It is shown on the schematic provided as Figure 4.2.

- A double circuit 132 kV line runs north from the Nalubaale generating station along the west bank of the Nile, then crosses the river and runs eastward toward the Tororo Substation, where connections to Kenya using a double circuit 132 kV line are made. From Tororo Substation also runs a 132 kV single circuit connection to Opuyo and Lira Substations.

4.2 Need for the Bujagali Interconnection Project

The development of the Bujagali HPP by BEL will require new transmission infrastructure to interconnect the project to the existing power transmission system. Feasibility studies undertaken for the project (Knight Piesold and Merz and McLellan, 1998 and Siemens, 2006) have concluded that the existing national network in Uganda is insufficient to evacuate the full 250 MW generating capacity of the Bujagali HPP. Thus, there is a clear need for upgrades to the existing or development of new transmission infrastructure to accommodate the proposed Bujagali HPP.

4.3 Previous Interconnection Analyses

A comprehensive analysis of the interconnection system options associated with the Bujagali HPP in its previous configuration was undertaken by its sponsor (AESNP) and documented in detail in its Environmental and Social Impact Assessment (AESNP, 2001). Four options by which power could be evacuated from the Bujagali HPP to the Ugandan national grid were evaluated by AESNP and its consultants in 1998 and 1999.

AESNP and their consultants completed an alternatives analysis for the transmission facilities using a range of social, environmental and technical criteria to identify the potential key impacts of the alternative corridors considered and, from these, select a preferred alternative. This process also involved consultations with UEB, who at that time, would be the eventual owner and operator of the transmission system. From these consultations, UEB advised AESNP that the Bujagali transmission system should:

- Use existing transmission corridors as much as possible to reduce impacts;
- Enable future system expansion to northern Uganda; and,
- Minimise the number of crossings of existing transmission facilities and other utilities.

The primary transmission line corridor routing alternatives connecting Bujagali to Kawanda that were considered were: a route roughly parallel to the existing 132 kV “northern” route between Owen Falls and Kampala, and one roughly parallel to the existing 132 kV “DANIDA line” corridor between Owen Falls and Lugogo substation in south-eastern Kampala.

Figure 4.1 Present Electrical Network in Uganda

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AESNP concluded that the northern route was preferred, as impacts on settlement and property are lower, it is shorter, and it does not require any crossing of existing transmission lines. Moreover, the capacity of the southern corridor system was considered difficult, if not impossible to expand, as both the substation and transmission line facilities were considered to be at capacity in the current locations.

AESNP also concluded that from an overall system design perspective, the northern route also would provide the Government Utility with greater flexibility for future system expansion, when compared to the southern route. In its independent assessment of the transmission line routes, the Panel of Experts, in its fourth report, concluded that AESNP had selected the most appropriate transmission line route. The Alternative routes AESNP and its consultants examined are shown on the maps provided as Appendix C, and full details can be found in AESNP's Transmission System EIS (ESG 2001).

In summary, the AESNP preferred option to connect the Bujagali HPP at 220 and 132 kV as follows:

- A 220/132 kV switchyard on the west bank of the Nile adjacent to the hydropower facility;
- A double circuit 220 kV line between The Bujagali Switchyard and a new substation to be located in Kawanda;
- A double circuit 132 kV line between the Kawanda substation and the existing Mutundwe substation; and,
- Double circuit 132 kV lines between Bujagali and Tororo and Bujagali and Nalubaale. These double circuit lines will be established by intersecting the existing Nalubaale–Tororo line.

A schematic showing the arrangements of the lines is shown as Diagram 2 on Figure 4.2. Figure 4.3 shows how the new lines would intersect with the existing Nalubaale – Tororo line.

Field reconnaissance and analysis of recent satellite imagery completed as part of this SEA process confirmed that there have been no major changes to environmental or social conditions in the area that would affect the overall conclusions set out above.

4.4 Present Interconnection Analyses

4.4.1 Description of Interconnection Options

As part of the ongoing planning for the IP and the HPP, new interconnection analyses were completed to ensure that the project was proceeding with the optimal interconnection option (Siemens PTI, 2006). Several alternatives were formulated for the interconnection of the Bujagali HPP.

The key alternative system plans that were evaluated are listed in Table 4.1, with the “Proposed IP Facilities” column representing the lines and substations that would be needed, if selected as the preferred option, to interconnect the Bujagali HPP. Each option is shown graphically on Figure 4.2.

The “Medium Long-Term Facilities” and “Long-Term Facilities” columns represents additional infrastructure that may be needed in response to the current best estimate of growth of the system. While not part of the IP option, those columns provide important information for the evaluation of long term costs and cumulative effects of the various options. Table 4.2 shows a general timeline for all the options analysed, where the time is defined by a “Limit” given by the maximum load that can be served by each system before triggering an expansion. Therefore, the actual calendar year when such expansion occurs, if ever, is a function of the actual load growth and concurrent status of generation capacity.

Table 4.1: Description of Alternative System Plans for Bujagali IP and Long Term System

| Option | Proposed IP Facilities | Medium Long Term Facilities | Long Term Facilities |
|------------------------------|--|--|--|
| Base Option (Dia 3, Fig 4.2) | Kawanda Substation 2x220 kV Bujagali-Kawanda (75 km) 2x132 kV Kawanda-Mutundwe (17 km) 2x132 kV Bujagali-Nalubaale (5 km) 2x132 kV Bujagali-Tororo (5 km) | | 132 kV Nalubaale to Kampala North (via the proposed Namanve substation) 2 x132 kV Bujagali to Nalubaale |
| Option 1 (Dia 4, Fig 4.2) | Kawanda Substation 2x220 kV Bujagali-Kawanda (75 km) 2x132 kV Kawanda to Mutundwe (17 km) 2x132 kV Bujagali-Nalubaale (5 km) 2x132 kV lie Bujagali-Tororo 1x132 kV Bujagali-Nalubaale* (5 km) | 1x132 kV Bujagali to Nalubaale 132 kV Nalubaale to Kampala North (via the proposed Namanve substation) | 2x220 kV Bujagali to Kawanda |
| Option 2 (Dia 5, Fig 4.2) | 2x132 kV Bujagali-Nalubaale 1x132 kV Bujagali-Nalubaale 2x132 kV Bujagali-Tororo 1x132 kV Nalubaale-Kampala North | Kawanda Substation 1x132 kV Bujagali to Nalubaale 2x230 kV Bujagali to Kawanda 2x132 kV Kawanda to Mutundwe | no additional facilities |

| Option | Proposed IP Facilities | Medium Long Term Facilities | Long Term Facilities |
|-------------------------------|--|---|---|
| Option 3 (Dia 5, Fig 4.2) | Kawanda Substation 1x220 kV Bujagali-Kawanda but operated initially at 132 kV 2x132 kV Kawanda-Mutundwe 2x132 kV Bujagali-Nalubaale 1x132 kV Bujagali-Nalubaale* 2x132 kV Bujagali-Tororo | add second 220 kV circuit to Bujagali to Kawanda , operations continue at 132 kV 1x132 kV Nalubaale to Kampala North | Upgrade operation of Bujagali to Kawanda to 220 kV 1x132 kV Bujagali to Nalubaale* |
| Option 3a (Dia 5, Fig 4.2) | Kawanda Substation 2x220 kV Bujagali-Kawanda but operated initially at 132 kV 2x132 kV Kawanda-Mutundwe 2x132 kV Bujagali-Nalubaale 1x132 kV Bujagali-Nalubaale* 2x132 kV Bujagali-Tororo | 1x132 kV Nalubaale to Kampala North 1x132 kV Bujagali to Nalubaale | Upgrade operation of Bujagali to Kawanda to 220 kV 1x132 kV Bujagali to Nalubaale* |

* Can be permanently delayed by the use of a 70 ohm series reactors in the first 2x132 kV Bujagali to Nalubaale line

Table 4.2: Load Saturation Levels for all Interconnection Options Identified

| Option | Proposed IP Facilities | Medium Long Term | Long Term |
|-------------|------------------------|------------------|-----------|
| Base Option | 1030 MW | N/A | 1200 MW |
| Option 1 | 870 MW | 990 MW | 1200 MW |
| Option 2 | 750 MW | 790 MW | 1200 MW |
| Option 3 | 730 MW | 815 to 920 MW | 1200 MW |
| Option 3a | 815 MW | 920 MW | 1200 MW |

All of the options listed above require, either initially or in the future, a new single or double circuit 132 kV line between Bujagali and Nalubaale (e.g. Option 3a needs this line by 2013 under a high load growth scenario.) However, for all options other than Option 2, there is the possibility of postponing indefinitely the 3rd as well as the 4th circuits to Nalubaale if series reactors are installed as part of development of the first line. Thus, Option 3aR (Diagram 5, Figure 4.2) would be the same as Option 3a, but with added Series Reactors that would eliminate the need for future 132 kV lines between Bujagali and Nalubaale. The series reactors option works adequately from a technical point of view and it is a feasible alternative to the transmission lines above. However, in this case the interconnection between Bujagali and Nalubaale will be through a single double circuit line, which could trip simultaneously, and the third line would provide added operational flexibility.

For the formulation of the options above, Siemens PTI had to give special consideration to other investments associated with the Kawanda substation, which is treated differently under several options. The first of these investments are the lines Kawanda to Masaka West, which are required to prevent loss of load on the Western Region under certain contingency conditions, and are not related with the Bujagali

project. However, as in the Base Option these lines operate from the outset at 220 kV while in others they operate initially at 132 kV; the cost differences were incorporated into the analysis completed by Siemens. Also the two transformers at Kawanda 220/132 kV are necessary both for the interconnection of Bujagali and Karuma, but if Karuma is not built, only one transformer is initially necessary for Option 1 and no transformer is necessary for Options 2 and 3, which require it in the medium term. Therefore, two transformer(s) were considered by Siemens PTI for the economic evaluation of the Base Option and one transformer for the economic evaluation of the other options either installed initially (Option 1) or simultaneously with Karuma (Options 2 and 3).

4.4.2 Evaluation of Interconnection Options and Selection of the Preferred System Option

Siemens PTI conducted extensive load flow, stability and economic evaluation studies for each of the interconnection options in the short, medium and long term, as well as testing each option's sensitivities to the uncertainties associated with the predicted load growth, the installation of new generation in Uganda, Lake Victoria hydrology and costs of fuel, among others. The overall project costs for each option as determined by Siemens PTI are provided in Table 4.3.

As indicated in Table 4.3, Option 3 and 3a have similar total costs (capital plus operating costs), and Option 3 has smaller capital cost. However, the improved flexibility that would be achieved by installing a second circuit from the outset, as proposed in Option 3a, outweigh the capital cost difference between the two options.

From an environmental and social standpoint, Option 2, the primary feature of which is a 132 kV line Nalubaale to Kampala North, affects significantly less land area than the other options (Table 4.3). However, it has significant resettlement and related social issues due to the large amount of built up area affected compared to the other options. Figure 4.4 shows the routing of the options superimposed on a satellite image of the region. The figure clearly shows the densely built-up land use in the vicinity of the Kampala North Substation. Photographs 1 and 2, Figure 4.5 provide examples of the dense land-use in this area, including within the wayleaves of the existing lines in the area. Due to the dense settlement, the number of people expected to be resettled is relatively high compared to the other options.

This option also requires a 132 KV line Bujagali to Nalubaale. Field reconnaissance and analyses of satellite imagery indicate the land within a few km of the Nalubaale Substation is similarly highly constrained (Photographs 1 and 2 of Figure 4.6), and depending on the specific route selected many hundreds of people could be affected along this short stretch alone.

The greater resettlement involved for Option 2, and the higher price of land in the affected areas, is expected to result in land acquisition and resettlement costs that are

at minimum the same as Option 3a, or likely greater, which would further exacerbate the over USD 10 million cost difference between the options.

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Figure 4.2 Schematic Diagrams of Power System Options

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Figure 4.3 Bujagali Project Connection to National Network

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Figure 4.4 Land Use & Study Area (False Colour Composite Image)

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Figure 4.5 Photographs of Landuse Near Kampala North

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Option 3a has comparatively the least dense land use affected, the primary exception being the last kilometre of the 132 kV Kawanda-Mutundwe line, where land use near the Mutundwe substation has become highly constrained.

However, unlike Option 2, series reactors could be used with Option 3a to preclude the future need for the 132 kV Bujagali-Nalubaale. For this reason, Option 3a with series reactors (Option 3aR) is the overall preferred Option from the social standpoint.

While both Option 2 and 3aR affect the same amounts of land in the Mabira CFR, Option 3aR does affect more land overall and therefore has greater potential for environmental effects. As well, portions of the 132 kV Kawanda-Mutundwe Line affects portions of the Lubigi Swamp in several areas. For this reason, Option 2 would be preferred over Option 3aR from a strictly biophysical perspective. However, the much greater potential for resettlement and social effects of Option 2 on the approaches to Kampala North and Nalubaale substations as compared to Option 3aR clearly favour Option 3aR as the overall preferred plan.

Table 4.3: Evaluation of Alternative System Plan Options

| Factor | Base Option | Option 1 | Option 2 | Option 3 | Option 3a |
|-------------------------------------|---|---|--|---|---|
| Life of Project Cost (USD Millions) | 76 | 73 | 85 | 61 | 68 |
| Area of land Affected (ha) | 375 | 403 | 305 | 403 | 403 |
| Length of New Lines (km) | 97 | 105 | 87 | 105 | 105 |
| Flexibility – Responsiveness | Least | Least | Medium | Most | Most |
| Social Impacts | Least Resettlement required | Least Resettlement required | Most Resettlement required | Least Resettlement required | Least Resettlement required |
| Env. Impacts | Most land affected, several crossings of Lubigi Swamp | Most land affected, several crossings of Lubigi Swamp | Least Land Affected, avoids Lubigi Swamp | Most land affected, several crossings of Lubigi Swamp | Most land affected, several crossings of Lubigi Swamp |

4.5 Detailed Route Selection and Optimisation

Option 3aR was selected as the preferred system plan. The land required for the plan is the same as the land that would have been required for the AESNP plan. Both plans

have the same lines and substations – the only difference being that while the Bujagali-Kawanda Line will be constructed at 220 kV, it will be operated initially at

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Figure 4.6 Photographs of Landuse Near Nalubaale Station

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132 kV. As the constructions standards are the same, the land area remains the same also.

Prior to withdrawing from the project and Country AESNP identified a specific route for the wayleaves and specific site for the Kawanda substation. The route selection process is well documented in the AESNP's EIS Report (ESG 2001). All landowners and project affected people (PAPs) were surveyed, a detailed resettlement Action Plan (RAP) was prepared, and the portion of it applicable to the Kawanda site was executed. In some places, concrete markers were placed by AESNP denoting the location of the wayleaves.

Recent consultations with the potentially affected villages along the routes indicated that in many places villagers and PAPs know where the AESNP Line was routed, and in many cases, concrete markers can still be located by affected individuals. Comments were received by some PAPs previously surveyed by AESNP that they have been waiting all these years for their compensation, and that they have not maintained their buildings that were within the wayleaves. To locate the line elsewhere would leave such affected parties with no compensation for the disruption caused as a result of the earlier routing work, and thus, legacy issues that would need to be addressed.

Therefore, it was determined that, if no significant changes have occurred to land use, then the route for the transmission lines should, wherever possible, adhere to the routing previously identified by AESNP. To this end, a field reconnaissance and analysis of satellite imagery was completed for the entire route. Table 4.4 provides the key observations for various sections of the route, and for the Kawanda substation. Based on these observations, it was deemed necessary to complete a routing and site update and optimisation for the Kawanda Substation and for the 132 kV Kawanda-Mutundwe Line, as presented below.

Table 4.4: Key Changes to Routing Corridor Previously Identified by AESNP

| Site/Route | Key Observations |
|---|--|
| 2 x 132 kV lines Bujagali to cut-off point on existing Bujagali-Tororo line | No significant changes to land use or settlement patterns. Portions of route within the fenced area acquired for the HPP have re-vegetated. |
| 220 kV line Bujagali to Kawanda | No significant changes to land use or settlement patterns, much of land use in eastern portion remains plantation lands and Mabira CFR. In the western portion the growth of peri-urban land surrounding Kampala remains south of the routing corridor |
| Kawanda Substation | Additional development of the school immediately southwest of the site constrains the routing of lines as planned by AESNP. |

| Site/Route | Key Observations |
|----------------------------|---|
| 132 kV Kawanda to Mutundwe | Residential land-use along portions of the route has intensified – several stretches of route that were clear of houses are now occupied by recently constructed buildings and dwellings, which would significantly increase resettlement requirements along those stretches. East of the Lubigi Swamp the new construction has started on the new Kampala Northern Bypass road, presenting a possible routing opportunity. |

4.5.1 Kawanda Substation Optimisation

Approximately 1.502 ha of land were acquired by AESNP for development of the Kawanda substation. The boundary of the acquired property, and the layouts of the substation within the property and transmission line connections, are shown on Figure 4.7(a). Figure 4.7(b) shows the optimised layout for the substation and transmission lines, as well as the extent of new property to be acquired by UETCL.

As shown on Figure 4.7(a), the original layout has the busbars of the substation oriented in a general north-south alignment, requiring the transmission lines to be interconnected from the east and west sides. As is also shown on Figure 4.7(a), the school buildings on the property adjacent to the west side of the substation constrain the routing of new lines into/out of the substation.

Figure 4.7(b) shows an optimised layout for the substation with the busbars of the substation oriented in an east-west alignment, allowing the transmission lines to be interconnected from the north and south sides of the substation. This layout effectively avoids the need to route new transmission lines across the school property. Figure 4.7(b) also shows the extent of new property that will need to be acquired to allow for the new layout, as well as accommodate laydown area for construction. The figure also shows the adjustments that have been made to the transmission line routing.

4.5.2 132 kV Kawanda-Mutundwe Route Optimisation

Figure 4.8 shows the route that was identified for by AESNP for the 132 kV line between the Kawanda and Mutundwe substations, along with the optimised route. Reconnaissance of the AESNP route indicated that extensive new housing has created a significant constraint along that route, roughly between AP 15 and the Mutundwe substation (Figure 4.8). Construction of the line along the AESNP route would result in significant more physical resettlement than was anticipated in the RAP developed by AESNP.

For this reason, an optimisation exercise was initiated to determine if an alternative route could be found that would reduce the number of people that would potentially be physically resettled.

Because this line is within the major urban centre of Kampala, new cross-country routes are constrained by dense urban and peri-urban residential and commercial land uses. Thus, the two main alternatives for routing the line are the east side and the west side of the Lubigi Swamp. The optimisation considered two new alternative routes along the east side of the swamp and one new alternative route along the west side.

The new Northern By-pass Road is being constructed along the eastern side of the swamp, adjacent to existing residential areas that extend to the edge of the eastern boundary of the swamp. The road, and its orientation relative to residential areas and the swamp, is clearly visible in Figure 4.8. Observations made along the road indicated that locating the transmission line route on the eastern side of the road would result in similar, if not higher, numbers of people resettled. For this reason routing east of the bypass road was not considered a viable alternative to the existing AESNP Route

The possibility to locate the transmission line on the west, or swamp side of the road was also considered. Discussions held with the GoU's Road Agency Formation Unit indicated that, while the roadway was being constructed as a single carriageway, it was ultimately designed to be a dual carriageway road. The second carriageway would be constructed to the west, or swamp, side of the road. Thus, the transmission line would need to be located a minimum of 30 to 40 m away from the edge of the existing road, and so require a significant amount of activity to take place within the swamp, including building access roads to each tower. While this route would avoid much resettlement, the complexity of construction and the potential impacts on the wetland all indicated that this alternative was not preferred when compared to the existing AESNP route.

The routing team walked most of the west side of the swamp, with the objective to identifying a feasible alternative routing for the line. The original route and the optimised route are shown on Figure 4.8. Table 4.5 provides the rationale for the optimised route.

Table 4.5: Kawanda to Mutundwe Transmission Line Route Optimisation

| Route Segment | Optimisation Rationale |
|---------------|---|
| AP3 to AP5 | The new route is located alongside an abandoned railway bed, thereby avoiding numerous houses that are located along the roadway where the original route was located |
| AP5 to AP9B | The AESNP route ran along the south and west sides of Lubigi swamp, affecting many properties and houses in Kyengera Parish and Sumbwe Parish. An alternative route was identified that uses the existing road crossings of the swamp as opportunities to locate the transmission line towers. The alternative route would result in somewhat more construction activity within the swamp. However, it would avoid numerous properties, and thus was selected as the preferred route for this section. |
| AP9B to AP11 | Field observations indicated that shifting the route about 30 m eastward would avoid several properties and have little to no effect on the swamp. |
| AP14 to AP15B | Land use surrounding the main road has intensified significantly since the AESNP route was selected. As a result, numerous homes would be affected along the AESNP route. An alternative route was identified that requires two, and possibly three, towers in the swamp. One tower would be adjacent to the existing road, and therefore would result in minimal disturbance of the swamp. Impacts from the other towers in the swamp would be managed by locating the towers as close to “dry land” as possible, construction during the dry season, and using special wetland construction techniques, such as using mats to create temporary access routes to the tower locations |

Figure 4.7 Optimized Layout for Kawanda Substation

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Figure 4.8 Location of AES NP Route and Optimized Route

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5.0 Project Description, Construction, Operation and Decommissioning

5.1 Life Cycle Overview

A life cycle analysis identifies the major issues and concerns that are likely to evolve over the life of a project. For the IP these issues include the:

- General project location/routing and design;
- Construction;
- Operation and maintenance; and,
- Eventual decommissioning.

These issues have been considered during the SEA prior to any non-reversible actions being undertaken by UETCL or its contractors. The following sections identify the key activities to be completed and facilities to be constructed and operated over the lifetime of this project.

5.2 General Project Description

Section 4 of this SEA described the system planning and route and site selection process for the facilities that are included as part of the IP. In summary, the system plan involves developing the infrastructure listed below to provide three initial interconnection points with UETCLs existing system at the existing Mutundwe, Nalubaale and Tororo substations:

- Bujagali Substation: This facility, which will be built and operated by BEL as part of the HPP project, will be located on the west bank of the Victoria Nile adjacent to the Dumbbell Island hydropower facility. This station will be designed and constructed to allow operation at 220 kV, but will be initially operated at 132 kV. In the future, switching operation to 220 kV will only require installation of new step-up transformers. BEL will build and operate this facility as part of the HPP. All power from the HPP will flow through this substation.
- “Bujagali to Tororo” and “Bujagali to Nalubaale” Lines: Two new 132 kV double circuit lines will run about 5 km south from the Bujagali Substation to a junction point along the existing Nalubaale to Tororo line. The existing line will be severed with one end reconnected to the new lines so as to create a new line between Nalubaale and Bujagali and a new line between Bujagali and Tororo (Figure 4.3). Power for Tororo would now be delivered from Bujagali substation rather than the Nalubaale substation. Power could flow in either direction between the Bujagali and Nalubaale substations depending on the operational status of the generation stations.
- Installation of 2 x 132 kV Reactors of 70 ohm each at Bujagali switchyard.

- “Bujagali to Kawanda” Line: This new 75 km long line will be designed and constructed to 220 kV standard but initially operated at 132 kV. In the future switching operation to 220 kV will only require installation of new transformers at the Bujagali and Kawanda substations.
- Kawanda Substation: This station will be designed and constructed to allow operation at 220 kV, but initially operated at 132 kV. In the future switching operation to 220 kV will only require installation of new transformers. The station will be sized and laid out to allow interconnection of future lines with UETCL’s longer range system plans in mind.
- “Kawanda to Mutundwe” Line: a new 17 km, 132 kV double circuit line will interconnect the Kawanda substation and the existing Mutundwe Substation and thus comprise the third interconnection point for the IP. Internal improvements (e.g., new bay and switching gear) at Mutundwe will be needed to accommodate this new line.

5.2.1 Transmission Line Design

The routes for the transmission lines have been presented in Section 4, as illustrated on Figure 5.1). The lines shall be designed with steel lattice towers of the type commonly used in Uganda and worldwide. Figures 5.2 and 5.3 show typical designs for the two main types of transmission towers to be constructed. Figure 5.2 shows the design of a tension tower (also known as a compression tower). Tension towers are used at angle points, dead end points, at points where the local topography demands it, and at intervals of approximately 5 km along straight stretches of line. They are recognisable because the insulators are mounted horizontally. They are designed to take horizontal and vertical loads and thus are heavier than the other type of towers, which are known as suspension towers (Figure 5.3). Suspension towers are recognisable because the insulators are mounted vertically. They are of a lighter construction than tension towers because they do not have to take horizontal loads.

Concrete pad and chimney foundations shall be used for most towers, although raft foundations may be required for some locations. Additional detail on foundation design and construction is provided in Section 5.3.3.1. Climbing guards shall be installed on all towers to reduce vandalism and to reduce risk to public safety.

The towers will be about 50 m in height, although the specific height of any individual tower will vary. The 230 kV towers will be somewhat taller than the 132 kV towers, and somewhat further apart. The distance between towers will vary between 200 and 400 m. The wayleaves for the 132 kV line is 30 m. For the 230 kV line the wayleave is

Figure 5.1 Preferred System Plan

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Figure 5.2 Typical Design 220kV Tension Tower

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Figure 5.3 Typical Design 220kV Suspension Tower

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40 m. Where lines run in parallel, UETCL requires an additional 5 m of separation between the wayleaves. No permanent structures, such as houses or outbuildings, will be allowed to remain or be constructed within the wayleaves, which are also shown graphically on Figure 5.4. Growth of crops will be permitted, but limited to a height of 1.8 m or less – thus most annual crops and low growing perennial crops such as tea are permitted. Figures 5.5 and 5.6 depict compatible and non-compatible land uses within the wayleave.

5.2.2 Substations

Under the planned transmission system configuration for the Bujagali project, a substation will be required in the Kawanda area (10 km north of Kampala) to reduce the voltage of the incoming transmission line from 220 kV to 132 kV. This substation will also provide for a more efficient low voltage distribution capability in and around Kampala, an otherwise saturated system. Construction of the substation will require the permanent acquisition of approximately 5 ha of land for the substation itself, plus additional area for an access road. The site (Maganjo) is approximately 1 km south of the Kawanda township. The layout and orientation for the Kawanda substation is shown on Figure 5.7.

Access to the Kawanda Substation will be the existing access road from the Kampala-Bombo highway, which is currently used for access to Kawanda Secondary School. No new access roads will be constructed, except for a short (100 m) extension from where the existing access road ends to the substation site. The remainder of the access road (300 m) will be upgraded to take heavy vehicles, but it is not anticipated that paving will be required.

The Bujagali Substation will be constructed as part of the HPP. Details about its location and design are provided in the HPP SEA Report.

In addition to the new substation at Kawanda, minor expansion works will be needed at the existing Mutundwe Substation in order to accommodate the new 132 kV line.

5.3 Construction

5.3.1 General

An engineering, procurement and construction (IP-EPC) contractor has not been selected for the IP. Thus, the information provided in this section may change once the preferred EPC Contractor has been selected. Any such changes would be incorporated into the environmental action plan for the project.

The anticipated programmes for the transmission line component and the Kawanda substation are presented in Figures 5.8 and 5.9 respectively. The programmes are based upon a six-day working week (Monday to Saturday inclusive).

The EPC activities are divided into two separate components:

- Procurement, Manufacturing and Transport; and,
- Construction, further divided into the three distinct sections of transmission line.

The procurement, manufacturing and transportation component is broken down into five tasks, as outlined on the programme (Figure 5.8). The first task (engineering) involves the design and specification of all transmission line components. The remaining tasks involve the actual procurement of these components, and the logistics of transportation to Uganda.

The construction component will involve the following tasks: site survey, route clearance and access, civil works (i.e. construction of foundations), tower erection, conductor stringing and inspection testing, commissioning, operational acceptance and handover. Although the overall programme requires about 31 months, the time span between commencement of route clearance and the completion of conductor stringing is expected to be 16 months. It is expected that the EPC Contractor will carry out the works on all lines simultaneously. The timing and schedule will be confirmed following selection of the EPC Contractor.

5.3.2 Procurement, Manufacturing and Transportation

Detailed engineering will include completion of geotechnical and engineering surveys to provide detailed information needed for:

- Placement of towers;
- Design of foundations;
- Design of towers; and,
- Substation design.

Engineering and detailed design will commence upon award of the EPC Contract. At this stage, minor adjustments may be made to the route to allow the EPC Contractor to optimise the design including number of towers and span distances between towers, foundation designs, and number of heavy angle towers.

Figure 5.4 ROW and Wayleave Requirements for 132kV and 220kV Transmission Lines

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Figure 5.5 Compatible Land Uses Within Transmission Wayleave

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Figure 5.6 Incompatible Land Uses Within Transmission Wayleave

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Figure 5.7 Layout of Kawanda Substation

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Figure 5.8 Preliminary Programme for Bujagali Transmission Line

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Figure 5.9 Preliminary Programme for Kawanda Substation

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A major portion of the material incorporated into the IP will be components that are only manufactured outside of Uganda (e.g. tower steel and components, conductors, insulators, transformers and switchgear). Materials and goods that may be procured from within Uganda include:

- Concrete (approximately 4,000 m³ will be needed);
- Aggregates (approximately 11,000 m³ will be needed);
- Food; and,
- Miscellaneous supplies and services.

Materials for the transmission line construction will be stored in one or more temporary construction yards. The location for the yards will be determined by the EPC Contractor. Each yard would require an estimated 0.5 to 1.0 ha with the following general characteristics:

- Hard standing or graded and pre-compacted soil;
- Office space;
- A workshop;
- Water and electricity;
- Sewerage;
- Security (fencing and a gatehouse); and,
- A close location to the Jinja-Kampala highway.

It is expected that the EPC Contractor would rent a developed site in the area of Mukono or Lugazi. The site will be returned to its original state at completion of construction or as specified in the rental agreement. No staff accommodation will be provided at the storage yard, other than for site security.

Material for the substations will be stored on-site, or if additional room is needed, on suitable nearby property to be selected by the EPC Contractor.

Steel components for the IP will be produced outside Uganda. These, along with conductors, insulators and fittings, and transformers, will be delivered by ship to the port of Mombasa in Kenya. All material and equipment procured internationally will be transported by rail or road to a bonded warehouse in Jinja, and from there to the storage yards via public highways.

Materials and equipment procured locally or nationally will be transported directly to the storage yard. Sorting, inspection and reconciliation of quantities will be carried out upon delivery to the storage yard.

Material destined for the transmission line will be trucked from the storage yard to site via public highways and the wayleave itself. It is planned that three to five teams will work on the transmission line at any one time, using the storage yard as a depot. On this basis, there will be an estimated maximum of 80 vehicle movements per day

due to the presence of the storage yard, including deliveries and movement of light/personal vehicles.

5.3.3 Construction Activities

5.3.3.1 Transmission Lines

All the towers on the transmission line will be constructed prior to the installation of conductors. Tower foundations will vary according to the prevailing geology. For the majority of towers, pad and chimney foundations will be used, which will be excavated mechanically. A cross section through a typical foundation of this type is provided in Figure 5.10. By this method, a concrete pad will be constructed at the bottom of the excavation, and each foot of the tower erected within its own ‘chimney’ of steel reinforced concrete. After 48 hours, the form work will be removed, and the excavation will then be back-filled to original ground level and consolidated.

In areas that may be prone to seasonal flooding, (particularly around Kawanda and western Kampala) a raft foundation for transmission line towers will be used, a cross-section for which is also shown in Figure 5.10.

The raft foundation is similar in concept to the pad and chimney foundation, except all four feet of each tower will be set on a single raft of concrete. If the tower is sited upon hard rock, a minimal foundation only is required. Any required excavation of rock will be carried out by drilling, barring, wedging or use of compressed air tools. It is not anticipated that blasting will be necessary.

Upon delivery of the steelwork from the storage yard to the tower location, erection of the transmission towers will proceed using a winch and gin pole. Typically, the gin pole will be supported on one leg of the tower while the sections are bolted on. The gin pole will then be lifted to a higher attachment point to repeat the process. Figures 5.11 and 5.12, which are generic drawings taken from AESNP (2001), an international contractor, show the process of tower erection.

Once the towers are erected, the conductors and shield wires will be strung and tensioned with specialised equipment to achieve the designed sag. Stringing is carried out first by hanging a pilot wire from each tower, connecting the pilot wires together, and then using the pilot wire to draw the conductor along the insulators. This is normally done in sections of six to seven km at a time.

Guard structures will be used when installing the conductor over highways, main roads, waterways, railroads or any overhead power or communication lines to ensure the conductors do not cause a hazard to the public or the construction staff.

Figure 5.10 Transmission Tower Foundations

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Figure 5.11 Tower Erection With Lateral Gin Pole

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Figure 5.12 Tower Erection With Swinging Gin Pole

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Compression dead-ends and splices will be used to secure the conductor to certain towers and join sections of conductor. After the conductors and shield wires are attached to the insulators or clipped to supports the lines will be sagged to the proper tensions, and fitted with vibration dampers.

A number of tests will be undertaken to ensure that the line performs to specification. During testing, line ground clearance will also be thoroughly checked. Once construction of the transmission line is completed, the soil along the right-of-way will be assessed for problems such as erosion or compaction, and corrective action will be taken as appropriate. Areas of bare soil will be seeded with native cover crops to stabilise the soil, reduce erosion and prevent invasion by undesirable plant species.

No chemical use (e.g. curing agents, plasticisers, cable oils or pesticides) will be required on site during construction. Curing of concrete foundations will be executed by means of wet jute bags.

5.3.3.2 Kawanda Substation

For the purposes of this SEA work at the Kawanda substation is anticipated to take place over a period of approximately 30 months. The schedule will be confirmed once the EPC Contractor is selected. The level of activity in the first year will be most significant, and will consist of site surfacing and other civil works. The electrical installation activities will take place in the second year. This will consist of the erection of steel structures and the installation of high voltage equipment, control boards, wiring and control cables. Tasks required during the construction phase include:

- Civil works (levelling, drainage and fencing);
- Drilling and excavation of footings, and preparation of crushed rock pad;
- Installation of foundations and other support structures;
- Installation of oil collection systems;
- Erection of steel structures;
- Erection of HV equipment;
- Construction of control building and installation of control boards;
- Installation of wiring and control cables; and,
- Testing, energising and commissioning of the substation.

5.3.4 Access Roads

Access to the transmission line wayleave will be gained solely by use of existing public highways and access roads. No new roads will need to be constructed. Where the new transmission line will follow the existing “northern route” transmission line (39.5 km), the existing access track within that wayleave will be used. Access to the new tower locations will be gained via a short ‘spur’ from this track.

Where an existing UETCL access track is not present (i.e. in areas where the new transmission line does not follow the existing line), an access track of approximately 5 m width will be cut through all vegetation along the wayleave, where possible following the centreline of the wayleave. Clearance for housing and other buildings will be maintained by local adjustment of the route. Cut trees will be left for the use of (or sale by) local owners.

In areas of the wayleave other than the access track, clearance of vegetation will be minimised, but a certain amount of clearance will be required in the immediate area of the towers. Only so-called ‘dangerous trees’ will be cut, i.e. those that could damage the transmission line if they fell on it (typically large trees within 30 m of the transmission line). All clearance of vegetation will be done by hand and will not use heavy machinery. Soil will not be left exposed.

It is not planned for the access track to pass through wetlands. Watercourse crossings are also minimised. Within Mabira Forest, existing bridge and culvert structures will be used to cross watercourses, although these may require some strengthening to take heavier loads.

During conductor stringing, construction workers will need walking access in a direct line between towers in order to hang the pilot wire. This will be done with minimal damage to crops. This access will not be required in low-lying areas such as permanent or seasonal swamps.

Access to the Kawanda Substation will be the existing access road from the Kampala-Bombo highway, which is currently used for access to Kawanda Secondary School. No new access roads will be constructed, except for a short (100 m) extension from where the existing access road ends at the substation site. The remainder of the access road (300 m) will be upgraded to take heavy vehicles, but it is not anticipated that paving will be required. A barrier will be erected between the traffic zone and pedestrian zone on this road, and crossing corridor personnel will be provided at the beginning and end of the school day, if required. Speed limits on this road for construction vehicles will also be posted to minimise any problems with pedestrians. School staff and pupils will be briefed on the nature and risks of vehicle movements to and from the site.

The expected construction programme for Kawanda will require approximately 140 containers to be delivered to the Kawanda site over seven months. This delivery traffic combined with movements of light vehicles will result in less than 20 vehicle movements per day to and from the site. No staff accommodation will be provided at the substation site, other than for a night-watchman.

5.3.5 Equipment

The storage yard for the transmission line construction is expected to be the base for a fleet of vehicles to be used for the construction process. It is anticipated that the following vehicles and equipment will be required:

- One large crane for handling goods within the storage yard;
- Trucks: of various sizes, some fitted with Hiab or Atlas-type hoists for unloading materials and equipment at each tower site;
- Mobile cranes of 26-30 tonne capacity;
- ‘Forest type’ large wheeled tractors with winches;
- Cable stringing pullers;
- Pilot line winders;
- Cable stringing tensioners;
- Cable reel carriers;
- Truck/trailer mounted water tanks;
- All purpose four-wheel trailers;
- 4-wheel drive vehicles;
- Compressors with pneumatic equipment such as rock drills; and,
- Concrete mixers.

5.3.6 Labour Force

The forecast number of staff required for construction of the transmission line is as follows: two Project Managers (expatriate), six to ten Supervisors (mainly expatriate), and 150 semi-skilled and unskilled workers (recruited locally). These workers will operate as approximately five separate erection crews. Semi-skilled and unskilled workers will be trained by supervisors prior to commencement of construction. Local people will be recruited as unskilled labourers from the villages traversed by the transmission line, where possible.

While in many cases the workers will arrive at site by foot, buses will be provided as necessary to bring workers to the wayleave. Expatriate staff will be housed in existing accommodation (apartments or hotels). No construction workers’ camp will be required. No “induced impacts” traditionally associated with workers’ camps (e.g. growth in prostitution, stretching of social services like schools and health clinics beyond their capacities) are therefore anticipated.

At the peak of construction activity, about 100 workers will be involved in the construction of substation facilities at Kawanda. It is estimated that 85 percent of the workforce will be labourers; 5 percent semi-skilled workers (e.g. equipment operators); 5 percent highly skilled workers and 5 percent managers and supervisors.

The recruitment process will be managed by UETCL and its sub-contractors and contractual commitments will be sought from any labour-only contractors that

labourers provided will be employed in line with the provisions national labour law including working hours, overtime, and form and frequency of pay.

The site is within reasonable commuting distance of Kampala, consequently, a residential camp for workers will not be required.

5.3.7 Testing and Commissioning

Various tests will be undertaken to ensure that the IP performs as per specifications. During testing, line ground clearances will be thoroughly checked. Once construction of the transmission line is completed, the soil along the right-of-way will be assessed for problems such as erosion or compaction and corrective action will be taken, as appropriate. Areas of bare soil will be seeded with native cover crops to stabilise the soil, reduce erosion and prevent invasion by undesirable plant species.

Once all circuits have been connected, ‘dry’ testing will begin. This testing entails confirmation that all connections have been made according to the wiring diagrams. Voltage is then applied to individual circuits to check for correct performance of circuit breakers and correct settings of relays. ‘Wet’ testing will involve energising the complete system and a final test, prior to full commissioning.

Testing and commissioning will be carried out by two to three inspection engineers and about ten semi-skilled workers.

5.4 Operation and Maintenance

Once the transmission lines are constructed there is relatively little ongoing maintenance required. The key activities involve surveillance of the condition of the transmission line and wayleave; emergency maintenance and repairs; and vegetation control.

Vehicular access to most sections of the wayleave will be required to allow supervision and monitoring, and to effect line repairs when needed. Outside agriculture areas or otherwise cleared areas, undesirable vegetation within the wayleaves will be controlled by cutting. Herbicides are not expected to be used. The removal of accumulated growth will continue to take place in accordance with UETCL’s existing wayleave clearance programme, with clearance at least yearly.

During normal operation of the Kawanda Substation there will be generally two to three operational staff and two to three cleaners and guards. The majority of traffic to and from the substation will be light vehicles, i.e. no regular loads greater than two tonnes, and should be no more than five vehicle movements per day.

The transmission system will be almost free from noise, and emissions will be limited to a low hum. This will not be noticeable from within buildings outside the substation site.

The substation will be nearly maintenance-free. Maintenance will be limited to annual cleaning and checking of circuit breaker connections, and will require a team of approximately five engineers and semi-skilled workers, for approximately one week. Changing of transformer oil will not be required.

5.5 Decommissioning

It is anticipated that the interconnection facilities will be continuously maintained and repaired, and will be operated for several decades. Because of their long useable life the circumstances under which they might ultimately be decommissioned are difficult to foresee. Thus, only a general decommission approach can be presented.

The transmission lines would be deconstructed in reverse order from their construction, using similar equipment and techniques. The conductors and shield wires would be lowered to the ground, and all cables would be spooled and removed from the right-of-way for salvage. The towers would then be dismantled and removed from the right-of-way for salvage. The disposal or otherwise of tower foundations would depend upon the intended future land use. In grazing lands and in areas allowed to revert to forest, the foundations would likely be left in place, and would gradually deteriorate. In other situations (e.g. cultivated fields, land intended for residential or industrial development), foundations might be demolished and removed. Similarly, measures to restore soils would depend upon the intended future use. Access would be required throughout the length of the line for movement of heavy equipment and crews. A process would be needed to remove easements and dispose of land no longer needed.

For the Kawanda Substation, the decision on whether to decommission or upgrade will depend on development of the Ugandan transmission system in the interim, and the system requirements at the time. Under a typical decommissioning process, all steelwork would be lowered to the ground, the cables spooled, and all components including transformers removed for salvage. Transformer oil would be drained and recycled. Access to the substation would be via the existing access road to the Kampala-Bombo highway, and no new access route would need to be constructed. Should a decommissioning decision be made, it is anticipated that the substation site and control building would be re-used for industrial, commercial or other compatible purposes. Otherwise, the site would be cleared and levelled in a manner suitable for the most likely future land use. The land would then be disposed of through a process applicable at that time.

5.6 Associated Facilities

The IP is closely associated with the Bujagali Hydropower Project. The HPP site is located at Dumbbell Island, approximately 8 km downstream of the Town of Jinja and 9 km north of the in the existing Nalubaale and Kiira dams that are located at the outlet of Lake Victoria. At Dumbbell Island the river will be dammed by an approximately 30 m high rock filled dam and associated spillway works. The dam will impound a reservoir that extends 8 km upstream to the Nalubaale dam. The reservoir will have a surface area of approximately 388 ha at Full Supply Level (FSL), which is considered to be at elevation 1,111.5 m AMSL. The reservoir will provide live storage of 12.8 million m³ of water. The total volume of water at FSL will be 54.0 million m³.

A powerhouse will be constructed at the dam housing up to 5 x 50 MW vertical-mounted Kaplan turbine generation units that together, will provide a maximum generating capacity of 250 MW of electricity. Permanent access to the facility will be from the Jinja to Kayunga road on the west bank of Nile, branching off from the main road at a point about 8 km north of the existing Nalubaale Dam. A high voltage substation, to be known as the Bujagali Substation, will be located on the west bank of the Victoria Nile adjacent to the dam and power house. This substation will be designed and constructed to allow operation at 220 kV, but initially operated at 132 kV. In the future, switching operation to 220 kV would require installation of new step-up transformers, 220 kV bus and associated circuit breakers and protective equipment and possible minor on-site relocations of some of the power lines. BEL will build and operate this facility as part of the HPP. All power from the HPP destined for the national grid will flow through this substation.

Two hundred and thirty eight hectares of land has been obtained for the project. Eighty hectares will be newly inundated land, with the balance of the acquired land needed for the facilities listed above as well as temporary facilities needed during construction. These temporary facilities include haul roads, coffer dams, laydown and storage areas, and quarries.

Further detailed descriptions about the design, construction and operations plans for the HPP are provided in the Bujagali HPP SEA Report.

6.0 Public Consultation and Disclosure

This chapter describes the community consultation and disclosure plan (PCDP) activities that were undertaken during the preparation of the SEA for the Bujagali Interconnection Project (IP). This section also provides an outline of planned community engagement activities that are to be undertaken leading up to and during the construction of the IP which are to be done in association with the Resettlement and Community Development Action Plan (RCDAP). A separate stand alone IP PCDP Report has also been prepared which includes additional details on the consultation and disclosure process and is provided in Appendix E.

The PCDP is intended to be fully integrated with the project planning, design and implementation process so as to enhance community benefits. Similar to the SEA, the PCDP is not intended to be a “static” document that only describes what has been undertaken, but perhaps more importantly, it plays a role in the overall long-term social and environmental management system for the project that sets into motion a proactive plan to enhance community benefits and minimise negative effects.

The PCDP has built on public consultation procedures carried out in 1999/2001 by the previous project sponsor, AES Nile Power (AESNP), as well as extensive public consultation carried out by the UETCL Bujagali Implementation Unit (BIU) Team since then, particularly in 2004-2005. Similar to the previous public consultations, UETCL has sought to obtain alternative views on the design and construction of the transmission system, including concerns of potential impacts and ways to mitigate such impacts. Based on this input, UETCL has assessed alternatives and considered raised concerns in its decision-making process.

Public consultation and disclosure procedures have been and will continue to be carried out in an ongoing, transparent, consistent, up-to-date and equitable manner. Relevant project information has been, and will be made accessible in a timely manner and in a language understandable to the groups being consulted. Information included as part of this process has been considered in the preparation of the SEA Report and associated action plans (e.g. the RCDAP).

6.1 Applicable Laws, Regulations and Policies to Public Engagement

The GoU’s Environmental Impact Assessment Regulations (1998) set out the minimum requirements for stakeholder consultation and engagement. The project must also address the consultation and engagement requirement of the IFIs involved in the project. At the time of preparing the SEA it was understood that the only IFI to be involved with the IP is the African Development Bank. Details about the requirements that apply to the project are provided in Chapter 2 of this SEA, and in the PCDP Report.

6.2 Stakeholder Analysis

6.2.1 Areas of Influence/Stakeholders

The consultation programme was developed and implemented taking into account the various areas of influence (AOIs) that were identified as part of the SEA (see Section 3.2). Based on these recognised areas of influence, Table 6.1 below outlines the stakeholder groups that were consulted with and a summary of how those consultations were undertaken.

Table 6.1: Consultation Activity Summary

| Stakeholders | Consultation Activities |
|---------------------------|--|
| National Public | Project notices in national newspapers, web site and making documentation available to all interested parties. |
| Government Agencies | Meetings were held with various government agencies and SEA documentation was circulated through NEMA. |
| NGOs (national and local) | Numerous NGOs were identified and contacted to arrange meetings with to discuss their concerns and interests. Project documentation was circulated to the NGOs and offers made for additional meetings. |
| Local Communities | Contact was made with District and Sub-County level governments to inform them of the project. Sub-County Consultation committees were established and met with to assist in consultation activities with local villages. Public meetings, organised by the Sub-County Community Development Officers were held in the affected communities to advise people of the project and to receive their comments and concerns. |
| Project Affected Persons | PAPs include that own property, live and/or are involved in economic activities (typically farming) within the transmission line corridor and associated activities. As part of the RCDAP process, socio-economic surveys were undertaken to establish a profile of the PAPs. It is noted that PAPs within the boundaries of the Kawanda Substation were resettled by the previous project sponsor. An assessment of this past resettlement was undertaken and the results document in the APRAP Report. |
| Vulnerable groups | Vulnerable group representatives were included on the Sub-County Consultation Committees. Their interests were considered based on the the input provided by the Consultation Committees and through their meetingd with the affected villages. |
| Business Operators | Business operations located within the transmission corridor were identified and profiled as part of the Rap process. |
| Tourist/visitors | A section of the transmission project parallels a section of the Nile River and has the potential for visual impacts and could potentially affect tourism activity. Tourist interests were represented through contact with tourist based organisations. |
| Cultural Groups | The Kingdom of Buganda was directly consulted with through meetings and the submission of project documentation. These consultations are ongoing. |

It is noted that no indigenous peoples were identified to be resident within the project area of influence.

6.2.2 Description of Stakeholders

The following provides a summary description of the stakeholders most affected by the project, which includes: Vulnerable Groups, Local Villages & PAPs; Tourist Operators/Tourists; and, Cultural Groups. Section 3.7 of the SEA Report and Section 4 of the RCDAP provide a detailed description of socio-economic conditions in the study area.

Vulnerable Groups (IP)

Vulnerable groups were identified as women, the elderly, children (particularly orphans) and people with disabilities. The development of the IP has the potential to directly affect vulnerable groups, particularly those that live in and/or are involved in economic activities within the transmission right-of-way/wayleave. Vulnerable individuals have been identified through the socio-economic surveys that were conducted as part of the RAP process. Groups such as orphaned children are to receive special attention to ensure that their living situation is not in anyway disadvantaged and to ensure that any compensation is allocated fairly and appropriately (so as to avoid others taking advantage of them).

Local Villages & PAPs

The proposed transmission line corridor passes through the boundaries of Mukono, Wakiso and Mpigi Districts and within Kampala City Council (KCC). Within each District, a number of sub-counties (LC3s) and villages (LC1s) are affected. About eight sub-counties are intersected and about 55 villages are affected. The location of the communities that were consulted with are shown in Figure 6.1. Most of the lands affected by the IP involve small subsistence farming lots. Closer to Kampala, the land could be considered as an urban fringe area with fairly high population densities in the vicinity of the proposed line.

The RCDAP includes a detailed description of the PAPs that are to be affected by the IP.

Tourist Operators and Tourists

As with the hydropower project, the interconnection project has some potential for effects on tourist operators/tourism activity, although to lesser extent. One feature of note is the Mabira CFR. As outlined in Section 3.5.1.5 of the SEA Report there are proposals to grow the ecotourism potential for the reserve and thus, there exists the potential for some impacts on tourism activity as a result of the proposed T-line construction through the reserve as discussed in the SEA Report. The proximity of a

section of the transmission line to a section of the Nile River also has the potential for visual affects from points along the east bank of the river which are frequented by tourists.

Cultural Groups

The main cultural group potentially affected by the IP project is the Kingdom of Buganda. The Kingdoms of Uganda are officially recognised cultural institutions by the GoU and each kingdom is represented by a head cultural leader or ‘King’ (Kabaka). The Kingdoms are organised into several “Chiefdoms” as well as smaller clans that are based on the family. An administrative government body composed of various representatives and a council governs the Kingdoms. It is noted that the Kingdom of Buganda owns a considerable amount of land of which is leased to others for various periods of time.

6.3 Stakeholder Engagement

The consultation and disclosure programme was designed and implemented so as to foster community awareness of the proposed project and SEA study, and to provide opportunities for community input and involvement. Careful attention was made to the various national and international principles/policies/guidelines (as previously noted) as they relate to consultation. The approach was also designed recognising that an extensive amount of consultation was undertaken by the previous project sponsor, and more recently, consultation activities undertaken by the BIU. By all indications, the starting point was a relatively high awareness level of the project, and which was confirmed through the initial community consultations undertaken in August 2006.

Figure 6.1 Location of Consulted Communities

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6.3.1 Previous Consultation Activities

From 1997 to 2001, AESNP undertook an extensive public consultation programme using methods best suited to the diverse interests of the various stakeholders and their level of literacy. Consultation was undertaken with local, regional, national and international interests and stakeholders. Methods of public consultation that were applied during the course of the project included:

- Targeted briefings;
- Displays and exhibitions;
- Project progress reports and newsletters;
- Advertising;
- Interviews with key people;
- Site visits;
- Informal at-home meetings;
- Surveys; and,
- Focus group discussions.

The AESNP ESIA reports provide summaries of all consultations that were undertaken and the major issues/concerns that were raised. Some of the key IP issues from the past consultation process, as well as those raised since the project was put on hold, are as follows:

- Need for and project benefits;
- Economic impacts;
- Environmental effects;
- Public health (disease);
- Transparency of the process;
- The need for electricity to local communities and the affordability of power;
- Improvements in local community infrastructure;
- Banking procedures for stakeholders;
- Protection of women, orphans, elderly and physically challenged;
- Jobs for local people;
- Disruption to culture;
- Crop damage compensation;
- Importation of labour from the outside;
- EMF effects from the transmission lines;
- Public health implications (HIV/AIDS increase) from construction workers; and,
- The need to address unresolved issues of the resettled persons.

The information collected in the previous consultation process was used as a starting point for the preparation of the PCDP. This information was used with some caution though recognising the changes to the project (although few), the potential for new stakeholders and the potential for new issues and concerns.

More recently, the Bujagali Implementation Unit (BIU), which has been an agent of the Uganda Electricity Transmission Co. Ltd. (UETCL), has been engaging the potentially affected communities. Consultations related to the IP that have occurred included:

- Meetings with the 55 local communities (LC1s) along the proposed electrical transmission corridor (as formerly proposed by AES) were conducted in July 2005 to identify changes in land use and land ownership; and,
- In November 2005, letters were sent to all landowners along the proposed AES transmission corridor advising them that the UETCL would undertake a reassessment of the land that would be required for the transmission line.

6.3.2 Implemented Community Engagement Activities

Consultation activities undertaken and to be undertaken by UETCL have been organised into the following phases:

- **Phase 1:** Initial consultation activities that fed into the development of the SEA Terms of Reference;
- **Phase 2:** Release of the SEA Terms of Reference and Draft PCDDP;
- **Phase 3:** Release of SEA Consultation Summary Report;
- **Phase 4:** Release of the Final Draft SEA Report and Action Plans;
- **Phase 5:** RCDAP Planning Consultation; and,
- **Phase 6:** Ongoing Project Consultation.

Figure 6.2 presents a schematic diagram of the key consultation activities and their timing.

A key guiding principle to the PCDDP process is that it involved *free, prior and informed* consultation with the affected communities to enable informed participation. The following presents a summary of the extent to which this was achieved:

- All consultations have been *free* and under the observation of a witness NGO (InterAid). Stakeholders have been encouraged to attend consultation events and/or to provide comments on disclosed materials directly to UETCL. There has been no evidence that stakeholder involvement and the comments provided have been as a result of coercion by another party. The review of media articles/ editorials in various newspapers shows that there is much freedom to express ones views in Uganda;
- Consultations have been undertaken *prior* to project decisions being made and have had influence on the design of the project. Consultations will also continue on issues such as the RCDAP design as well as other action plans in regards to mitigation prior to them being finalized and implemented;

- There has been much information disclosed to the various stakeholders to ensure that they are *informed* about the project. Information that has been disclosed has included: the SEA ToR, the draft PCDP, a project newsletter (which was also translated into Luganda), an SEA Summary Report, meetings with the Sub-County Consultation Committees and local village meetings with the assistance of the Sub-County Community Development Officers. All of these items/activities contributed to created community awareness about the project. The information disclosure activities (to keep people informed) have been focussed on those who have/will be potentially affected by the project. There have also been other notifications targeted at the general public and the NGO community in the form of newspaper/radio notices and letters. All of these activities have been described in this chapter as well as in the PCDP Report. UETCL is committed to keeping the local communities informed by making the SEA reports available to the local community as well as the release of future newsletters/information bulletins that are to be focussed on the RCDAP and other action plans/mitigation activities; and,
- Information to the communities has been disclosed in a cultural appropriate manner. This has involved the conduct of meetings/presentations in the local language; the preparation and distribution of a project newsletter in the local language; the use of local language radio stations to advertise meetings and to notify the release of information materials; the engagement of locally based Consultation Committees consisting of various community representatives; the engagement of the Sub-County Community Development Officers to organize and facilitate meetings with the affected villages; and contact with Kingdom leaders to confirm how/and with whom should consultations be conducted with.

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Figure 6.2 Public Consultation and Disclosure Activities

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The project sponsor retained the services of a witness NGO (InterAid) in August 2006 to assess whether or not UETCL and their affiliates abide by Ugandan law and international requirements when undertaking the PCDDP activities. InterAid was required to attend a sample of the consultation activities and to establish a grievance mechanism. (See Section 6.5.1 for further details on this.)

The following sections describe the consultation phases and the activities undertaken in each Phase.

6.3.2.1 Phase 1 – Initial Stakeholder Consultation

The project sponsor has conducted two initial sets of consultations prior to the release of the SEA ToR and this draft PCDDP. These consultations took place in January and March 2006 and largely involved meetings with various government agencies. Some additional meetings were also conducted in late May 2006. The purpose of these meetings was to reintroduce the project and to identify initial comments and expectations that the agencies may have with respect to the project and SEA process (Note that these consultations were for both the IP and HPP projects and were undertaken by the Burnside Consultation Team). The agencies that were met with are outlined in Table 6.2 below.

Table 6.2: Initial Government Agency Consultations

| Consulting Activity | Agencies/Groups Consulted |
|----------------------------|--|
| January 2006 Consultations | <ul style="list-style-type: none"> • BIU • Ugandan Electricity Generation Co. Ltd. (UEGCL) • Ugandan Electricity Transmission Co. Ltd. (UETCL) • Ministry of Energy and Mineral Development (MEMD) • National Environmental Management Authority (NEMA) • Jinja District (reps. of Jinja, Budondo, Bujagali, Kyabirwa, and Namizi) • Mukono District (reps of Mukono, Wakisi, Kikubamutwe, Naminya, Buloba) • National Fisheries Resources Research Institute (NAFIRRI) • Uganda Wildlife Authority • Directorate of Water Development • National Forest Authority • Rural Electrification Authority • Ugandan Investment Authority • Ministry of Tourism, Trade and Industry • Electricity Regulatory Authority • Nile Basin Initiative |
| March 2006 Consultations | <ul style="list-style-type: none"> • BIU • Makerere University Institute of Environment and Natural Resources (MUIENR) • National Forest Authority (NFA) • Road Agency Formation Unit (RAFU) • Mukono District • NAFIRRI • Jinja District • NEMA • Ministry of Tourism, Trade and Industry (MTTI) • Uganda Wildlife Authority (UWA) • Tourism Operators (Nile River Explorers, Equator Rafting, Adrift) • Mabira Forest Tourism Ecotourism Centre • Jinja tourism businesses networking meeting • Local hotel/lodge/tourism owners and operators • Operator of Kiira and Nalubaale Hydro Dams (Eskom) • Directorate of Water Development (DWD) • LC1 and LC3 representatives of Wasiki subcounty |
| May 2006 Consultations | <ul style="list-style-type: none"> • BIU • National Association of Environmental Professionals (NAPE) • National Forest Authority (NFA) • Wetlands Inspection Division • National Association for Professional Environmentalist (NAPE) • Save the Bujagali Crusade |

Key points raised from initial agency and NGO consultations, as they relate to the IP include:

- The recognition of the urgent need for new reliable electrical generation sources given current rolling power blackouts;
- The concern that the lack of power is damaging the economy;
- The need to audit the results of the previous RAP (for the Kawanda substation) (this has been undertaken and corrective action is being initiated);
- The need for land to compensate the removal of land in the Mabira forest;
- NGOs have suggested that the previous process was not transparent – it did not involve NGOs;
- Need for an EA process that promotes open dialogue;
- The need to consider and assess other electricity generation options in the EA;
- The need for a more integrated EA process and examination of the issues;
- The need for an NGO forum to discuss the issues;
- The need for input from the people and not just community representatives who may be biased in their opinions;
- The need to provide training and employment recruitment; and,
- The need to provide opportunity for local women to participate during construction (e.g. breakfast/lunch/dinner kiosks).

Business/Tourism Operator Meetings

Discussions were had with the National Forest Authority/Mabira Ecotourism Centre regarding impacts of the proposed transmission line on forest activity.

Assessment of Past Resettlement

As part of the assessment of past resettlement, surveys and discussions were undertaken with a sample of those people who had been relocated in 2001 by the previous project sponsor from the Kawanda substation site. These people are now living in the host community Nansana. The purpose of these consultations was to assess the effectiveness of the previous resettlement programme and to identify concerns and issues of the resettled people that have yet to be resolved. These meetings/interviews were conducted in April 2006. The report on the work is found in the Assessment of Past Resettlement and Action Plan (APRAP) provided as Appendix F to this SEA report.

In summary, issues identified included:

- Although the resettlers were promised land title, at the time of the APRAP work, none had received land title;
- The hand pump put in place by the previous project sponsor is not operational;

- Land provided to some was reported to be less fertile than what they had before and land parcels are reported to be smaller (apparently some sold some of their land after it was provided to them); and,
- That the previous project sponsors rushed them into the new houses when they were not quite ready to move (the BIU reported that they were given 6 months notice).

Consultations with Mabira Forest Communities

As part of an assessment of the effects of the transmission line on the Mabira Forest, consultations (focus group discussions) were undertaken with several communities in the vicinity of the forest including: Buwoola, Ssanga and Ssesse. The number of people in each discussion group ranged from 30 to 40 individuals. In addition to the meetings, a questionnaire with 34 open-ended and close-ended questions was distributed to forty two (42) respondents selected at random from the villages of Nkaaga, Bakata, Ssanga, and Ssesse to find out their view about the benefits, costs and the likely compensation they expected due to the loss of the part of the forest as a result of the 220 kV power line. Issues raised during these meetings included:

- The communities did not raise significant concern with the proposal to develop a new transmission line through the forest;
- They requested that they be provided the trees that are cut down within the transmission corridor;
- They requested that they be provided employment opportunities;
- There seem to be some concern that nothing transpired since the previous consultations were undertaken;
- Suggested that some of the compensation money should be channelled in the form of community development initiatives (e.g. improving schools); and,
- Requested that they be provided with tree seedlings for agro-forestry activities.

The report regarding these consultations is found in Appendix E to this SEA report.

6.3.2.2 Phase 2 – Release of the SEA Terms of Reference and Draft PCDP

The Phase 2 consultations occurred from July to August 2006 were focused on gaining input on the SEA ToR and the draft PCDP. Contact was made with various interests in order to inform them of the process, to identify issues/concerns, and to obtain input on the planned consultation programme.

Public Notice

An initial public notice that announced the initiation of the SEA study and release of the SEA ToR and draft PCDP was placed in the following three newspapers:

- New Vision (on August 5 and 8, 2006);
- The Monitor (on August 5 and 9, 2006); and,
- Bukedde (in Luganda) (on August 5 and 8, 2006).

In addition to appearing in the newspapers, the notice also was placed on the New Vision web site for a period of two weeks in early August 2006.

The public notice also identified contact information for additional information and advised that the SEA ToR and PCDP are available from the project website.

NGO Meetings

Offers were made to meet with a targeted group of NGOs in July/August 2006. The purpose of these meetings was to introduce the project and to obtain their initial feedback and concerns in regards to the project and SEA study. Initial contact was made with about 20 NGOs. Both local and national NGOs were consulted with. A summary of IP related key issues raised during the NGO meetings is provided in Table 6.3 below. Both the IP and the HPP was the subject of these discussions.

A follow-up email on August 22, 2006 was sent to the NGOs that were met with as a reminder to submit their comments on the SEA ToR and PCDP.

The only written comments formally submitted by an NGO (at the time of writing this report) on the SEA ToRs were from NAPE, although their comments were focussed on the HPP and not the IP.

Table 6.3: Summary of Phase 2 NGO Meetings

| Meeting Date | Organisation | Summary of Comments |
|---------------|---|---|
| July 27, 2006 | Uganda National NGO Forum Plot 25 Kabalagala Box 4636 KLa. 031 260373/ 041 510272/ 041 501674e-mail; ngoforum@infocom.co.ug | <ul style="list-style-type: none"> • Their interests can be represented by ACODE and NAPE. |
| July 27, 2006 | Anti-Corruption Coalition Uganda (ACCU) Mr. Godfrey Rwakabale (Coordinator) Plot 243 Tuffnel Drive 041 535659/ 535660/ 0772611482 Email: rwakabale@anticorruption.or.ug | <ul style="list-style-type: none"> • Their role is mainly promotion of corporate social responsibility. • Knew the project history since the times of AES Nile Power. • Pledged their contribution to the SEA process. |
| July 1, 2006 | International Union for the Conservation of nature and Natural resources (IUCN) Mr. Alex Muhwezi (Country Rep.) Plot 39, Acacia Avenue 041 344508/ 0772221499 Email; alex.muhwezi@iucn.co.ug | <ul style="list-style-type: none"> • Country Rep. was out of country but still promised to forward their input to the document. At the time of writing this report, no input has been received. |
| July 26, 2006 | Uganda Wildlife Authority (UWA) Director, tourism business development and planning Mr. Damian B. Akankwasa Box 3530 kla. 041 355000/ 0772 790729 damian.akankwasa@uwa.or.ug | <ul style="list-style-type: none"> • Needed to look at the SEA TOR's as a guide to UWA's input and old EIA documents. • UWA is supportive of the project. Their role will be more of guidance throughout the process. |

| Meeting Date | Organisation | Summary of Comments |
|----------------|---|--|
| August 1, 2006 | Green Watch Uganda Kanneth Kakulu/ Irene Ssekyana Suite No.5, Ground Floor -Airways House. P.O. Box 10120, Kampala- Uganda Tel: 256-41-344 613 Fax: 256-41 343 787 Email- irene@greenwatch.or.ug OR environment@greenwatch.or.ug website: www.greenwatch.or.ug | <ul style="list-style-type: none"> • Willing to participate. • Had concerns on whether the affected communities were consulted. or the NGO feedback would be basis for consultation. (Explained to them that community consultation is ongoing). |
| August 2, 2006 | Uganda Debt Network Mr Kapepwe Julius 041 543974/ 041 533840/ 041 223152 jkaepewe@udn.or.ug | <ul style="list-style-type: none"> • They are willing to participate in this development. • Requested copies of the TORs to act as a basis of their input. |
| July 27, 2006 | DENIVA Mr. Wandera Peter 041 530575/ 041531150 info@deniva.or.ug | <ul style="list-style-type: none"> • Liked the concept of involving NGOs unlike the way it was conducted previously. • Promised to have a look at the TORs as a group and give feedback. At the time of writing this report, no input has been received. |
| August 1, 2006 | Environmental Alert Christine Nantongo (Programme Manager) Kabalagala off Gaba road P.O.Box 11259, Kla. Tel: 256 41 510215; 0772440926 Email envalert@envalert.org | <ul style="list-style-type: none"> • Appreciated the approach the SEA team took making sure the Civil society is involved in this SEA process. Advised that all the groups under the National NGO forum umbrella should be contacted. |
| August 2006 | Wildlife Clubs of Uganda Tibakenya, Dr. Elly Africa Box 4596 Kampala Phone: +256.41.256534 Fax: +256.41.258351 | <ul style="list-style-type: none"> • SEA TOR and draft PCDP set. No comments received. |

| Meeting Date | Organisation | Summary of Comments |
|----------------|--|--|
| July 27, 2006 | National Association of Professional Environmentalist (NAPE) Frank Muramuzi 041-534453/ 0772 492362 Email: nape@utlonline.co.ug | <ul style="list-style-type: none"> See HPP SEA/PCDP for a summary of their comments as all related to the HPP |
| August 2006 | Action for Development (ACFODE). Type: Non-indigenous. Physical Address:- Plot 623/624 ACFORD House Bukoto, Kampala. Postal Address:- Telephone & Fax:- 532311 & 530460 Email:- ngoforum@starcom.co.ug. Contact Person:- Mrs.Annette Muwonge | <ul style="list-style-type: none"> SEA TOR and draft PCDP set. No comments received. |
| August 2006 | Uganda Fisheries and Fish Conservation Type:- Indigenous Telephone & Fax:- Email:- ngoforum@starcom.co.ug. Contact Person:- | <ul style="list-style-type: none"> SEA TOR and draft PCDP set. No comments received. |
| July 28, 2006 | Uganda Manufacturers Association (UMA) 041 220831/ 041 221034/ 0772 861147 Mr. Mawanda Robert. | <ul style="list-style-type: none"> As an umbrella of manufacturers, they fully support the project especially in light of the current power crisis that greatly affects the manufacturing sector. Manufacturers only get electricity an average of 17 days per month. There is more than 50% decrease in production because of this. Promised to convene a UMA Environment sub-committee meeting and provide input into the project document (SEA ToR). At the time of writing this report, no input has been received. |
| July 28, 2006 | Save Bujagali Crusade (SBC) Afunaadula 0782555222 | <ul style="list-style-type: none"> Concerns of political influence in developmental projects and the need for political support for the alternatives and removal of all barriers to such developments. There should be a grievance handling mechanism for the PAPs. There is need for confidence building with the PAPs. |
| August 1, 2006 | ECOVIC | <ul style="list-style-type: none"> Due to the short notice for the meeting, they could not provide |

| Meeting Date | Organisation | Summary of Comments |
|----------------|---|---|
| | Kefa Kaweesa (Director) 0772 2455270 kefasan@yahoo.com | <p>comments at the meeting though they knew about the project.</p> <ul style="list-style-type: none"> • Have to share the project's TORs with the rest of the team and then come up with a proper input. At the time of writing this report, no input has been received. |
| August 1, 2006 | Nile Basin Discourse Sarah Naigaga 0782 436700 | <ul style="list-style-type: none"> • Was very interested to get in involved in the exercise and on receiving project's documents, would then prepare a response. At the time of writing this report, no input has been received. |
| August 1, 2006 | Uganda Dams Dialogue Mr. Bazira (Chairman) 0772 504173 bazirae@yahoo.com | <ul style="list-style-type: none"> • The organisation represents both the government and several civil society organisations. One of the aims is to address concerns surrounding dams developments in the Country. • They are to convene a meeting, review the TORs and provide feedback. (At the time of writing this report, no input has been received.) |
| July 31, 2006 | Student Partnership Worldwide Jinja (SPW) Jimmy Innes (Country Director) jimmy.innes@spw.org 0782 974434 | <ul style="list-style-type: none"> • Most of their work is channelled to community based environmental programmes. Would therefore be happy to participate in this SEA process especially where community related issues are involved. |
| July 31, 2006 | JIDDECO (Jinja) Paul Bateeze (Coordinator) 0772 408378 jiddeco@jiddeco.or.ug | <ul style="list-style-type: none"> • Despite being located in Jinja (project area) they did not participate in the previous EIA process and hence have limited awareness about the project. • Documentation was provided to them (SEA ToR and PCDDP) for their review and input. At the time of writing this report, no input has been received. |
| July 31, 2006 | Busoga Trust (Jinja) Frank Kumbuga & Johnson Waibi (programme manager) 0772 452693 / 043121572 | <ul style="list-style-type: none"> • Just like JIDDECO, it's also under the Busoga arch-dioceses. • Could not provide specific comments on the process. • Provided with the TORs for their review and comments. No input received but have held separate meetings with Busogo Kingdom. |
| August 4, 2006 | African Institute for Energy Governance (AFIEGO) Dickens Kamugisha 041571597 - 0782407085 afiego-ug@yahoo.com | <ul style="list-style-type: none"> • Would liaise with the ACODE director after getting the TORs and provide their input. At the time of writing this report, no input has been received. |

| Meeting Date | Organisation | Summary of Comments |
|----------------|--|--|
| August 2, 2006 | Energy Plus Ltd 535 Kisaasi Road, Bukoto 041-533073- 077-2441953 eng@utlonline.co.ug | <ul style="list-style-type: none"> • Glad to be considered for participation in this process, as they have many concerns. • There was need for them to consult other professional colleagues due to the professional nature of the concerns, in order to have an informed and professional input. At the time of writing this report, no input has been received. • Their firm did not have budgetary provision for this activity this financial year. • Needed some funding from the project sponsor for them to carry on this activity. (Note that UETCL is not providing funding to NGOs) |
| August 4, 2006 | ACODE Plot 96 Kanjokya Street Tumushabe Godba 041 530798 – 0782 202816 | <ul style="list-style-type: none"> • Would liaise with the AFIEGO director after getting the TORs and give their input. At the time of writing this report, no input has been received. |

Community Meetings

There are about 55 communities potentially affected by the transmission line within the districts of: Mukono, Mpigi, Wakiso and Kampala. To consult with the potentially affected villages, consultation committees were established within the following 12 sub-counties:

- Mutundwe Parish;
- Nsahgi;
- Wakiso;
- Nabweru;
- Nangabo;
- Kira;
- Kawuga;
- Mukono;
- Nagojje;
- Najjembe;
- Wakisi, and,
- Njeru Town.

Each sub-county committee included representatives as outlined in Table 6.4.

Table 6.4: Sub-County Committee Composition

| Area of Representation | Composition |
|---|---|
| Political | L.C III Chairperson Sub county Chief L.C 1s of the affected villages. |
| Technical | Environment Health/Education Works/Production/Community development |
| Special Interest / Vulnerable Groups | Women People with Disability Youth Elderly Directly affected persons (in case none of the above is) |

The purpose of these committees was to sensitise the affected villages regarding the project and to obtain their concerns and suggestions. In Phase 1 of the PCDP process, these committees met with the villages in the form of village meetings, and in some cases, consulted with local leaders such as teachers and vulnerable groups.

The SEA ToR and the draft PCDP were provided to the Sub-County Committees in late July 2006 along with a list of issues/questions to explore with the villages including:

1. What general concerns do people have regarding the proposed development of the IP?
2. Is there any specific information regarding your village that the project team should be aware of?
3. What types of information are people interested in receiving?
4. Are there any specific issues/topics that people would like more information on?
5. How would people like to receive information about the project and the SEA study results in the future?
6. How should the results of the Draft SEA and other project information be made available to the villages?
7. Is the use of sub-county committees to consult with the villages appropriate?
8. Are there other consultation approaches/methods that could be used?
9. What mitigation measures should be undertaken to reduce negative effects?
10. How do the villages/people want to be involved in the future?
11. Are there any specific local interest groups that we should be consulting with?
12. What expectations do the villagers have regarding community development opportunities as a result of the project?
13. Do people have any comments/concerns with respect to the proposed study schedule?

The initial meetings were undertaken in late July/August 2006. The subcommittees reported back the findings to the study team in early August 2006. A summary of key issues raised in these meetings is provided below. The PCDDP includes a more detailed summary of the discussion points.

Summary of Phase 2 IP Community Discussions

- The Committees generally indicated support for the project and look forward to the benefits from the project.
- The key issue relates to the property compensation to be provided for the transmission line corridor. Some landowners expressed concern on the need to undertake revaluation of the affected properties.
- People are not aware of the process and need to be informed (particularly for those who have acquired the land since the first valuation). Need to provide information to the community such as who the project sponsor is, who is going to benefit from the project and when will they see the benefits?
- Concerns expressed over remaining issues in the Naminya resettlement village in Wakisi Sub-County.
- Requests made for funds to be released for community improvement prior to project initiation.

- The use of newsletters using a Q&A format was suggested as a means of communication.
- People want to know their fate – the project has taken too long. People want to know about the line and whether they can use the land within the corridor.
- Suggestions were made in regards to community development initiatives included: Assistance in new power supplies (e.g. solar or rural electrification); provide trees for planting/agro forestry; new road culverts; and school improvements.
- Land within the corridor has been left idle since the last evaluation so now has less value. Questions were raised regarding whether people will be compensated for not being able to use their land for the past 5 years.
- Issues regarding the reactivation of bank accounts and whether cash payments could be made?
- Women expressed fear that once the men receive the money that they will take off – The Committee indicated that they could assist in this.
- Some indication of concern related to health effects of transmission lines.
- Requested that employment opportunities be made available during construction.
- Noted that there are some small shrines along the route that will need to be relocated.
- It was reported that people are well sensitised to the Project and of its affects – people went through past training activities.
- The delay in the previous process led to some frustration among the community and has hindered development in the area.
- Community is uncertain as to the extent to which the corridor can be used in the future – people will need to be reminded of what uses are permissible

Buganda Kingdom Meeting

The proposed transmission line route passes through the Kingdom of Buganda. An introductory meeting was held with representatives of the Kingdom of Buganda on August 15, 2006. The purpose of this meeting was to reintroduce the project/study, to identify concerns and identify how the Buganda Kingdom would like to be involved in subsequent steps of the process. Key issues raised during these meetings included:

- The Kingdom has not yet familiarised themselves with the project and its potential issues. Are willing to do this, but will require assistance;
- A key concern is the impact on their land – they noted that they are undertaking a land tenant audit at this time;
- Want to avoid misinterpretation of the project; the parish chiefs need to be made aware of it;
- Public confidence in the project needs to be restored;
- It was suggested that the Parish Chief might want to sit in on the Sub-County Consultation Committees;

- Additional meetings with the technical committee will be required as well as with the Kingdom Parish Chiefs; and,
- It was suggested to the TC that a Buganda representative might want to monitor the land valuation process (for the T-line).

In follow-up to the above noted initial meeting on August 31 and September 5 2006. The August 31 meeting was held with the Kingdom's technical committee and following this meeting the Technical Committee submitted a statement of issues to UETCL. A summary of the key issues from these meetings is provided below.

Summary of Buganda Kingdom Issues

- The Kingdom has agreed to work closely with BEL & UETCL to ensure the successful implementation of the project;
- The Kingdom's key concern relates to the project's impact on land that the Kingdom owns and land that the Kabaka (King) owns. The Kingdom offered access to ownership mapping to assist in this identification process;
- Consultation with the communities should be done in conjunction with the Kabaka's officers ("the Batongol");
- Recognising that some of the Kingdom's/King's lands have "squatters" on it, how is each party to be compensated?
- The Buganda Land Board should be consulted to provide assistance on the process (the Board is the custodian of the Kingdom's land is not necessarily bound by the Ugandan Land Act);
- Related to compensation is the need to properly identify the affected stakeholders;
- What will be the benefit of the line to the Kingdom? Some of the projects proceeds should go to the Kingdom;
- That the line will destroy lands that are important to people's livelihoods and could be culturally significant. It will be necessary to create similar environments to replace those that are impacted;
- The Kingdom is concerned about wetlands that may be affected. Some of these wetlands provide watering areas for livestock;
- There are already two lines that pass through communities that have very little access to electrical power. The Kingdom proposes that for those communities which the line passes through, that they be provided with greater access to electrical power;
- There will be a need to monitor social economic and environmental issues;
- The Kingdom is interested in reviewing environmental documentation. The Kingdom is interested in working with BEL/UETCL to ensure environmental protection;
- Where possible the line should be rerouted to avoid impacts shrines/graves. The Minister of Culture can assist in these matters;

- It was asked whether there is a social responsibility clause to guide project development; and,
- The Kingdom would form a coordinating committee to oversee the project.

National Government Agency Meetings

It was understood that NEMA had circulated the SEA ToR to relevant agencies and requested their comments. Comments received were then considered in NEMA's decision on the SEA ToR approval (which was approved in September 2006). Ongoing meetings were also held with a variety of agencies on IP related issues including:

- National Forest Authority;
- Wetlands Inspection Division; and
- Uganda Wildlife Authority.

Public Inquiries

A telephone number was provided in the public notices for the purposes of information requests and to address inquiries to the project team. As well, an email address was provided on the project website (www.bujagali-energy.com) for people to send in comments and ask questions. Although the telephone number was widely publicised, only a few calls were received during Phase 2. Most of the inquiries were related to employment opportunities.

6.3.2.3 Phase 3 – Release of SEA Consultation Summary Report

The Phase 3 consultation activities occurred from September to October 2006 and were focused on the release of the draft SEA findings in the form of a SEA Consultation Summary Report for the purpose of obtaining input from various interests. A copy of the SEA Consultation Summary Report is provided with the PCDP Report (Appendix E). The SEA Consultation Summary Report was produced in English as well as Luganda. Activities that were undertaken and the input that was received are outlined below.

SEA Summary Release Advertisements/Distribution

A public notice regarding the release of the SEA Consultation Summary Report, and its availability for review, was placed in the New Vision and Monitor newspapers (English) on September 23/27 and 23/26, 2006, respectively. The same ad, but in Luganda was placed in the Bukedde newspaper on September 23/27, 2006. In addition to advertising the release of the SEA Consultation Summary Report, contact information was provided should people have comments or questions regarding the project. Copies of the public notices are included in the PCDP Report.

The availability of the SEA Consultation Summary Report was also advertised on national radio (CBS and Radio One stations). The ads ran from October 2 to October 11, 2006.

The SEA Consultation Summary Report was distributed to the Sub-County Consultative Committees and provided to the LC3/LC1 level governments.

Newsletter

A 4-page newsletter was prepared which provided an overview of the project as well as a summary of key SEA findings to date. The newsletter was distributed to people who attended the public meetings and copies left with the LC3 and LC1 government levels. The Newsletter was produced in English and Luganda. The PCDP Report includes a copy of the Newsletter.

Community Meetings

Recognising that there are about 55 villages potentially affected along the T-line, it was determined that the most effective manner to consult with the villagers was to have the Community Development Officers of each Sub-County arrange and hold the meetings. In preparation of this, an all day CDO training session was held on September 23/06 whereby the CDOs were informed of the project and presented with the objectives of the consultations that they were to undertake as well as the key questions/issues that they were to explore with the villagers. The CDOs were also provided with copies of the newsletter to provide to the villagers. It is noted that the meetings were available to all in the village to attend and participate, not just the PAPs. The CDO-run village meetings occurred in late October/early November 2006.

The purpose of the meetings was to:

- To provide a project update to the villagers;
- To explain project benefits to the community; and,
- To identify concerns and if possible to answer questions.

Some of the meetings were attended by representatives of the BIU/Consulting team to audit the meetings and to assess the effectiveness of the CDOs to conduct the meetings. Based on the notes/CDO reports received, the following summarises the key issues that were raised. For the most part, the issues raised, as outlined in Table 6.5, deal with land compensation issues.

Table 6.5: Local Community Comments and Concerns

| Issue | Comments/Concerns |
|--|---|
| Land Valuation/ Compensation | <ul style="list-style-type: none"> • Will the project consider the original valuations or revised 2006 valuations; • What values/rates will be used? • When will people be advised as to the compensation amounts? • What happens when only part of a house is affected? • What will happen with new homes that have been built in the corridor since 2002? • Remaining small pieces of land (due to the corridor splitting up a parcel) should be purchased as they will be unproductive. • Why can't UETCL purchase the entire 35 m wide corridor and then close it off to future use? • What are people to do if they are not satisfied with the compensation amount offered? • People don't understand why the process is taking so long – they want their money now. • What happens to those who were within the old corridor but are now not affected by the new corridor? They were told to use/improve this land and in some cases the land has been sitting idle since then. • How will the compensation amounts be communicated to the people? • Questions were raised regarding how compensation will be paid for land that is owned by the Kakakba (Kingdom King) and has tenants on it? • The route has changed, what guarantees are there that it won't change again? • Will communal lands/facilities be compensated? • People who have used the affected land for brick making should be compensated. • Questions were raised regarding how compensation will be paid for land that is owned by the Kakakba (Kingdom King) and has tenants on it? • Will communal lands/facilities be compensated? • People who have used the affected land for brick making should be compensated. • The initial line that had been marked had traversed their area but now it has shifted and they had stopped using their land, who will pay the damages they have suffered ever since it was identified? |

| Issue | Comments/Concerns |
|--|---|
| | <ul style="list-style-type: none"> • That the PAPs should receive financial training prior to receiving the compensation money. • Will the project sponsor pay for the extension of electricity into our community? • Are we not going to be paid for all those years we were told to not pay for the land? |
| Community Improvement/Awareness Suggestions | <ul style="list-style-type: none"> • Suggestions for community improvement initiatives included: school facility upgrades/new school, road upgrades, new water supply (not just wells but reserve tanks also), improved health care facilities, power line extension, job training, HIV/Aids awareness, and involving social development groups. • That the community be educated and sensitised on how to avoid HIV/AIDS. • People need to be sensitised regarding the health effects of high voltage lines. |
| Communication Suggestions | <ul style="list-style-type: none"> • The use of radio or informing the LC1 chairperson was indicated as the best means for public announcements. • The people indicated that they were appreciative of these meetings; |
| General Concerns | <ul style="list-style-type: none"> • Safety concerns (to children) during the construction process. • How will issues relating to the construction workers and HIV/Aids be dealt with? • A local committee should be struck to monitor the project and oversee the community development initiatives. • Delays to implement the project were reported to have caused “dragging” peoples’ economic status behind as they were using the land for subsistence farming; they were told to stop using it. • Concerns raised in regards to effects on communal water supplies (e.g. for Wamala Village). • People are concerned about the bad language that power line workers often use. (and effects on children). |

NGO Consultation

SEA Summary documentation and Newsletter #1 was sent to NGOs and a request for comments made. An initial email was sent on October 1, 2006 to 36 NGOs with an

attached electronic copy of the SEA Consultation Summary Report and a request for comments made by October 19, 2006 (comments on both the HPP and IP were requested). A follow-up letter and hard copy of the SEA Consultation Summary Report was subsequently sent to the NGOs in October and a request for comments made (in the end, attempts were made to reach about 50 NGOs with this information – see the PCDP Report for list of NGOs contacted). The comment period was extended to October 26, 2006, as well as an offer to receive comments after that date, should the organisation be unable to respond by the specified date. No written comments on the SEA Consultation Summary Report were received from any of the NGOs.

A follow-up meeting was held on October 13, 2006 with representatives of the Nile Basin Discourse Forum, ECOVIC and the Ugandan Wildlife Society. Representatives of the BIU and the Burnside consultant team attended. The purpose of the meeting was to identify concerns that these agencies may have and to gauge their interest level in participating in social development and environmental restoration activities associated with the project. Although most of the discussion focussed on the HPP, some of the comments were also of relevance to the IP. Some of the comments made at this meeting included:

- Important to engage in dialogue with the affected communities to ensure that their needs are being met;
- The people need to be properly informed of the process and potential opportunities;
- Need to assess the skills/ability for stakeholders to participate in the process;
- That NBD/ECOVIC are interested in being involved with the implementation of the RCDAP initiatives;
- There is a need to start mitigation/restoration/RCDAP activities early in the process as they take time to develop and to be effective;
- NGOs are very interested in reviewing the Power Purchase Agreement for the project; and,
- That UWS would be interested in participating in the monitoring of environmental restoration activities.

The Aids Support Organisation

The Aids Support Organisation (TASO) is the largest indigenous NGO providing HIV/AIDS services in Uganda and the region. To-date a total of 83,000 people with HIV/AIDS have been registered and 22,000 directly receive care and support.

TASO had developed an AIDS/HIV management programme for the Bujagali project for the previous project sponsor. The programme was however never implemented.

A meeting with TASO representatives was held with representatives of BEL, BIU and Burnside attending on October 13, 2006. The purpose of the meeting was to confirm

TASO's interest in assisting in the AIDS/HIV programme for the project – TASO confirmed their interest to participate.

It was indicated that much has changed when the first programme was first developed about 5 years ago. In follow-up to the meeting, TASO submitted a conceptual plan for an AIDS/HIV programme.

National Government Agency Meetings

Copies of the SEA Consultation Summary Report were sent to various GoU organisations including:

- National Environment Management Authority (NEMA);
- Ministry of Energy and Mineral Development (MEMD);
- Ministry of Water and Environment;
- Ministry of Tourism, Trade and Industry;
- Ministry of Lands and Urban Development;
- Ministry of Gender, Labour and Social Development;
- Ministry of Agriculture;
- Directorate of Water Development;
- Fisheries Resources Research Institute (FRRI);
- Uganda Wildlife Authority;
- Directorate of Water Development;
- National Forest Authority;
- Rural Electrification Agency;
- Ugandan Investment Authority;
- Ugandan Electricity Generation Co. Ltd. (UEGCL);
- UMEME Ltd.; and,
- Commissioner for Disaster Management.

No comments on the SEA Consultation Summary Report were provided. NEMA indicated that their comments would not be provided until the full SEA Report was submitted.

Public Inquiries

A telephone number was provided in the public notices for the purposes of information requests and to address inquiries to the project team. As well, an email address was provided on the project website (www.bujagali-energy.com) for people to send in comments and ask questions. Very few calls were received during Phase 3 despite the contact numbers being advertised through newspaper ads. Calls received were largely from job seekers.

Only a few inquiries regarding the IP were submitted through the project email address. Comments were submitted by the IRN, ECOVIC, NAPE and self employed tourism workers at the Bujagali Falls camp site. Responses were provided to those who submitted comments.

Comments were submitted from landowners as well as the Uganda Tourism Association regarding the proximity of the proposed transmission line along the Nile River as it extends down to the Tororo line. These stakeholders expressed concerns regarding impacts on property (residential as well as a tourist horse back riding camp that are along the river) as well as the visual effects of the line from the river and from along the east bank which is frequented by tourists. The landowners were visited on their properties in mid October 06 by representatives of the BIU, BEL and the Consulting Team. The routing of the line was reviewed with the landowners. A commitment was made to investigate whether this section of the corridor could be moved further west and away from the river. It was indicated that this would only be done if a route with overall equal or less impact could be identified. The examination of the routing was still pending during the writing of this report.

Associated Activities Consultation

The main associated project to the Bujagali IPP is the Bujagali Hydroelectric Project (HPP), which involves the development of a 250 MW hydroelectric facility on the Nile River. A separate, yet complementary SEA and PCDDP programme was undertaken for the HPP. The PCDDP programme was run concurrently with the consultation programme for the IP. The results of this consultation programme have been documented in the HPP SEA Report (Chapter 6) and a separate HPP PCDDP report. Feedback received from the HPP consultation activities that related to the IP (as some of the IP project area overlaps with the HPP project area) was considered as part of the IP SEA process.

6.4 Summary of Key Issues

As a result of Phase 1-3 engagement and consultation activities, an number of issues were identified and which were taken into account in the preparation of the of the SEA. Also considered in issue identification were the interim reports of the RAP survey consultant and the Witness NGO (InterAid). The key issues and how these issues were addressed are presented in Table 6.6 below:

Table 6.6: Summary of Key Issues and Responses

| Issue | Response |
|---|--|
| Issue 1: Past resettlement activities | To accommodate the Kawanda substation, residents/tenants were resettled by the previous project sponsor (Nansana village). There has remained some unfilled promises regarding the resettlement. An assessment of the past resettlement activities was undertaken and an <i>Assessment of Past Resettlement Activities and Action Plan</i> (APRAP) Report outlined the concerns/issues and proposed activities to be undertaken. UETCL has committed to resolve certain of these past resettlement issues in the near term. Consultation on resolving these past problems has been occurring by the BIU and is expected to continue into 2007. |
| Issue 2: Land Compensation for the T-line | The key concern relating to the IP process is the land/asset valuation process and what people can expect (and when) to receive as compensation. The issue has been complicated by the previous (2001) valuation exercise (see below). As well, along some sections of the line, land speculation has occurred which has raised concern regarding the legitimacy of some of the claimed assets on the affected properties. The RCDAP report provides a detailed description of these issues. The witness NGO (InterAid) has become very familiar with this issue. |
| Issue 3: Will the previous valuation results be considered? | As noted above, people are initially concerned that the previous land/asset valuations would not be honoured and that the new valuation would be lower because some lands have been idle since the original valuation was done. People were told not to improve/use their land by the previous project sponsor after this first valuation was completed. Through the consultation process, BEL has explained to the PAPs that based on a GoU directive, that the original valuation would be honoured (where records are available) so that people would not be worse off with the more recent valuation. |
| Issue 4: Will I be compensated for loss of land use over the past 5 years? | As people reported being told by the previous project sponsor to not improve/use their land after the original valuation, some have requested that they be compensated for this loss of land use for the past 5 years. These claims are to be assessed on a case-by-case basis as a part of the RAP process. |
| Issue 5: Community development opportunities/the need to consult | There is some expectation by the affected communities that they should receive some benefit from the project in some way (beyond land compensation). An IP specific community development plan is to be implemented whereby the communities will be required to propose projects and make application to UETCL for funding. UETCL will undertake consultations/awareness building exercises with the potentially affected communities prior to construction initiation. The Resettlement and Community Development Action Plan (RCDAP) describes the proposed programme for community development. |

| Issue | Response |
|---|---|
| Issue 6: Construction workforce impacts | <p>Local residents have expressed concerns in regards to the social and health consequences of construction workers coming into their community. They have expressed concerns regarding bad behaviour of these workers as well as HIV/AIDS.</p> <p>No specific workers camps are to be created for the IP construction. Instead, workers will be bussed in from the Kampala area on a daily basis. As such, workers are only expected to be in each of the communities for a short period and largely during the work day.</p> <p>A comprehensive AIDS/HIV programme is to be implemented (with the assistance of the Ugandan AIDS/HIV NGO TASO or similar organisation) which is to involve education programmes for both the local community and the workers.</p> |
| Issue 7: Local community access to electricity | <p>Access to electricity within many of the affected communities is generally poor. Recognising that this is a power project, the local communities have expressed interest in getting improved access to electricity as a community development initiative. It has been explained to the communities that electrical distribution is under the authority of UMEME, which is a private company. UETCL cannot simply direct UMEME to improve electrical connection in the area. Nevertheless, GoU through REA and UMEME Concession, (who have access to an international funded programme) and can be approached to improve electrical access in the area.</p> |

6.5 Future Consultation Events

6.5.1 Phase 4 - Release of the SEA Report and Action Plans

In Phase 4, the focus of the consultation will be on the release of the SEA Report and associated Action Plans. This consultation period will be undertaken in conjunction with the review and approval process of the SEA Reports by both NEMA and the international lenders and is expected to last from the SEA submission date to financial closing. Phase 4 consultation activities are to include:

- Notices by NEMA in early December 2006 advising the public of the availability of the SEA Report for review and comment. These notices are appearing in national newspapers including the New Vision, Monitor and Bukedde (in local language);
- The IP SEA Report and Executive Summary is being made available at public locations such as libraries, government offices, UETCL and BEL offices;
- The SEA documentation will be accessible through the project website: www.bujagali-energy.com;
- Meetings will be set up with each of the Sub-County consultation committees (that have already been formed) present the key SEA results. An issues-based presentation will be made followed by a discussion period. The purpose of the

meetings is to ensure that the local government representatives are aware of the key project findings and understand how the project will affect their communities;

- A letter will be sent to the identified NGOs advising them of the release of the SEA Reports and a request made for their comments. They will be notified that a CD copy can be sent to them and an offer to meet will be made;
- UETCL will consider and respond to questions received regarding the SEA Report and action plans;
- If necessary update/addendum documentation will be prepared and released to address issues that emerge through the Phase 4 consultation process;
- UETCL will also offer the opportunity to meet with an interest groups/government agencies to discuss their concerns; and,
- The need for additional community meetings will be assessed during this period and if necessary, meetings will be held.

Table 6.7 summarises how each of the stakeholder groups will be consulted with in Phase 4.

Table 6.7: Summary of Future Consultation Activities per Stakeholder Group

| Stakeholders | Consultation Activities |
|---------------------------------|--|
| National Public | Advertisements of the release of the SEA reports will be placed in national newspapers. Documents will be available for review at public places such as libraries. The public will be encouraged to provide comments. |
| Government Agencies | NEMA will distribute the reporting to GoU agencies for review and comment. NEMA to consider their comments in making an approval decision. |
| NGOs (national and local) | Letters/emails being sent to about 50 NGOs advising them of SEA Report release and offers to meet with them. |
| Local Communities | Meetings with the Sub-County Consultation committees to explain key SEA findings and to receive their feedback. Purpose is to ensure that they understand the implications of the project on their communities. |
| Project Affected Persons (PAPs) | The BIU continues to deal with past resettlement issues. These issued are to be resolved prior to construction initiation. |
| Vulnerable groups | Vulnerable group interests are represented through the Sub-County Consultation Committees. Input on how their interests will be taken into account will be considered at the above noted meetings. The need for specific meetings (in regards to the SEA) with vulnerable group representatives of the affected villages will be reviewed. |
| Business Operators | Business owners will be consulted with through RCDAP process. |
| Tourist/visitors | Agencies such as the Uganda Tourism Association will be kept informed of the project. |
| Cultural Groups | Meetings with Buganda Kingdom will continue to address their concerns. |

It is noted that NEMA's review and approval process requires:

- Advertising the availability of the SEA Report through national newspaper(s). The report is to be made available for a period of time not less than 14 days. Comments on the SEA Report are due within 21 days of the public notice;
- The release and distribution of SEA Consultation Summary reports to public accessible locations;
- The project sponsor (UETCL) may have to respond to some of the comments received as requested by NEMA; and,
- An optional public hearing may be held at the discretion of NEMA.

Grievance Management Mechanisms

The availability of a Grievance Mechanism will be advertised with the other project notifications regarding the release of the SEA Reports. The advertisements will include InterAid contact information should an individual have a grievance with the SEA process. A grievance form has been prepared and will be available through the chairpersons of the local villages. The Sub-County Committees will also be used to channel the forms and vet the grievance issues. They will identify which ones can be solved locally or one that has to go to higher level beyond the village and Sub-county. The community leaders know the PAPs very well and have the political and social responsibility for the community members. InterAid will advise BEL on how to respond to received grievances. Responses and actions (if necessary) to resolve the grievance will be communicated to the individual who submitted the grievance. A written record of all grievances received, and how they were dealt with, will be kept by InterAid and UETCL.

6.5.2 Phase 5 – RCDAP Planning Consultation

Phase 5 of the consultation programme is anticipated to commence once SEA approval has been obtained.

Included as part of the SEA Report is the Resettlement and Community Development Action Plan (RCDAP), which describes the proposed community development initiatives to be implemented as part of the project. The initiatives in the RCDAP are to be considered as draft and are in need of confirmation/further definition prior to their implementation. There is a need to meet with the communities to make them aware of the programme and to assist them in the identification of priority initiatives. The communities also need to be aware that the RCDAP fund, while generous, is of a finite amount and thus there is a need to focus on the most urgent needs for the communities. The following is a proposed list of activities to be undertaken:

- Identify and retain the BEL Community Liaison Manager who would oversee the community consultation/engagement activities;

- Confirm membership and role of the Sub-County Consultation Committees. Meet with and explain the proposed RCDAP to the Consultation Committees;
- Keep the public informed on the progress of the RCDAP development and implementation through the preparation and release of information bulletins/newspapers;
- Meet with vulnerable group representatives of the consultative committees and explore the needs of vulnerable peoples in the area;
- Train the Sub-County CDOs for them to undertake community initiative prioritisation exercises in the affected villages. With this input, roll-up their input to the Sub-County level and with the assistance of the Consultation Committees;
- CDOs to work with the affected villages to make their applications for community development initiatives;
- The Sub-County Consultation Committees to review/pre-screen the community applications;
- If accepted, the Community Liaison Manager in consultation with the Sub-County Consultation Committees are to oversee the preparation of implementation plans; and,
- Oversee the start-up of the RCDAP initiatives that should be implemented prior to construction start-up (e.g. job training activities).

As well, during this period, the Community Liaison Manager will work with InterAid in responding to and resolving any received grievances.

It will also be important to keep the communities informed on the project progression including employment opportunities.

6.5.3 Future Consultations Phase 6: Ongoing Project Communication

Once the project has begun the construction phase, project updates are to be communicated to the public to inform communities on project activities including the RCDAP and other action plan activities. During this period, the Community Liaison Manager will:

- Coordinate the release of regular project information/updates with the EPC contractor during the construction period;
- Providing updates to the project website: www.bugagali-energy.com;
- Work with the Sub-County Consultation Committees on the release of project information and obtaining community feedback;
- Work with InterAid in the ongoing Grievance response process;
- Receive and respond to questions from the local community;
- Communicate the results of RCDAP activities;
- Coordinate the release of Annual Reports which will among other things, report on RCDAP activities, environmental management activities and environmental/social monitoring activities; and,

- Work with TASO (and possible other CSOs) in regards to the development and release of Aids/HIV education materials.

6.6 Disclosure Plan

In promoting transparency and accountability, UETCL has and will continue to “provide relevant material in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted”. To date, UETCL has disclosed the following:

- SEA ToR and the draft PCDP;
- IP SEA Consultation Summary Report;
- The final draft IP SEA Report and SEA Summary;
- The PCDP Report;
- The Assessment of Past Resettlement Action Plan (for the Kawanda Sub-station) (APRAP); and,
- The RCDAP.

The SEA ToRs and draft PCDP were distributed in July 2006 to the National government (NEMA) and local government stakeholders (sub-county level).

The draft SEA Consultation Summary Report was released in late September 2006.

The final draft SEA Report and associated action plans were released in early December 2006.

There may be a need to prepare and release SEA addendum/update reports depending on issues that surface during the review of the Draft Final SEA Report.

The SEA Report and Actions Plans are being made available to the other identified stakeholders and the public at large at publicly accessible locations and on the project web site: www.Bujagali-energy.com.

In addition to the above, an Environmental and Social Action Plan (ESAP) will be prepared and released to the local communities in early 2007. ESAP “update reports” will be released quarterly during construction and an annual ESAP report released during the operations period.

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7.0 Impact Identification, Management and Monitoring

This SEA adopts a project life cycle assessment format. It focuses on the development of specific management initiatives during the construction, operation, and decommissioning phases of the project to ensure that: i) the people closest to the project receive the projected benefits; ii) environmental and socio-economic impacts are minimised; and iii) health and safety impacts are kept to a minimum. To optimise the life cycle assessment, linkages between potential impacts (i.e., key environmental issues), mitigative measures (i.e., management actions), net effects (i.e., residual effects), and monitoring programmes (i.e., management decision tools) are explicitly made.

The section provides:

- Compliance screening of the project against Government of Uganda Legislation, International Treaties and Conventions Ratified by Uganda, and Project Applicable Performance Standards (Section 7.1);
- Identification and analysis of developmental and community benefits (Section 7.2);
- Identification and analysis of “Key Project Issues” (Section 7.3); and,
- A net effects analysis in tabular format summarising the key project issues from Section 7.3, as well as the balance of issues and concerns that are of a more routine nature, the impacts of which are well understood and manageable using proven techniques (Section 7.4).

The mitigation and management tables provided in Section 7.3 provide the basis for development and implementation of the project specific Social and Environmental Action Plan summarised in Section 8 and provided in full as an accompanying report.

7.1 Compliance Screening

7.1.1 Government of Uganda Policies and Regulations

The applicable Government of Uganda policies and regulations, along with a brief statement indicating project compliance with each, are provided in Table 7.1.

Table 7.1: Compliance of the Bujagali Electrical Interconnection Project with Government of Uganda Policies and Regulations

| Act or Regulation Project Status: Rationale | |
|--|---|
| The Constitution of the Republic of Uganda, 1995 | Complies: The Bujagali Interconnection Project has been planned in accordance with all relevant government enacted laws to protect and preserve the environment from abuse, pollution and degradation, and to manage the environment for sustainable development. |
| The Electricity Act, 1999 | Complies: The facilities will belong to and be operated by UETCL. The authorisation of UETCL to construct the line is granted under S.68 (1) of the Electricity Act by the Electricity (Authorisation of Construction of the UEB Electric Supply Line) Notice 2000. UETCL has issued 60-day advance notices to all landowners whose land it wishes to enter [need to confirm if done/when to be done]. Compensation for affected people will be determined in accordance with the Land Act, 1998 and the Land Acquisition Act, 1965. Where an interest in land greater than the right of use is required for purposes of construction of the interconnection project, the Government of Uganda may exercise compulsory acquisition. |
| The National Environment Management Statute, 1995 | Complies: An Environmental Impact Statement is being prepared following the requirements of the Statute, including obtaining a certificate of approval of EIA before the project is implemented. The transmission line will run through or near the Lubigi swamp, situated west of Kampala. Although the erection of towers will have no significant effect on the ecological composition of the swamp, specific permission will be sought from the Wetlands Inspectorate Division and NEMA by UETCL. Mitigation/compensation for a new encumbrance on a CFR will be undertaken in accordance with Schedule 3 of this Statute. |
| The Land Act, 1998 | Complies: As required under the Constitution of Uganda, prompt payment of fair and adequate compensation where land is compulsorily acquired will be made by UETCL in accordance with the valuation principles laid out in S.78 of the Land Act. The assessment of compensation for the right to use the land is based on the diminished use of the land by owner/ occupier of the land and will be paid by UETCL. |
| The Forests Act, CAP 246 | Complies: UETCL will obtain a license in the form of Form A of the second schedule of the Forest rules for purposes of clearing forest products from Mabira, Kifu and Namyoya CFRs. UETCL will also obtain a permit in the form of Form E for the purposes of occupation of forestry land or undertaking works. The Ministry of Lands, Water and Environment also established a policy framework for the sustainable management of CFRs. UETCL will operate within this framework in implementing the transmission line project. |
| The Local Government Act No.1/1997 | Complies: The proposed corridor line will pass through the districts of Kampala, Mukono and Wakiso. UETCL has consulted with, and will continue to consult with District and lower Local Councils, which were granted the responsibility of managing their natural resources by the Act so that their concerns can be adequately addressed. |
| The Town and Country Planning Act CAP 30 | Complies: The proposed corridor passes through the districts of Kampala, Mukono and Wakiso. The project will comply with the relevant District Plans, wherever possible, and with all other provisions of the Town and Country Planning Act CAP 30. |

| Act or Regulation Project Status: Rationale | |
|--|---|
| The Uganda Wildlife Statute, 1996 | Complies: The Bujagali Interconnection Project will be consistent with the requirements of the Uganda Wildlife Statute, 1996, including preparation of an Environmental Impact Statement. However, save from the above, no approvals for implementation of the project will be required from the Uganda Wildlife Authority. |

7.1.2 International Treaties and Conventions

Relevant international environmental treaties and conventions, along with a brief statement indicating project compliance with each, are provided in Table 7.2.

Table 7.2: Compliance of the Bujagali Electrical Interconnection Project with International Treaties and Conventions Ratified by Uganda

| Treaty / Convention | Status: Rationale |
|--|--|
| 1958 Convention on Fishing and Conservation of the Living Resources of the High Seas | Not Applicable: The Bujagali Interconnection Project will not involve activities within the high seas. |
| 1968 African Convention on the Conservation of Nature and Natural Resources | Consistent with Article XIV, full consideration was given to ecological, as well as to economic and social factors in the formulation of development plans for the interconnection project. A number of mitigation measures were developed to reduce its potential ecological effects, including optimisation of the route and facility locations, reduction of right-of-way width, access management, and provisions for local people to be able to utilise portions of the right-of-way for specific purposes. The project has also committed to mitigation measures that will increase in number of hectares of high quality forested land, and improved management of the resources within the CFRs. |
| Convention on Wetlands of International Importance Especially as Waterfowl Habitat | Complies: The Bujagali Interconnection Project will not involve activities within a wetland of international importance. |
| 1985 Vienna convention for the Protection of Ozone Layer | Complies: The Bujagali Interconnection Project will not produce or emit significant amounts of ozone-depleting compounds. |
| 1987 Montreal Protocol on Substances that Deplete the Ozone Layer | Complies: The Bujagali Interconnection Project will not produce or emit significant amounts of ozone-depleting compounds. |
| 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora | Complies: The Bujagali Interconnection Project will not import or export endangered species. |
| 1992 International Convention to Combat Desertification | Complies: Activities associated with the Bujagali Interconnection Project will not promote desertification. |

| Treaty / Convention | Status: Rationale |
|---|--|
| 1992 Convention on Biological Diversity | In accordance with Article 14, Impact Assessment and Minimising Adverse Impacts, potential adverse environmental impacts on biological diversity due to a transmission line going through CFRs, have been identified and appropriate mitigation measures have been developed to ensure that impacts are minimised. In accordance with Article 8 In-situ Conservation, the project will provide funding for the NFA to rehabilitate portions of the Mabira CFR resulting in a net increase in high quality forest and improved management within the CFR. |
| 1992 Convention on Climatic Changes | Complies: The project does not involve significant emission of greenhouse gases. |
| Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in World Flora and Fauna | Complies: The Bujagali Interconnection Project will not involve importation or exportation of flora or fauna. Measures are in place to manage illegal take of bushmeat during the construction phase. |
| Intergovernmental Authority on Drought and Desertification | Complies: Activities associated with the Bujagali Interconnection Project will not promote desertification. |

7.1.3 Compliance with Project Applicable Performance Standards

Table 7.3 provides a compliance screening against the project applicable standards as determined by concordance analysis of the environmental performance standards and guidelines applicable to the project, as provided in Chapter 2 of this SEA Report.

Table 7.3: Summary of World Bank Group and Government of Uganda's Environmental Standards and Guidelines applicable to the Proposed Bujagali IP

| Parameter to be Measured or Environmental Management System Requirement to be Met | Project Standard or Requirement | Project Response; Where Addressed in SEA |
|--|---|--|
| <i>Workplace Air Quality</i> | | |
| Workplace air quality: monitoring | Periodic monitoring of workplace air quality should be conducted for air contaminants relevant to employee tasks and the plant's operations. | Complies. Table 7.9 (General Construction Related Issues – Air Quality) of the IP SEA. |
| Workplace air quality: maintenance of protective equipment | Ventilation, air contaminant control equipment, protective respiratory equipment and air quality monitoring equipment should be well-maintained | Complies. Section 8.4.5 of the IP SEA. |
| Workplace air quality: use of protective respiratory equipment | Protective respiratory equipment must be used by employees when the exposure level for welding fumes, solvents and other materials present in the workplace exceed the following threshold limit values (TLVs). | Complies. Section 8.4.5 of the IP SEA. |

| Parameter to be Measured or Environmental Management System Requirement to be Met | Project Standard or Requirement | Project Response; Where Addressed in SEA |
|--|--|---|
| Limits for Liquid Effluents (process wastewater, domestic sewage and contaminated storm water discharged to surface waters) | | |
| pH | 6 to 8 | Complies. Table 7.9 (General Construction Related Issues – Water Quality) of the IP SEA. |
| BOD | 30 mg/l | |
| COD | 100 mg/l | |
| Oil & Grease | 10 mg/l | |
| Total Suspended Solids | 50 mg/l | |
| Coliform bacteria | <400 MPN/100 ml (95 % of the time) | |
| Environmental Management Considerations for Hazardous Materials and Wastes | | |
| Hazardous material handling and storage: Storage and labelling | All hazardous (reactive, flammable, radioactive, corrosive and toxic) materials must be stored in clearly labelled containers or vessels | Complies. Table 7.9 (General Construction Related Issues – Management of Hazardous and Contaminating Material) and section 8.4.5 of the IP SEA. |
| Hazardous material handling and storage: local/international standards | Must be in accordance with local regulations or international standards and appropriate to their hazard characteristics. | Complies. Table 7.9 (General Construction Related Issues – Management of Hazardous and Contaminating Material) and section 8.4.5 of the IP SEA. |
| Hazardous material handling and storage: spill containment | Storage and liquid impoundment areas for fuels, raw and in-process materials, solvents, wastes, and finished products should be designed with secondary containment (e.g. dikes, berms) to prevent spills and the contamination of soil, groundwater and surface waters. | Complies. Table 7.9 (General Construction Related Issues – Management of Hazardous and Contaminating Material) and section 8.4.4 and 8.4.5 of the IP SEA. |
| Hazardous materials handling and storage: fire prevention systems | Fire prevention systems and secondary containment should be provided for storage facilities, where necessary or required by regulations, to prevent fires or the release of hazardous materials to the environment. | Will comply. Level of detail to be addressed by EPC Contractor subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Hazardous materials and wastes: asbestos | Processes, equipment, materials and products involving the use or potential release to the environment of asbestos or asbestos containing materials (ACMs) should not be installed. | Will comply. Level of detail to be addressed by EPC Contractor subsequent to SEA (See Section 8.4.3 and 8.4.5 of the IP SEA). |
| Hazardous materials and wastes: chromates | Formulations containing chromates should not be used in water treatment processes. | Will comply. Level of detail to be addressed by EPC Contractor subsequent to SEA (See Section 8.4.3 and 8.4.5 of the IP SEA). |
| Hazardous materials and wastes: PCBs | Transformers or equipment containing polychlorinated biphenyls (PCBs) or PCB-contaminated oil should not be installed. | Will comply. Level of detail to be addressed by EPC Contractor subsequent to SEA (See Section 8.4.3 and 8.4.5 of the IP SEA). |
| Hazardous materials and wastes: ozone depleting substances | Processes, equipment and central cooling systems involving the use or potential release to the environment of chlorofluorocarbons (CFCs), including halon, should not be installed. | Will comply. Level of detail to be addressed by EPC Contractor subsequent to SEA (See Section 8.4.3 and 8.4.5 of the IP SEA). |

| Parameter to be Measured or Environmental Management System Requirement to be Met | Project Standard or Requirement | Project Response; Where Addressed in SEA |
|---|---|---|
| Solid Wastes | | |
| Solid wastes: recycling/reclamation | Solid waste materials are to be recycled or reclaimed where possible. | Complies. Table 7.9 (General Construction Related Issues – Management of Solid Waste) and section 8.4.3 and 8.4.5 of the IP SEA. |
| Solid wastes: disposal | If recycling or reclamation is not practical, solid wastes must be disposed of in an environmentally acceptable manner and in compliance with local laws and regulations. | Complies. Table 7.9 (General Construction Related Issues – Management of Solid Waste) and section 8.4.3 and 8.4.5 of the IP SEA. |
| Solid and liquid wastes: hazardous materials | All hazardous materials, process residues, solvents, oils, and sludges from raw water, process wastewater and domestic sewage treatment systems must be disposed of in a manner to prevent the contamination of soil, groundwater and surface waters. | Complies. Table 7.9 (General Construction Related Issues – Management of Hazardous and Contaminating Material) and section 8.4.3 and 8.4.5 of the IP SEA. |
| Ambient Noise | | |
| Ambient Noise – Construction period | 75 dBLAeq daytime 65 dBLAeq night time | Complies. Table 7.9 (General Construction Related Issues –Noise) and section 8.4.5 of the IP SEA. |
| Ambient Noise – Operational Period | 55 dB(A) in the day and 45 dB(A) in the night in residential/ institutional or educational areas; 70 dB(A) in the day or night in industrial or commercial areas; or a maximum increase in background levels of 3 dB(A). | Operation of the interconnection facility or substation is not expected to contribute significant noise to any sensitive receptors |
| Workplace Noise | | |
| Workplace noise: control measures | Feasible administrative and engineering controls, including sound-insulated equipment and control rooms should be employed to reduce the average noise level in normal work areas. | Will comply. Level of detail to be addressed by EPC Contractor subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Workplace noise: plant maintenance | Plant equipment should be well maintained to minimise noise levels. | Complies. Section 5.4 of the IP SEA. |
| Workplace noise | Personnel must use hearing protection when exposed to noise levels above 85 dBA | Complies. Table 7.9 (General Construction Related Issues –Public and Worker Health and Safety) and section 8.4.5 of the IP SEA. |
| Work In Confined Spaces | | |
| Work in confined spaces: dangerous gases and lack of oxygen | Prior to entry and occupancy, all confined spaces (e.g. tanks, sumps, vessels, sewers, excavations) must be tested for the presence of toxic, flammable and explosive gases or vapours, and for the lack of oxygen. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Work in confined spaces: ventilation | Adequate ventilation must be provided before entry and during occupancy of these spaces. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Work in confined spaces: use of respirators | Personnel must use air-supplied respirators when working in confined spaces, which may become contaminated or deficient in oxygen during the period of occupancy. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Work in confined spaces: requirement for observers/ assistants | Observers/assistants must be stationed outside of confined spaces to provide emergency assistance, if necessary, to personnel working inside these areas. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |

| Parameter to be Measured or Environmental Management System Requirement to be Met | Project Standard or Requirement | Project Response; Where Addressed in SEA |
|--|--|--|
| <i>Right of Way Alignment</i> | | |
| Right of way alignment: minimising environmental impacts | All new rights of way should be aligned taking environmental factors into consideration, in a manner which will minimise, to the extent possible, the need for physical alteration and the impact on sensitive natural environments, cultural resources, agricultural lands, and residential and commercial areas. | Complies. Section 7.3 of the IP SEA. |
| Right of way alignment: land acquisition | Land acquisition must be carried out in accordance with World Bank resettlement guidelines, which require identification and quantification of any impacts on land-based livelihood, and compensation to landowners and people relying on the land for their livelihood. | Complies. Bujagali IP APRAP and RCDAP address the details of this project requirement. |
| Right of way alignment: environmentally sensitive areas | Where rights-of-way are to be established through remote and currently inaccessible environmentally sensitive areas, the potential impacts on the natural environment, indigenous populations, population immigration and natural resource exploitation must be assessed and measures adopted to minimise these impacts. | Complies. Sections 7.3.2 and 7.3.3 of the IP SEA. |
| Right of way alignment: minimising environmental impacts | Environmental impacts of proposed projects should be minimised through such measures as visual impact considerations in siting and design, restricting right-of way use by non-authorised persons, erosion and sediment control during and after construction, and use of low-impact maintenance procedures. | Complies. Sections 7.3.2, 7.3.3 and 7.3.5 of the IP SEA. |
| <i>Electrocution</i> | | |
| Electrocution: de-energising of equipment | Strict procedures for de-energising and checking of electrical equipment must be in place before any maintenance work is conducted. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Electrocution: maintenance of energised equipment | In cases where maintenance work has to be performed on energised equipment, a strict safety procedure must be in place and work must be performed under constant supervision. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Electrocution: revival training | Personnel training must be conducted in revival techniques for electrocution. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| <i>Other Physical Agents</i> | | |
| Other physical agents | Equipment should be designed and maintained for accepted safe working levels of physical factors that may have adverse health effects (e.g., ionising and non-ionising radiation, magnetic fields). | Complies. Section 7.3.4.2 and Section 8.4.5 of the IP SEA. |
| Other physical agents: monitoring | Work areas should be monitored regularly for radiation and field levels, and equipment integrity (e.g., protective shields, lockouts). | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| <i>Health and Safety</i> | | |
| Health – General: sanitary facilities | Sanitary facilities should be well equipped with supplies (e.g., protective creams) and employees should be encouraged to wash frequently, particularly those exposed to dust, chemicals or pathogens. | Complies. Table 7.9 (General Construction Related Issues –Public and Worker Health and Safety; Construction Related Issues – Labour and Working Conditions) and Section 8.4.5 of the IP SEA. |

| Parameter to be Measured or Environmental Management System Requirement to be Met | Project Standard or Requirement | Project Response; Where Addressed in SEA |
|--|--|--|
| Health – General: workplace ventilation | Ventilation systems should be provided and appropriately maintained to control work area temperatures and humidity. | Complies. Table 7.9 (General Construction Related Issues –Public and Worker Health and Safety; Construction Related Issues – Labour and Working Conditions) and Section 8.4.5 of the IP SEA. |
| Health – General: work in high temperature/humidity | Personnel working in areas of high temperature and/or humidity should be allowed to take frequent breaks away from these areas. | Complies. Table 7.9 (General Construction Related Issues –Public and Worker Health and Safety; Construction Related Issues – Labour and Working Conditions) and Section 8.4.5 of the IP SEA. |
| Health – General: medical examinations | Pre-employment and periodic medical examinations should be conducted for all personnel, and specific surveillance programmes instituted for personnel potentially exposed to toxic or toxic or radioactive substances. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Safety – General: prevention of mechanical injuries | Shield guards or guard railings should be installed and maintained to eliminate human contact with moving parts, or hot or cold items. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Safety – General: prevention of falling injuries | Elevated platforms and walkways, and stairways and ramps should be equipped with handrails, toe boards and non-slip surfaces. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Safety – General: prevention of electrocution by electrical equipment | Electrical equipment should be grounded, well insulated and conform with applicable codes. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Safety – General: protection from dust and hazardous materials | Personnel should use special footwear, masks and clothing for work in areas with high dust levels or contaminated with hazardous materials. | Complies. Table 7.9 (General Construction Related Issues – Management of Hazardous and Contaminating Material; General Construction Related Issues –Public and Worker Health and Safety; Construction Related Issues – Labour and Working Conditions) and Section 8.4.5 of the IP SEA. |
| Safety – General: high temperature materials | For work near molten or high temperature materials, employees should be provided with non-slip footwear, gloves, safety glasses, helmets, face protection, leggings and other necessary protective equipment. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Safety – General: eye protection | Eye protection should be worn by personnel when in areas where there is a risk of flying chips or sparks, or where intense light is generated. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Safety – General: protection from dangerous materials | Personnel should wear protective clothing and goggles when in areas where corrosive, reactive, ignitable or toxic materials are stored or processed. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Safety – General: eyewashes. | Emergency eyewash and showers should be installed in areas containing corrosive materials. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |

| Parameter to be Measured or Environmental Management System Requirement to be Met | Project Standard or Requirement | Project Response; Where Addressed in SEA |
|--|--|--|
| Safety – General: safety programme | A safety programme should be established for construction and maintenance work. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Safety – General: fire prevention and fire safety programme | A fire prevention and fire safety programme should be implemented and include regular drills. | Will comply. Level of detail to be addressed subsequent to SEA (See Section 8.4.5 of the IP SEA). |
| Safety – General: climbing towers | Employees involved in climbing towers must be provided with non-slip footwear, gloves, helmets, face protection, leggings and other necessary protective equipment. | Complies. Table 7.9 (General Construction Related Issues, – Labour and Working Conditions) and Section 8.54 of the IP SEA. |
| Site Drinking Water | When sponsors are responsible for the project’s drinking water supply, they should use drinking water standards published by the World Health Organisation in “Guidelines for Drinking Water Quality, Health Criteria and the Supporting Information”. | Complies. Section 5.3.2 and Table 7.9 (General Construction Related Issues –Labour and Working Conditions) of the IP SEA. |
| Training | | |
| Training: harmful materials | Employees should be trained on the hazards, precautions and procedures for the safe storage, handling and use of all potentially harmful materials relevant to each employee’s task and work area. | Complies. Table 7.9 (General Construction Related Issues – Management of Hazardous and Contaminating Material) and Section 8.4.5 of the IP SEA. |
| Training: Material Safety Data Sheets | Training should incorporate information from the Material Safety Data Sheets (MSDSs) for potentially harmful materials, which can be obtained from the supplier(s) of the chemicals being used. | Complies. Table 7.9 (General Construction Related Issues – Management of Hazardous and Contaminating Material) and Section 8.4.5 of the IP SEA. |
| Training: environmental health and safety | Personnel should be trained in environmental, health and safety matters including accident prevention, safe lifting practices, the use of MSDSs, safe chemical handling practices, and proper control and maintenance of equipment and facilities. | Complies. Table 7.9 (General Construction Related Issues –Public and Worker Health and Safety; General Construction Related Issues –Labour and Working Conditions) and Section 8.4.5 of the IP SEA. |
| Training: emergency response | Training should also include emergency response, including the location and proper use of emergency equipment, use of personal protective equipment, procedures for raising the alarm and notifying emergency response teams, including local and regional hospitals, and proper response actions for each foreseeable emergency situation. | Complies. Table 7.9 (General Construction Related Issues –Public and Worker Health and Safety; General Construction Related Issues –Labour and Working Conditions) and Section 8.4.5 of the IP SEA. |
| Record Keeping and Recording | | |
| Occupational health and safety monitoring | Records of job related accidents and illnesses shall be maintained. The records shall include all incidents resulting in an incapacity to work for at least one full workday beyond the day on which the accident or illness occurred. Records must also include the total number of days of absence from work as the result of an incident. | Complies. Table 7.9 (General Construction Related Issues –Public and Worker Health and Safety; General Construction Related Issues –Labour and Working Conditions) and Sections 8.4.5 and 8.5.4 of the IP SEA. |

| Parameter to be Measured or Environmental Management System Requirement to be Met | Project Standard or Requirement | Project Response; Where Addressed in SEA |
|---|---|---|
| Environmental/ occupational health and safety records and reporting | The sponsor should maintain records of significant environmental matters, including monitoring data, accidents and occupational illnesses, and spills, fires and other emergencies. This information should be reviewed and evaluated to improve the effectiveness of the environmental, health and safety programme. An annual summary of the above information should be provided to IFC. | Complies. Table 7.9 (General Construction Related Issues –Public and Worker Health and Safety; General Construction Related Issues –Labour and Working Conditions) and Section 8.4.5 and 8.5.3 of the IP SEA. |

7.2 Developmental & Community Benefits

The project will result in several developmental and community benefits at the national, regional and community levels. These benefits include:

- The project will facilitate interconnection of the Bujagali HPP into the national grid, thereby providing business and people access to much needed power;
- Communities and villages that host the proposed facilities will benefit from access to a Community Development Fund for worthy projects such as upgrades to schools, health centres, and water supply;
- The infrastructure being provided will support transmission needs beyond the IP. Ugandans will benefit through improved system redundancy and potential capacity for future expansion; and,
- The regional and local economies will benefit from opportunities for employment and by opportunities to provide goods and services required during construction.

7.3 Key Project Issues

The following key project issues have been identified based on comments received by project stakeholders, and the experience of the study team with similar assignments. Each of the issues is dealt with, in turn, in the following subsections. Issues of a more routine nature that are common to large construction projects, and for which effective mitigation measures are well known, are dealt with directly in the Summary of Impacts, Mitigation and Monitoring provided as Table 7.8, at the end of this chapter.

- Resettlement and Compensation;
- Impacts on CFR Lands;
- Impacts on Lubigi Swamp and other wetlands;
- Impacts on public health, including HIV/AIDS and Electric and Magnetic Fields (EMFs);
- Aesthetics;
- Labour Force Management;
- General construction related issues; and,

- Cumulative Effects Associated Facilities.

7.3.1 Resettlement and Compensation

The details of Resettlement and Compensation activities to be carried out for the Bujagali Interconnection Project are presented in the Interconnection Project Resettlement and Community Development Action Plan (RCDAP). The RCDAP also contains a detailed implementation plan, including budget, schedule, description of monitoring activities. This section provides a summary of:

- The land required for the project;
- The people, businesses and other land uses affected; and,
- UETCL's compensation and resettlement strategy.

Overall, the compensation and resettlement measures are designed to ensure compliance with the laws and regulations of Uganda and international requirements contained in the Equator Principles, particularly that project-affected persons are better off or, at least, no worse off as a result of the project. The range of ownership situations and strategies for compensation are shown in figure 7.1.

7.3.1.1 Project Impacts - Land

Land affected by the construction and operation of the Interconnection System falls into the following categories:

- Transmission Lines:
 - Wayleave,
 - Right-of-Way,
 - Temporary land needs for construction purposes;
- Sub-stations:
 - Permanent land acquisition,
 - Temporary land needs for construction purposes.

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Figure 7.1 Range of Ownership Situations and Strategies for Compensation

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Right of Way

The Right of Way is the land required for a maintenance track under the line and the location of the towers. This corridor is 5 m (2.5 m on either side of the centreline) in width which suffices for both the access path and the four legs of towers.

UETCL will determine whether land falling within the 5-m wide Rights of Way will remain the property of its current owners (titles would then not be transferred) or whether it should be fully transferred to UETCL, which solution is preferable as all usufruct rights will belong to UETCL.

This land must be accessible at all times by UETCL for maintenance purposes. Whether titles are transferred or not, land falling in the Right of Way is deemed not to have any residual value for its current owners, and will, therefore, be compensated in full to its present owners.

Wayleave

The Wayleave is recognised as the safety corridor outside of which negative impacts from transmission lines are assumed to be negligible. The width of the corridor depends on the line voltage. The Ugandan standard is a 30 m wide corridor for a 132 kV Wayleave and 40 m for 220 kV lines.

Titles for wayleave land will not be transferred from its present owners; this land will remain their property. This land is, however, subject to the following restrictions:

- No construction is allowed in the corridor; and,
- All vegetation is to be kept below 6 ft height (1.8 m).

In the wayleave outside of the 5 m right of way, cultivation or other uses of land may continue provided above-mentioned restrictions are complied with by the owner and the occupants of land.

Kawanda Sub-Station

Land required for the substation in Kawanda was formally acquired by ULB based on compensation paid by AESNP in 2001 (See Assessment of Past Resettlement Activities – APRAP, Kawanda Sub-Station).

Some limited additional land acquisition will be performed at Kawanda Sub-Station to accommodate a slight change in the general lay-out of the station, intended to minimise impacts on a neighbouring school.

Temporary Land Needs for Construction Purposes

During construction, some areas may have to be temporarily occupied by the contractors in charge of the transmission lines construction. Owners and occupants will be compensated against the loss of crops if any, and will receive a rent from the contractors for temporary occupation. There will be no transfer of rights in this case. Damaged crops will be compensated if any change occurs.

“Orphan” Land

Over a length of approximately 75 km, the new transmission line will follow an existing UETCL-operated transmission line. UETCL’s standards require that a 5-m strip separate the two corridors. In most situations, it is not anticipated that access to this strip should be hindered, as on both sides of it is land that is not taken permanently, but only encumbered by restrictions on building and higher crops. However, it is possible than in a limited number of specific field configurations (particularly if a residential structure is located in this strip), access may be hindered or a loss in value may be experienced. In line with usual practice on similar projects (transmission lines, pipelines, etc.), these cases will be considered on a case-by-case basis for potential compensation.

The following table presents a summary of the Project required corridor width:

Table 7.4: Required Corridor Widths for Project

| Section | Voltage (kiloVolt) | Width of Right of Way (m) | Width of Way Leave (m)* | Total Land Take (m) |
|---|--------------------|---------------------------|-------------------------|---------------------|
| Mutundwe – Kawanda | 132 | 5 | 2 x 12.5 | 30 |
| Kawanda – Bujagali (except for Mabira Forest) | 220 | 5 | 2 x 175 | 40 |
| Mabira Forest | 220 | 5 | 2 x 15 | 35 |

* Either side of the Wayleave.

The Project construction and operation will require:

- Permanent Land Take: 52 ha, as follows:
 - Right-of-Way: About 51.6 ha (128 acres) – as mentioned above, this is land that will be permanently required, and to which current land users will lose right of access;
 - Kawanda Sub-Station: About 0.4 ha (1 acre); 12.5 acres were already acquired in 2001; and,

- Land with restrictions on buildings and higher crops (way leave): About 301 ha (743 acres).

It is currently (October 31, 2006) estimated that the number of affected plots is about 2,485. As different household members within the same household may hold several distinct plots under different land tenure arrangements, this number is higher than the actual number of affected households (about 1,900).

7.3.1.2 Project Impacts - People

Physically Displaced People

Physically Displaced People are people whose residence has to be displaced because it is located within the Project land acquisition area.

It is estimated that about 120 households with 319 people will have to be physically displaced as a result of the Project. This is because their current residence is located within the Right-Of-Way or within the Way-Leave.

Most potentially physically displaced people live in densely settled areas around Kampala and along the West Bank of the Nile River, particularly:

- Nansana north to Kampala near Kawanda sub-station;
- Kitawuluzi next to Mutundwe sub-station; and,
- The West bank of River Nile, including villages Kikubamutwe, Buloba, Malindi, which is densely populated and where the overall footprint of the Project is wider.

Out of the total 120 physically displaced households, it is anticipated that a small number (about 15 in the more rural areas) will be able to relocate their residence to the remaining part of their plot. This potential “self-relocation” is, however, most unlikely in the densest areas in the suburbs of Kampala and along the Nile River Valley, where there will be little if any land remaining available to affected people for self-relocation after the Project has vacated the transmission corridor.

Economically Displaced People

Economically Displaced People are defined here as people whose livelihoods are affected by the Project land acquisition to such an extent that even if they are not physically displaced they will have to move to regain similar economic opportunities. In an agricultural setting, this is usually the case because people are affected by the acquisition of a significant proportion of the land they farm that leaves the remainder unsustainable.

Impacts on land for non-physically displaced people are usually benign. The total surface area of the wayleave is only about 50 ha over a length of 100 km and over

55 communities, which in average is less than one hectare for each community. Meanwhile, affected people will retain ownership or title rights of the wayleaves, with restrictions that usually affect subsistence agriculture only marginally, as matooke banana and grain crops still can be grown while complying with the 6-foot height restriction. It is therefore not anticipated that the number of economically displaced people from Kampala to Mabira Forest will be high. According to provisional results of the socio-economic surveys, this number must not exceed 10. These situations will be considered on a case-by-case basis.

This may, however, not be true of villages located along the Nile River West Bank, where people have already been affected by the HPP land acquisition, and where cumulative effects of successive phases of land acquisition can be expected. At the time of submitting this RAP, it is difficult to estimate the effect of this cumulative impact. Tentatively, it will be estimated for planning and budgeting purposes that about 30 households might be economically displaced in this area.

Total Number of Affected Households

About 1,902 households are affected by the Project land acquisition. This number includes the 120 potentially physically displaced households and the 40 potentially economically displaced households.

7.3.1.3 Project Impacts - Summary

The following table summarises Project impacts on land, structures and people:

Table 7.5: Project Impacts on Land, Structures and People

| Impact | Value | Unit |
|---|-------|------------|
| Surface Area of Right-Of-Way (permanent land take) | 128 | Acre |
| Surface Area of Way Leave (land affected by restrictions of use) | 743 | Acre |
| Surface Area of Land Additionally Required for the Extension of Kawanda Sub-Station | 1 | Acre |
| Total Surface Area Required for the Project | 872 | Acre |
| Surface Area of Right-Of-Way (permanent land take) | 51.8 | Hectare |
| Surface Area of Way Leave (land affected by restrictions of use) | 300.7 | Hectare |
| Surface Area of Land Additionally Required for the Extension of Kawanda Sub-Station | 0.4 | Hectare |
| Total Surface Area Required for the Project | 352.9 | Hectare |
| Number of Affected Households | 1,902 | Household |
| Number of Affected Individuals | 5,060 | Individual |
| Number of Physically-Displaced Households | 120 | Household |

| Impact | Value | Unit |
|---|--------------|-------------|
| Number of Physically-Displaced People (individuals) | 319 | Individual |
| Number of Economically Displaced Households | 40 | Household |
| Number of Economically Displaced People (individuals) | 106 | Individual |
| Number of Affected Residences | 230 | Unit |
| Number of Affected Non-Residential Structures | 236 | Unit |
| Number of Affected Graves | 35 | Unit |
| Number of Affected Shrines | 10 | Unit |

7.3.1.4 Principles for Compensation and Resettlement

Key Principles

The key principles committed upon by UETCL in this RCDAP are the following:

- Resettlement and compensation of Project-Affected People will be carried out in compliance with Ugandan legislation, IFC's Performance Standard 5 and WB OP 4.12;
- All physically or economically displaced people will be offered an option between either a full resettlement package, including the provision of replacement residential land and a house, or cash compensation;
- Past experience in Uganda has shown that cash compensation, although very sought after by many household heads, could be detrimental in the medium term, to other household members, particularly the females and children; the Project will make every effort to promote resettlement rather than cash compensation, and this plan is designed accordingly;
- A majority of Project-Affected People (PAP) derive their livelihood from agriculture. Where farmers are physically or economically displaced, they will be offered a resettlement option including the provision of agricultural land of potential equivalent to that of the land they have lost;
- UETCL will assist PAPs' in restoring their affected livelihoods, and will provide transitional assistance, as necessary, as long as livelihoods are not restored to their previous level;
- The RCDAP implementation and outcomes will be monitored and evaluated as part of a transparent process; and,
- PAPs and host communities will be informed and consulted during the whole course of RCDAP development, implementation and evaluation.

General Approach of Compensation and Resettlement

Situation 1: The Affected Household Is Neither Physically Nor Economically Displaced

This means, in practice, that the remaining land is deemed economically viable and no residential building has to be removed.

Such situations of rather benign impact apply to an overwhelming majority of affected households. In these cases, cash compensation will be offered and no resettlement option will be offered. Cash compensation will be at District Land Board rates for land, crops, and structures, with payment of disturbance allowance as per Ugandan regulations. An uplift will be added to this compensation to meet full replacement value requirements, as rates established by District Land Boards usually do not meet this requirement.

Situation 2: The Affected Household Is Physically Displaced but not Economically Affected

The construction of a replacement house will be offered wherever the residential building has to be removed. Depending on situations, resettlement may involve the construction of a replacement house:

- Either on the remaining part of the plot if the remaining land holding in the neighbourhood of the affected plot is deemed economically viable, or if the household's livelihood is not based on agriculture, and if the affected household agrees to such a solution; in such cases, no replacement agricultural land will have to be provided and the household will simply continue to use the land they previously farmed or continue to engage in their non-agricultural activities, while dwelling in their new residence; and,
- Or on another resettlement plot if the remainder of the affected plot is not economically viable; in such situations, replacement agricultural land of similar potential will also have to be provided in the vicinity of the residential resettlement plot.

Residential land will be provided to resettlers under secure tenure (either freehold or very long term leases), regardless of the previous regime of occupation. Agricultural land will be provided under the same regime of occupation as the land it replaces in the previous location.

Situation 3: The Affected Household Is Economically Displaced but not Physically Displaced

In such situations, the residential building of the affected household is not affected, but land take is such that their agricultural sustainability is jeopardised. These situations will be compensated through the provision of replacement agricultural land

with or without physical relocation of the homestead, depending on whether replacement land is available in the vicinity.

It is envisioned at this stage that resettlement would require four different sites, in Kampala South, Kampala North, Wasswa and on the West Bank of the River Nile.

Details on resettlement and compensation strategies are provided in the RCDAP.

7.3.2 Impacts on CFR Lands

7.3.2.1 Mabira Central CFR

A total of 17.6 km of the proposed 220 kV line is located in the Mabira CFR, affecting approximately 61.6 ha of CFR land based on a 35 m wide wayleave. The location of the line in the Reserve has been raised as a concern with respect to loss of vegetation and habitat for forest wildlife within the wayleave, especially in light of the World Bank's Natural Habitats Safeguard Policy (OP 4.04). Specific concerns that have been identified, and which are discussed in this section are:

- The permanent loss of 70.44 ha of forested land will reduce the available habitat for forest dwelling animal species and reduce the forest's capacity to sequester carbon;
- The proposed transmission line will go through 5.63 km of Recreation/Buffer zone;
- The approximate doubling of the width of the existing cleared corridor may create a barrier to movement of forest species between the forest lands north and south of the cleared corridor;
- The line introduces a physical hazard to birds and climbing animals (applies to entire length of the line); and,
- If road access is improved in the vicinity of Mabira CFR, it may result in an increased level of illegal timber harvesting and hunting within the reserve.

7.3.2.2 Kifu and Namyoya CFRs

The proposed interconnection system will also pass through Kifu and Namyoya (also known as Mwola) CFRs.

In the case of Kifu CFR, the proposed transmission line will run immediately adjacent to the existing 132 kV line for a distance of 1.0 km through presently degraded forest. The proposed transmission line will result in 3.7 ha being removed from productive land. This represents 0.25 percent of the CFR.

In Namyoya CFR, the proposed transmission line will go through 1.9 km of degraded natural forest that is in the process of being converted to *Eucalyptus* plantations, under agreement with the NFA. With a wayleave width of 35 m, 6.7 ha will be

removed from productive land, representing a total of 0.3 percent of the CFR. Compensation will be based on a 40 mwayleave (7.7 ha).

Mitigation measures that will be undertaken to limit the impact of the proposed transmission line in these reserves include:

- Wayleave width will be limited to 35 m; and,
- Clearing will be limited in selected areas along the wayleave so that the resulting corridor does not pose a barrier to the movement of “forest interior” wildlife species between the forested areas north and south of the route.

Neither Kifu nor Namyoya CFRs has high biodiversity value at present. Therefore, the possibility of illegal cultivation occurring within these two reserves as a result of the widened wayleave is considered to be low. If there were any ecological implications to the forest habitat lost within these two reserves, the proposed enhancement planting within the Mabira CFR, would more than compensate for these losses.

7.3.2.3. Proposed Mitigation Plan for Forest Reserves

The mitigation measures specified herein have been developed through a consultative process with:

- Forestry staff at the National Forest Authority Headquarters in Nakawa;
- Forestry field staff at the Mabira Forest Station;
- The National Environment Management Authority (NEMA);
- The Ministry of Water, Lands and Environment;
- Local leaders;
- Women’s groups;
- Private forest owners; and,
- NGOs and environmentalists active within the area.

Issue: The loss of forested land will reduce the available habitat for vegetation and wildlife, reduce community benefits from the forest and reduce the forest’s function as a carbon sink

A mitigation plan has been developed as a component of the Forest Economic Assessment (Appendix D). Under the forest mitigation plan to address the loss of forested land, UETCL:

The Developer:

- Pays the NFA for lost investments in plantation crop to compensate affected tree farmers and the Authority's own crop;
- Pays the NFA for loss of future benefits streams;
- Pays the NFA ground rent annually or makes a one-time payment of US\$ 13,635,166 representing the present value of annual payments;
- Meets the NFA's incremental management costs; and,
- *Does not* compensate the NFA for timber value of the growing stock since the Authority will supervise and realise benefits from the disposal of the timber in the impact area of Mabira.

The NFA:

- Disposes the growing stock in the impact area in Mabira CFR, to allow the Developer easy access and incurs the cost of removal of growing stock and receives all benefits realised therefrom;
- Acquires and disposes timber crop of the private tree farmers in Namyoya CFR;
- Disposes owned timber in Kifu CFR within the impact area;
- Allocates new planting area for affected tree farmers in Namyoya and Mabira CFRs;
- Provides the local communities of Mabira CFR with compensatory benefits for lost values with respect to firewood and poles, NTFPs, domestic water;
- Provides the global community with compensatory benefits for lost biodiversity and carbon sequestration values;
- Invests in natural forest rehabilitation from proceeds from the removal of the standing timber crop; and,
- Prepares new Forest Management Plan for Mabira CFR taking into account the impacts of Wayleave construction.

Private Tree Farmers:

- Receive payment for lost future crop; and,
- The NFA allocates proportionate area for planting within suitable CFRs.

Communities:

- Receive 'compensatory benefits' for lost livelihood values; and,
- Get preferential treatment for employment (if suitably qualified) during the construction and maintenance of the wayleave and any forestry-related activities.

The enrichment and regeneration planting will be part of a wider improved management and protection strategy for the whole of the Mabira CFR (including revising the Forest Management Plan and improving ecotourism facilities). All planting will be done with indigenous species such as *Maesopsis eminii*, *Markhamia*

lutea, *Milicia excelsa*, *Antiaris toxicaria*, *Ficus* spp., *Funtumia elastica*, *Terminalia* spp., *Celtis* spp., and *Albizia* spp. Seedlings will be purchased from tree nurseries operated by the NFA and, if necessary, supplemented by wildlings obtained from the forest, including from the wayleave prior to clearing.

This regeneration will, in the long run, result in a net overall gain of high quality forested land within the CFR that will provide habitat utilised by forest dwelling animals and will represent an increase the forest's capacity to sequester carbon. Thus, there will be a net improvement in the extent and quality of forest within the CFR as a result of the mitigative measures to be undertaken by UETCL.

The mitigation budget, based on the Total Economic Value of lost assets, is presented in Table 7.6 below.

Table 7.6: Mabira Forest Mitigation Plan Budget Summary (Values in Ugandan Shillings)

| Source of Economic Value | Mabira CFR | Kifu CFR | Namyoya CFR | Total Value |
|--|--------------------|-------------------|-------------------|--------------------|
| A. GROWING STOCK | 307,556,900 | 0 | 0 | 307,556,900 |
| B. PRESENT VALUES OF BENEFITS STREAMS | | | | |
| 1. Timber | 61,590,992 | 17,990,650 | 77,545,521 | 157,127,163 |
| 2. Poles + Firewood | 4,787,642 | 0 | 0 | 4,787,642 |
| 3. Non-Timber Forest Products | 5,398,565 | 0 | 0 | 5,398,565 |
| 4. Biodiversity | 1,555,490 | 0 | 0 | 1,555,490 |
| 5. Domestic Water | 4,334,445 | 0 | 0 | 4,334,445 |
| 6. Carbon Storage/Sequestration | 18,243,350 | 0 | 0 | 18,243,350 |
| 7. Ecotourism | 2,887,612 | 0 | 0 | 2,887,612 |
| 8. Landtake | 11,740,000 | 618,833 | 1,276,333 | 13,635,166 |
| 9. Immature plantings | 1,826,370 | 0 | 0 | 1,826,370 |
| Sub Total B | 112,364,466 | 18,609,483 | 78,821,854 | 209,795,803 |
| C. TOTAL GROWING STOCK AND BENEFITS STREAM(A+B) | 419,921,366 | 18,609,483 | 78,821,854 | 517,352,703 |
| D. ADD MANAGEMENT COSTS | | | | 16,552,160 |
| E. GRAND TOTAL ECONOMIC VALUES | | | | 533,904,863 |

It is the responsibility of the NFA to revise the Forest Management Plan for the Mabira CFR, if necessary, and to determine when and where mitigation activities are to occur, including: areas to be enrichment planted and tended; and, relocation of ecotourism facilities. A timetable with milestones is to be prepared by the NFA and agreed upon by UETCL within 6 months of the Interconnection project EIS being approved by NEMA.

The NFA has trained staff capable of implementing the above activities, but the department is handicapped by a lack of funds. Thus, UETCL has committed itself to providing funds for the mitigation activities outlined in Table 7.6.

Issue: The resulting cleared corridor may pose a barrier to movement of “forest interior” wildlife species between the forested areas north and south of the route

The route for the 220 kV line through the Mabira CFR has been routed immediately adjacent to the existing 132 kV line to minimise fragmentation effects on the forest. Cross line corridors between the north and south forested areas will be established by selectively minimising clearing along the wayleave, and by selective planting of suitable vegetation at the following locations:

- The valley at tower 142 of the existing line;
- The valley between towers 147 and 146 of the existing line;
- The valley stream about 50 m east of tower 152 of the existing line;
- The valley between towers 153 and 154 of the existing line; and,
- The Valley of the River Waliga between towers 169 and 168 of the existing line.

Incremental clearing of the wayleave is not expected to significantly change movements of wildlife species.

Issue: The line introduces a physical hazard to birds and climbing animals (applies to entire length of the line)

Concern has been expressed by the Uganda Wildlife Society, NFA and NEMA as to the possibility of injury to migratory birds arising from collision with transmission lines. This was prompted by reports of such incidences occurring in other countries such as South Africa (e.g. ESKOM, 1998).

Bird strikes and mortality are a concern for power lines primarily where lines are located in areas with high bird densities, such as waterfowl breeding colonies or staging areas. The proposed line is not located near any significant breeding or staging areas, and therefore bird strikes are not expected to have any significant effects on bird populations in Uganda.

Risk of electrocution by large climbing animals, such as vervet monkeys, or bats are not expected as the spacing of the conductors and the length of the insulators exceeds the reach of the climbing species and wingspan of bats present in the area. A reach of at least 1 m – with the animal touching both the insulators and conductors at the same time -would be required to achieve a short circuit between the conductor and tower. No species known in Mabira, or elsewhere in the study area, has a reach this long.

Issue: Presence of the line reduces aesthetic values for ecotourism and recreation

The 220 kV transmission line will not create a new visual element in the landscape, as it is adjacent to an existing line. It will, however, incrementally increase the level of intrusion present. As the transmission corridor is quite distant from existing tourism/eco-tourism features, adverse effects on these features are not anticipated. In the long run, UETCL's regeneration/enrichment planting measures will provide increased opportunities for ecotourism.

Issue: Improvements to Access Required for Construction May Increase Grazing, Bushmeat Hunting and Illegal Felling of Timber

The 1997-2007 Forest Management Plan for Mabira CFR (Forest Department, undated) indicates that the key activities damaging forest resources are (i) illegal farming, (ii) grazing of animals by people living in enclaves and areas adjacent to the reserve, and (iii) illegal felling of trees for lumber and charcoal production.

The access track along the existing transmission line provides access to much of the area traversed by the line. The conditions observed along the existing line during 2000 (AESNP, 2001) indicated that agricultural cultivation and grazing was occurring within and adjacent to the wayleave of the existing line. It was also considered that tree felling was occurring adjacent to the wayleave of the existing line. Visual surveys in 2006 indicate that UETCL and/or NFA are now enforcing the wayleave more strictly, and encroachment into the forest from the wayleave appears minimal. This is despite the more active ongoing clearance of scrub from the wayleave than previously, and recent upgrades to culverts and bridges along the wayleave, both of which have improved access by the public in general. NFA staff report that this is at least partly due to a system it has established, whereby local residents keep a watch and report any illegal activities to NFA, for a small reward. In turn, NFA actively polices illegal timber harvesting, pole cutting and other activities.

Vehicular access to and along the wayleave through Mabira Forest is now much better than it was in 2001, and as a result, no major upgrading to access roads/tracks is expected to be required. However, some minor upgrading may be required depending on the season when construction takes place (wet/dry), and the vehicles requiring access to a specific point on the interconnection system. As there is no significant level of encroachment at the present time, even with the current good levels of access, any minor improvements to access are unlikely to increase encroachment.

Prior to any upgrading of roads or bridges that provide access into and within the CFR, UETCL will meet with the NFA to agree the level of access that the NFA and UETCL want to maintain during and after construction.

The EPC Contractor will implement the following procedures to prevent illegal hunting of bushmeat by workers during the construction phase:

- Project workers will be prohibited from hunting bushmeat during working hours or on project work sites;
- Project workers will be sufficiently paid that they will not need to supplement their purchased food with illegally obtained bushmeat;
- Project workers will be prohibited from possessing firearms, snares and other hunting equipment when on project work sites; and,
- Bushmeat transport will not be permitted on project vehicles.

It is anticipated that mercantile timber cut during the construction of the proposed transmission line will be sold by NFA and removed from the CFR. At the discretion of the NFA, timber that has no market value will be stacked within the wayleave and left for local people to utilise for firewood or charcoal. The production of charcoal within the CFR by local people is done in agreement with NFA staff.

7.3.3 Impacts on Lubigi Swamp

Lubigi Swamp is a large wetland area in Kampala with significant hydrological and biological functions. For the interconnection project, the main concern, aside from short-term disturbance along the temporary access tracks to tower sites, is the effect on the hydrological functions of the wetland resulting from installation of concrete tower pads. The dominant vegetation is 2-3 m high papyrus. There is currently a weaving/basket-making industry based on the swamp. Since papyrus regenerates within 12 months, any construction related clearance will only be short-term in nature. No significant clearing will be necessary for operation or construction. Thus, no significant biological effects are expected. No Critical Habitat for endangered species will be affected by the project.

In 2001, AESNP consulted the National Wetlands Conservation and Management Programme (NWCMP) with regard to the transmission line being sited adjacent to Lubigi swamp. The NWCMP commented that the Lubigi Swamp is representative of a type of wetland that is widespread in Uganda. Moreover, it is ‘self-protecting’ to a large degree, as any construction within the wetland will be more difficult (and expensive) than on dry land, and therefore will tend to be avoided during both design and construction. This is reflected in the final alignment of the transmission line, which avoids wetland areas wherever possible. Consultation with the Wetlands Inspection Division (WID) in 2006 echoed this feeling, and also sought quantification of the area of the swamp to be impacted by the transmission line.

NWCMP and WID raised concern that any large-scale earthworks, such as temporary or permanent causeways, might cause suspended solids to be mobilised into the water column. Under the proposed alignment, only small causeways will be required in a few locations, as access can be gained to the majority of proposed tower locations by wheeled or tracked vehicles. Thus any effects of causeways in terms of either hydrological impacts or sediment mobilisation are expected to be negligible.

The proposed transmission corridor route runs along the edge of Lubigi Swamp for approximately 8 km. Exact tower locations will be determined on the ground at the time of construction (and in consultation with WID), to minimise social and environmental impacts, but assuming one tower every 300 m, and one third of these towers to be located inside the swamp margins, this equates to nine towers. Assuming a 20 m x 40 m pad and access way from 'dry' land or the road causeway for each of these towers, this represents 7,200 m² of land reclamation from the swamp, or less than one hectare. This represents a small fraction of a percent of the total area of Lubigi swamp, and thus is considered to be a minimal in terms of habitat loss. The fine-tuning of tower locations will include avoidance of flow channels, which will minimise the hydrological impact of the proposal.

In summary, the following mitigative measures will be used to minimise temporary disturbance of the wetland, and avoid permanent intrusion into the wetland area:

- The transmission line will use existing road corridors for construction and operational access wherever possible.
- The proposed alignment has been modified from the AESNP route, in order to avoid areas which have been subject to residential development since 2001, and to further minimise the area of swamp that will be affected by access ways. For example, the alignment now proposes to use small 'peninsulas' off the existing road causeways on the Masaka and Mityana Roads, rather than constructing dedicated causeways to new tower sites in the middle of the swamp. By making use of these existing causeways, the proposed route also 'cuts the corner' off the south-western portion of the swamp, which has reduced the length of the corridor by nearly 1 km from the AESNP alignment.
- Fine tuning of tower locations in consultation with local communities and the Wetlands Inspection Division.
- Fine tuning of tower locations will be done in consultation with local communities and WID, so that specific effects of these locations, will be minimised. As discussed above, this stage would include minimising effects on residents, and avoiding effects on water flows within the wetland;
- Footings of towers will be built to address wet season conditions;
- Towers that are located in seasonally wet areas will be built with raft foundations, rather than the pad and chimney foundation that is normally used on dry sites. The concrete pads that form the base of these towers will have no significant effect on hydrology. Construction of the raft foundations will require dewatering in the

immediate area of foundation excavation. The dewatering will be temporary and localised and is not expected to have any long term effect on flora or fauna.

- Use of specialised construction techniques where necessary.
- If the route fine-tuning exercise requires towers to be located in the swamp, in areas which cannot easily be accessed from existing roads or causeways, specialised construction techniques will be used to access the sites in a way that does not require permanent access ways to be built. It is envisaged that these techniques would include the use of temporary access ways, built from Terramats or similar structures, which would be removed after construction (see www.terramat.com).

7.3.3.1 Other Wetlands

Wetland areas along the transmission line route, aside from Lubigi swamp, are located on the western fringes of Kampala. Several small seasonal wetlands are also in and around the Kawanda area. No towers will be sited within these wetlands. The greatest impact on these wetlands will be aesthetic, due to a transmission line passing over them.

Where the transmission line will cross areas that are potentially important as bird flight paths, in particular large wetland bird species, UETCL shall take reasonable measures to make the conductor more conspicuous. These include the use of reflectors placed at intervals along the conductor. Such measures will be employed where the line crosses the Lubigi Swamp and where the line crosses the seasonal swamps to the north of Kampala.

7.3.4 Impacts on Public Health

This section examines concerns for public health related to HIV/AIDS and other communicable and sexually transmitted diseases (STDs) and exposure to electric and magnetic fields (EMFs). Public health issues and safety issues related to traffic and construction are dealt with in Section 7.3.7, and Table 7.9 of this report.

7.3.4.1 HIV/AIDS

The spread of HIV/AIDS was identified as a key potential public health issue by the International Environmental and Social Panel of Experts which was convened by AESNP in 1998. Concern was expressed that the already high prevalence of HIV found in Uganda could be exacerbated through spread of the disease by construction workers, truck drivers and prostitutes attracted to worker camps.

The EPC Contractor will bus workers to active construction sites each day from Jinja or Kampala. No camps will be used that might attract a concentration of prostitutes.

The EPC Contractor will, as part of each worker's initial orientation and ongoing education, provide public education information about HIV/AIDS transmission and preventative measures. Condoms will be made available to project workers at no cost.

7.3.4.2 Electric and Magnetic Fields (EMFs)

Background

Humans are exposed to a wide variety of natural and man-made electric and magnetic fields. The earth's atmosphere produces slowly varying electric fields (about 0.1 to 10 kV/m), with a product of these fields being lightning. The earth's core produces a steady magnetic field, which ranges in strength from about 470 milliGauss (mG) to 590 mG over North America. Many childhood toys contain magnets, and many individuals use magnets to hold items onto metallic surfaces. These permanent magnets typically have fields in excess of 100,000 mG. An increasingly common diagnostic procedure, magnetic resonance imaging (MRI), uses fields of 20,000,000 mG on humans and is preferred over X-rays because of its safety.

In modern electrified homes and apartments, typical baseline 60 Hz magnetic fields in the middle of rooms range from 0.5 to 2.0 mG. 60 Hz EMFs can also be found in the vicinity of all electrical appliances, which produce magnetic fields of 40-80 mG at distances of about half a meter, although the fields quickly diminish with distance. Personal electric appliances such as shavers, hair dryers, and electric toys can produce fields in the hundreds of mG in the vicinity of the person using them.

In the school and work environment copy machines, vending machines, computer terminals, telephones, wireless telephones, electric lights, tools, motors and heaters are all sources of EMFs.

Electric fields and *magnetic fields* have different properties (Table 7.7); however, more recent interest and research has focused on the potential human health effects of magnetic fields.

Table 7.7: Comparison of Electric and Magnetic Fields

| Electric Fields | Magnetic Fields |
|--|--|
| 1. Produced by <i>voltage</i> (i.e., lamp plugged in but turned off) | 1. Produced by <i>current</i> (i.e., lamp plugged in and turned on) |
| 2. Measured in volts per metre (V/m) or in kilovolts per metre (kV/m) | 2. Measured in gauss (G) or tesla (T) 1 milliGauss (mG) = 0.1 microtesla (μ T) milli (m) = 1 thousandth micro (μ) = 1 millionth |
| 3. Easily shielded (weakened) by conducting objects like trees and buildings | 3. Not easily shielded (weakened) by most material |

| Electric Fields | Magnetic Fields |
|---|---|
| 4. Reduced in strength with increasing distance from the source | 4. Reduced in strength with increasing distance from the source |

Source: National Institute of Environmental Health Services and U.S. Department of Energy. 1995. Questions and Answers About EMF. Washington, D.C.

EMFs from electrical transmission lines have extremely low frequencies and thus low energy levels. The energy levels are unable to break molecular bonds and thus are considered non-ionising. Higher frequency fields, such as microwaves, have sufficient energy to cause heating in conductive materials but are still non-ionising. The still higher frequencies of x-rays and gamma rays have sufficient energy to cause ionisation (breaking of molecular bonds). High-energy ionising radiation can, therefore, disrupt the molecular structure within cells.

Effects on Human Health

Research on the human health effects of EMF was initiated in the 1960s. Since that time, universities, government agencies, utilities, and other expert bodies at a global level have conducted significant research and review of the potential human health effects of exposure to EMF. Such research has included laboratory studies concerning the effects on cells, tissues and animals, as well as studies on human exposure and epidemiology (Federal-Provincial Working Group, 1998).

In the United States, the National Institute of Environmental Health Sciences (1995) has concluded that:

“Most recent reviews have concluded that the existing evidence, although suggestive, does not show that EMFs cause cancer. These include national reviews by the U.S. Environmental Protection Agency, the Committee on Interagency Radiation Research and Policy Coordination, the Australian Minister of Health, the National Radiological Protection Board of the United Kingdom, the Danish Ministry of Health, the French National Institute of Health and Medical Research, and reviews sponsored by the states of California, Texas, Connecticut, Illinois, Maryland, and Colorado.”

Available laboratory or human data have not demonstrated what, if any, magnitudes of power-line electric and magnetic fields cause human health effects (National Research Council, 1997).

Despite the lack of a demonstrated “cause and effect” relationship between exposure to EMF and human health effects, a precautionary approach has been embraced by several governments and organisations through the adoption of guideline limits. This approach provides guidance for the establishment of EMF exposure limits, as discussed below.

Applicable Regulatory Guidance on EMF Health Effects

In Uganda there are no promulgated EMF health and/or safety standards and, consequently, there are no particular levels of EMF that trigger “regulatory action.” Regulatory agencies have been unable to identify an adverse health effect against which it is possible to specifically define “safe” magnetic field levels. As discussed below, some non-regulatory guidance has been offered, based on limiting electric currents induced in body tissues to below one-tenth of typical naturally occurring electric currents in the body, even though such induced currents have not been associated with deleterious effects on health.

In the United States, some States have adopted guidelines based on maintaining the *status quo* for EMF exposure. Several States have adopted as guidelines the electric and magnetic field levels that have historically been present at ground level in transmission line corridors. However, none of these guidelines have been based on the conclusion that particular levels of EMF pose a risk to human health, and none have been developed using careful scientific methodologies.

The International Commission on Non-Ionising Radiation Protection (ICNIRP, 1990; 1998) has published interim guidelines on limits of exposure to 50/60 Hz electric and magnetic fields. The guidelines are based on analyses of the most recent scientific literature and on earlier review articles published by the World Health Organisation (WHO, 1993). The WHO concluded that no biological effects could be expected for magnetic fields smaller than 50,000 mG. The ICNIRP (1998) guidelines state that occupational exposure continuing throughout the working day should be limited to below 4,167 mG for magnetic fields and below 8.33 kV/m for electric fields. The guidelines also state that exposure for members of the general public should be limited to 833 mG for magnetic fields and 4.16 kV/m for electric fields. In addition, general public magnetic field exposure between 1,000 and 10,000 mG should be limited to a few hours per day.

Electric and Magnetic Fields for Bujagali Interconnection Project

Prior to final design, the EPC Contractor will calculate the EMF levels generated by the various components of the interconnection project. Design changes will be made to ensure levels for the proposed interconnection project will be well below the range suggested by guidelines and also well within the range of EMF generated by other common sources.

No adverse effects on human health and welfare can be expected from operation of the proposed facilities, either on the basis of EMF guidelines, or on the basis of conclusions reached by scientific review groups that have examined EMF studies reported in the scientific literature.

Mitigation and Monitoring Activities

The electrical transmission line will be designed and constructed to ensure that EMF levels are well below accepted guidelines for occupational and human health exposure limits. UETCL/GoU policy for keeping residences etc. out of wayleaves will minimise exposure of the general public to EMFs. No additional mitigative measures are required. EMF levels will be measured at representative cross-sections of the various transmission lines that are part of the system during initial full load operation. EMF levels are not expected to change with time, so further monitoring is not planned.

7.3.5 Impacts on Aesthetics

General

The following general mitigative measures and design elements will be used to minimise the aesthetics effects of the interconnection project:

- Where possible, straight line runs are maximised so that the need for angle towers, which have a more negative visual impact due to their heavier construction, is minimised. However, on the section from Mutundwe substation to the crossing of Hoima Road, a large number of angle towers are required in order to avoid the large number of routing constraints in the area;
- Where possible, including the portion of the Bujagali-Kawanda line within the Mabira CFR, the transmission route is located immediately adjacent to, and parallel to, an existing 132 kV line. This limits effects to an already disturbed area, rather than creating a new, discrete second corridor and impact zone;
- Where two lines are parallel, new towers will be constructed adjacent to existing towers, when possible, to minimise visual “clutter”. The spans on the 220 kV may differ from the spans of the existing 132 kV line and thus limit opportunity for adjacent tower siting. The towers for the two lines between Bujagali and the Tororo/Nalubaale cut-off allow for adjacent tower construction since both lines are of the same voltage;
- Existing tracks will be used for construction and maintenance operations as much as possible;
- The Kawanda substation will be designed to limit the amount of major earthworks required, and to ensure enough space is left to create a vegetative buffer around the main built elements, including a buffer between the school that is immediately south of the site, and the site itself;
- Lighting schemes for the sub-stations will be designed so that they do not create intrusive glare when seen from outside; and,
- All temporary construction works, such as borrow pits and contractor’s yards, will be restored upon completion.

The net effects of the proposed interconnection project have been assessed in accordance with the visual and aesthetic quality checklist included in NEMA's Guidelines for EIA in Uganda. Table 7.8 describes the impact on landscape and property for various sections of the interconnection system, and rates the visual effects according to the categories in NEMA's checklist.

As indicated in Table 7.8, for the most part aesthetic impacts of the proposed interconnection project are considered insignificant (NEMA's impact rating B). Significant impacts (NEMA's impact rating A) are expected:

1. Where the Kawanda to Mutundwe 132 kV line crosses the Lubigi Swamp;
2. Where the 220 kV line runs between Mabira and Namyoya CFRs because steep terrain creates potential for clear views of the towers and cleared wayleave; and,
3. Where the two 132 kV lines between the Bujagali substation and the existing Nalubaali-Tororo line runs close to the west bank of the river, and thus are visible from the west bank.

During the consultation process concern was raised about the visibility of the transmissions lines along the Victoria Nile (see the subsection on "Public Inquiries", Section 6.3.2.3). Figure 7.2 shows the location of the two new lines in relation to the river and the existing Nalubaale-Tororo line. Between the Bujagali substation and the cut-off point on the Nalubaale-Tororo line the routing is constrained by the river and the future quarry to the east, and by the road and associated settlement to the west. Generally the route will not be visible from the road that runs north south along the west bank. For much of the route the lines run east of the proposed quarry and well back from the river, and thus will not be readily visible from the east bank. At the northernmost end, close to the HPP, the dam and substation will dominate the views and thus the transmission line towers will not be a significant additional visual intrusion. Thus, the area of concern is limited to the section of line between the cut-off, and the Quarry, a distance of about 2 km. This equates to about 6 to 7 pairs of towers.

Between the quarry and the cut-off point, the lines do run closer to the river, and thus they may be visible from the river and from the east bank. The key vista from the east bank is the Bujagali Picnic Site. Photograph 1 in Figure 7.2 provides a view of the west bank taken from the picnic area. Views from proposed reservoir and eastern river bank will show pairs of towers set against backdrop of trees and rising ground. From some vantage points, portions of the towers may be seen in silhouette against the city. While visible, the towers do not dominate the landscape.

UETCL is committed to exploring possibilities to reduce visual impacts on land along the river. Further analyses are being completed to determine if the lines can be

shifted westward to a better location. That said, a major move is not expected due to much greater impacts on people that would occur.

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Figure 7.2 Existing Views of West Bank From Bujagali Picnic Site and Nile Resort

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Table 7.8: Description of Impact on Landscape and Property and Impact Rating

| Section of Transmission Line | Description of Impact on Landscape and Property | NEMA Impact Rating¹ |
|-------------------------------------|---|---------------------------------------|
| Bujagali to Tororo and Mabira | The existing transmission lines from the Nalubaale complex along the western bank of the Nile mean the Bujagali Falls-Tororo transmission line will have a minimal impact when viewed from the road. The view from the river is influenced by the steeper nature of the river banks in this section. Around Bujagali Falls, the lines will be visible on the western bank. However, the increasing steepness of the river bank downstream from Bujagali Falls to the hydro dam complex will result in only the tops of the towers being visible from the eastern bank. Dual lines along west side of Nile River will extend the existing effect further to north, but tree cover in area limits the effect. Views from proposed reservoir and eastern river bank will show pairs of towers set against backdrop of trees and rising ground, so will be seen in silhouette only occasionally. Line across estates will be largely contained by the wider landform. | A |
| Mabira CFR | Existing straight clearing through forest will be widened, but additional clearing will be perceived from a few locations only due to forest cover. Clearing will be limited to 35 m. Proposed route has been located adjacent to an existing line thereby creating an incremental effect at this location. Intermediate towers will be kept to a minimum. | B |
| Mabira CFR to Namyoya | Dualling of the route will be more apparent across this area of steeper terrain and open estate land. | A on steeper areas, otherwise B |
| Namyoya to Kawanda | Route generally follows lower ground so visual influence will be local and limited. West of Namyoya, the route follows the existing line and crosses a series of ridges and valleys. Impact here is intensification of existing influence. Many small groups of rural properties will be crossed. Many of these rural dwellings are often enclosed by crops, so view of line will be hidden during rainy season by crops. A few large houses at Naalya and Lubatu will have their views impacted. 50 properties affected in total, including a school and a church. | B |
| Kawanda | Route follows lower ground close to the edges of the valley bottom. Line will not be prominent in landscape except when crossing low hill at Katooke. Substation will be situated on a low-lying round-topped hill and will not be easily visible except from vicinity of the NARO Agricultural Research Institute (1 km to west). | B |
| Kawanda to Namungoona | Route between Nansana and Kawanda will affect about 35 properties and part of the Agricultural Station. Substantial length of line may be visible from Wamala's Tombs unless screened by trees. | B |

| Section of Transmission Line | Description of Impact on Landscape and Property | NEMA Impact Rating ¹ |
|------------------------------|---|---|
| Namungoona to Mutundwe | Route follows the less settled western side of the swamp. In most places, line will be seen against a backdrop of low hills. The Natate area is already heavily developed (railway, existing transmission lines and sub-station) so new line will not add significant new influence. | B, except where route crosses the swamp by Masaka Rd, then is A |
| | <p>Properties, including a school, in vicinity of Lubigi Swamp will be visually impacted, esp. large houses on hillsides overlooking the swamp. Visually impacted properties around the swamp include:</p> <ul style="list-style-type: none"> • at Nkokonjeru along Old Masaka Rd • occasional properties along west side of swamp • south end of Nansana where Hoima Rd. is crossed. <p>At Mutundwe, local housing west of existing substation will be visually impacted.</p> <p>Some houses near the rail crossing on Old Masaka Rd will be visually impacted. Dense crops and trees around many of the houses and existing urban development will limit impact.</p> | B |

¹ NEMA impact categories are: “A” (impacts significant unless mitigation incorporated) and “B” (impacts not significant).

7.3.6 Labour Force Management

It is envisaged that personnel for operations will be drawn from UETCL’s overall labour pool. If supplementary staff is needed, it is anticipated that they will be recruited locally through an open recruitment procedure and will receive appropriate training. UETCL is committed to complying with good employment standards and providing decent working conditions for its staff. UETCL will undertake to comply with all relevant national legislation and international standards, which are applicable to its operations.

UETCL will develop a human resource policy including provisions on written particulars of employment, payment, working hours, form and frequency of wage payment, and non-discrimination.

7.3.7 General Construction Related Issues

As part of project planning, a number of construction-related issues were identified that should be addressed within the context of this SEA. These are issues that are common to most large-scale construction projects and for which potential effects are well-known and effective mitigation available.

The issues identified are:

- Labour Force Management;
- Public and Worker Health and Safety;
- Traffic Management;
- Management of Hazardous and Contaminating Material;
- Management of Solid Waste;
- Soils and Agriculture;
- Water Quality;
- Air Quality;
- Noise;
- Siting and Design of Laydown and Storage Areas; and,
- Archaeological Sites.

The EPC Contractor will be responsible for implementing measures to mitigate and manage the potential effects related to construction activities. Project specific plans and programmes to be developed by the EPC Contractor are more fully described in Chapter 8 of this SEA. The mitigation, management and monitoring measures for all of the issues identified above are set out in Table 7.9.

7.3.8 Associated Facilities

The Bujagali HPP being planned and developed by BEL is closely associated with the IP. The IP is needed to allow the electricity generated by the HPP to be transmitted into the National Grid.

A closed aligned but separate SEA is being prepared for the HPP, with the objective to generally meet the same regulations and guidelines as are being applied to the IP SEA.

A similar set of SEA documents has been prepared for the HPP, including:

- SEA Executive Summary;
- SEA Main Report;
- Public Consultation and Disclosure Plan;
- Assessment of Past Resettlement Activities and Action Plan; and
- Community Development Action Plan.

Compliance screening for the HPP indicates that the project complies with GoU Legislation, international treaties and conventions ratified by GoU, and the Project Applicable Performance Standards.

The key project issues that have been identified in the HPP SEA, and for which detailed analyses have been completed and mitigation measures proposed, are:

- Resettlement and Land Compensation (for which an APRAP has been prepared);
- Effects on Land (mitigation for which is included in both BEL's and the EPC Contractor's EMMP);
- Effects on Water (mitigation for which is included in both BEL's and the EPC Contractor's EMMP);
- Effects on Air Quality (mitigation for which is included in the EPC Contractor's EMMP);
- Effects on Noise Levels (mitigation for which is included in the EPC Contractor's EMMP);
- Access Roads and Traffic (for which a Traffic Management Plan will be prepared);
- Effects on Managed and Protected Areas (mitigation for which is included in BEL's EMMP);
- Tourism, Whitewater Rafting and Aesthetics (provisions for which are provided in the APRAP and Community Development Action Plan (CDAP));
- Effects on Cultural Property (for which further consultation will be completed to ascertain the need for additional appeasement of spirits);
- Community Health, Safety and Security (provisions for which are included in the Traffic management Plan, CDAP);
- Labour and Working Conditions (for which a labour force management plan is proposed);
- Other Construction Related Issues (for which the EPC Contractor will prepare and adhere to a Traffic Management Plan, Waste Management Plan, Health and Safety Plan, and Environmental Mitigation and Monitoring Plan); and,
- Other Operations Related Issues (for which BEL will prepare plans for during the 4 year construction period).

The management measures highlighted above will be incorporated into a Social and Environmental Action Plan, to be finished and disclosed following selection of the IP EPC Contractor.

7.3.9 Cumulative Effects

Cumulative effects are incremental effects that result from an action when added to other past, present, and reasonably foreseeable future actions (U.S. CEQ, 1997). Cumulative Effects Assessment (CEA) considers the multiple effects that a project may have on the environment, over spatial and temporal boundaries, through the identification of Cumulative Environmental Effects (CEE) (Shoemaker, 1994).

The process of accumulation of CEE through the environment, together with the causes of environmental change, was examined to determine the potential and/or significance of CEE for the proposed interconnection project.

The spatial boundary used for this CEA corresponds with the study area for the interconnection project; it lies between Dumbbell Island in the east and Kampala in the west. Temporal boundaries used included the effects of past activities since hydroelectricity was introduced into the country in the 1950s, through to foreseeable future projects within a 20-year planning horizon.

Figure 7.3 provides a schematic of the existing and proposed transmission lines within the study area over the past fifty years.

Cumulative effects resulting from the proposed interconnection project include the following:

Ecological Features

- Wayleave width through Mabira and Kifu CFRs will increase from current 30 m to 65 m, but future potential incremental increase to 90 m (3-132 kV x 30 m) wayleave is avoided (see Figure 7.4);
- Access to, and within, Mabira CFR may be improved and control measures implemented in collaboration with the NFA and UETCL, facilitating improved management of the forest; and,
- Recreational facilities within Mabira CFR will be relocated within the reserve and improved, resulting in a net positive benefit to the reserve and its users.

Social Features and Conditions

- By locating the transmission line between Bujagali and Kawanda substation parallel to the “northern route” versus the DANIDA or 66 kV transmission corridor to the south, involuntary resettlement is minimised and sensitive compensation issues are not aggravated further. (Siting a new line adjacent to the DANIDA line could potentially displace some families for a second time as a result of transmission line construction.); and,
- Landowners will receive compensation to meet World Bank Group requirements including in certain cases, a “top-up” over Government of Uganda requirements. In general, landowners may receive a small net positive benefit due to the project.

Aesthetics

Visual impact of the interconnection project will be greatest in the vicinity of Lubigi Swamp where no major transmission infrastructure presently exists and along the Bujagali substation to the Tororo line connection (as seen from the eastern bank of the Nile River). Here, several transmission lines already come in/out of the Nalubaale switchyard.

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Figure 7.3 Schematic of Cumulative Effects & Proposed Transmission Lines Within Study Area

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Figure 7.4 Schematic of Cumulative Effects of Transmission Lines Within Study Area Forest Reserves

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Land Development Patterns

- A new substation is required at Kawanda since the three existing substations in Kampala (Kampala North, Mutundwe and Lugogo) are saturated;
- Locating a substation north of Kampala (i.e., at Kawanda) facilitates future expansion of the transmission grid within Uganda and potentially to export markets in Tanzania and Rwanda;
- By building the transmission line between Kawanda and Bujagali at 220 kV, the necessity of constructing a third 132 kV line in the future, possibly running parallel to 2x132 kV lines through Mabira CFR, is avoided;
- Constructing the line to 220 kV will result in a somewhat larger footprint for Kawanda substation; and,
- The establishment of a second transmission line along the “northern” route may reinforce the validity of this route as a corridor, possibly resulting in future linear projects seeking to utilise this corridor, as well.

7.4 Summary of Impact Management, Net Effects and Monitoring Measures

Table 7.9 sets out the potential impacts associated with construction of the interconnection project, along with the key impact management measures and effects monitoring measures to be implemented, and the expected net effects. Additional implementation details are specified in Chapter 8.

Mitigative measures associated with potential effects during operations are not included in Table 7.9. At completion of construction, ownership of the Interconnection project will be transferred to UETCL. UETCL will be responsible to implement environmental management measures associated with operation of the interconnection system. If necessary, UETCL will acquire technical assistance and training in environmental management practices for operation of the interconnection system, to strengthen its capabilities in this area.

Table 7.9: Impact Mitigation, Net Effects Analysis, and Effects Monitoring Activities

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|--|---|--|---|---|
| Resettlement and Land Compensation | | | | |
| Physical relocation of persons and acquisition of land or land rights for the project | Wayleaves, Rights of way and Kawanda Transformer Station | UETCL has identified all project affected persons and developed a Resettlement Action Plan (RAP) framework to address economic losses, physical resettlement and loss of land or land rights. The framework allows for land for land compensation, or cash, depending on the individual situation and preference of the project affected persons. The framework provides for additional assistance to vulnerable persons. | The compensation and resettlement measures to be provided are designed to ensure that project affected persons are better off or at least no worse off as a result of the project | UETCL to implement grievance, monitoring and evaluation procedures as prescribed in the framework |
| Impacts on CFR Lands | | | | |
| Incompatible land use in a designated reserve | Mabira, Namyoya and Kifu CFRs, and associates stakeholders/ communities | The interconnection project routing avoids the area identified as “Strict Nature Reserve” within Mabira FR. To reduce effects of the wayleave within CFRs this has been limited to 35 m, versus 40 m in non CFR areas. UETCL has estimated the Total Economic Value of lost forest resource, and will allocate equivalent monies to support initiatives by NFA, e.g. enhancement planting, which will compensate for loss of forest resource and associated benefit stream. | Net improvement in quality of Gazetted CFR Land | UETCL to inspect clearing in CFR areas to confirm work confined to 35 m wayleave. UETCL to update status of enhancement planting and other mitigation/compensation measures in regular compliance reporting |
| The permanent loss of 59 ha of forest land will reduce the available habitat for vegetation and wildlife and reduce the forest’s function as a carbon sink | Mabira CFR | UETCL has estimated the Total Economic Value of lost forest resource, and will allocate equivalent monies to support initiatives by NFA, e.g. enhancement planting, which will compensate for loss of forest resource and associated benefit stream to stakeholders and communities. After construction, amphibian and reptile surveys will be undertaken by UETCL, utilising the same experts as were involved in the previous biological surveys. A mitigation plan has been developed as a component of the Forest Economic Assessment. Under the forest mitigation plan to address the loss of forested land, UETCL propose will: | This regeneration will, in the long run, result in an overall net gain in the quality of forested land within the CFR that will provide habitat utilised by forest dwelling animals and increase the forest’s capacity to sequester carbon. | UETCL to update status of regeneration plan in regular compliance reporting. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|--|-------------------|---|---|---|
| | | <ul style="list-style-type: none"> • Reduce the width of the wayleave in the CFR to the minimum needed for safe construction and operation; • Assist NFA in undertaking enrichment planting within degraded areas of Mabira Forest; and, • Meet the NFA’s incremental management costs. | | |
| <p>The resulting cleared corridor may pose a barrier to movement of “forest interior” wildlife species between the forested areas north and south of the route</p> | <p>Mabira CFR</p> | <p>The 220 kV line through the Mabira CFR has been routed immediately adjacent to the existing 132 kV line to minimise fragmentation effects. UETCL will ensure cross line corridors between the north and south forested areas will be established by minimising clearing and selective planting of suitable vegetation at the following locations:</p> <ul style="list-style-type: none"> • The Valley of the River Waliga between towers 169 and 170 of the existing line; • The valley between towers 147 and 146 of the existing line; • The valley stream about 50 m east of tower 152 of the existing line; • The valley between towers 153 and 154 of the existing line; • The valley at tower 142 of the existing line. | <p>Incremental clearing of the wayleave is not expected to significantly change movements of wildlife species</p> | <p>Current status of “cross line corridors” to be determined by UETCL and NFA. Status of corridors discussed in post-construction line inspection report.</p> |
| <p>Improvements to access required for construction may increase grazing, bushmeat hunting and illegal felling of timber</p> | <p>Mabira CFR</p> | <p>Access has been improved in recent years, by UETCL upgrading the existing right-of-way through Mabira Forest, including associated bridges and culverts. This has not resulted in significant encroachment. As no significant further upgrades are foreseen, no specific mitigations are necessary</p> | <p>No significant change in existing accessibility of the Mabira CFR is expected.</p> | <p>UETCL, in collaboration with NFA, to report on status of access and any issues arising, in regular compliance reporting</p> |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|---|------------------------|---|--|---|
| The power lines introduce a physical hazard to birds and climbing animals | Entire length of lines | <p>Risk of electrocution by large climbing animals, such as vervet monkeys, or bats are not expected as the spacing of the conductors and the length of the insulators exceeds the reach of the climbing species and wingspan of bats present in the area.</p> <p>The proposed line through the Mabira CFR is not located near any significant breeding or staging areas, and therefore bird strikes are not expected to have any significant effects on bird populations in Uganda. Where the transmission line will cross areas that are potentially important as bird flight paths, in particular large wetland bird species, UETCL shall take reasonable measures to make the conductor more conspicuous. These include the use of reflectors placed at intervals along the conductor. Such measures will be employed where the line crosses the Lubigi Swamp and where the line crosses the seasonal swamps to the north of Kampala.</p> | The proposed line is not located near any significant breeding or staging areas, and therefore bird strikes are not expected to have any significant effects on bird populations in Uganda Risk of electrocution by large climbing animals is not expected | UETCL, in collaboration with UWS, to report on unusual bird strikes and/or animal electrocutions, in regular compliance reporting |
| Presence of the line reduces aesthetic values for ecotourism and recreation | Mabira Forest | No existing or planned tourism facilities are likely to be directly affected. | In the long run, the improvements to the tourism facilities and the regeneration/enrichment planting measures will provide increased opportunities for ecotourism. | During construction UETCL to report on status of tourist facilities in regular compliance reporting |
| Illegal hunting of bushmeat by workers during construction | Primarily Mabira CFR | <p>UETCL and the EPC Contractor will:</p> <ul style="list-style-type: none"> • Prohibit project workers from hunting bushmeat during working hours or on project work sites. • Prohibit project workers from possessing firearms, snares and other hunting equipment when on project work sites. • Prohibit transport of bushmeat on project vehicles. • Pay workers an adequate wage so that they can buy their food without augmenting it with illegally obtained bushmeat. | No significant illegal hunting expected | UETCL to randomly inspect vehicles at ingress and egress points of construction areas in the vicinity of Mabira FR |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|---|-----------------------------------|---|--|--|
| Impacts on Wetlands | | | | |
| Effects on the hydrological functions of Lubigi Swamp due to installation of concrete tower pads. | Lubigi Swamp | Footprint of tower pads and access ways will be minimised by appropriate siting and design. Towers will be sited from main channels within the swamp. | No significant change in hydrological function of the wetland. | UETCL to inspect construction activities in Lubigi Swamp daily |
| Effects on breeding grounds for birds e.g. crested crane | Seasonal swamps, Lubigi Swamp | In areas that are potentially important as bird flight paths, in particular large wetland bird species, UETCL shall take reasonable measures to make the conductor more conspicuous, e.g. reflectors placed at intervals. | No significant impact on bird population | UETCL to maintain records of abnormal bird strikes and corrective actions taken |
| Impacts on Public Health | | | | |
| Spread of HIV/AIDS and other communicable and sexually transmitted diseases (STDs) | Areas of concentrated workers | UETCL and the EPC Contractor will bus workers to active construction sites each day from Jinja or Kampala. No worker camps will be used that might attract a concentration of prostitutes. UETCL and the EPC Contractor will undertake an awareness programme for communicable diseases for workers and the public. UETCL and the EPC Contractor to distribute condoms to project workers at no cost. UETCL and the EPC Contractor to make malaria prophylactics available to expatriate work force at no cost. | The project is not expected to have a significant effect on prevalence or transmission of HIV/AIDS and other communicable diseases | UETCL to maintain a record of each worker's orientation and ongoing education Maintain records of condom distribution programme. |
| Effects on EMF levels generated by the interconnection project on public health | Extent of Interconnection project | The electrical transmission line will be designed and constructed to ensure that EMF levels are well below accepted guidelines for occupational and human health exposure limits. Habitations and other permanent structures such as schools, shops or offices will be prohibited within the wayleaves. | No adverse effects on human health and welfare can be expected from operation of the proposed facilities, either on the basis of EMF guidelines, or on the basis of conclusions reached by scientific review groups that have examined EMF studies reported in the scientific literature | UETCL to measure EMFs at representative cross-sections of the various transmission lines during initial full load operation of the system. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|-------------------------------------|--------------------------------|---|--|---------------------------|
| Aesthetics | | | | |
| Visibility of towers and conductors | Entire interconnection project | <ul style="list-style-type: none"> • Straight-line runs are maximised to reduce the need for angle towers; • Where possible, locate the new line adjacent to existing power lines. Locate new towers adjacent to existing towers to minimise visual “clutter”; • Existing tracks will be used for construction and maintenance as much as possible; • Where a transmission line runs across a ridge, locate the access track off or across the line to avoid accentuating the route; • New sub-stations will be designed to limit the amount of major earthworks required, and to ensure enough space is left to create a vegetative buffer around the main built elements; • Lighting schemes for the sub-stations will be designed so that they do not create intrusive glare when seen from outside; and, • All temporary construction works, such as borrow pits and contractor’s yards, will be restored upon completion. | For the most part, aesthetic impacts of the proposed interconnection project are considered to be insignificant. Significant impacts are expected where the Kawanda to Mutundwe 132 kV line crosses the Lubigi Swamp, and where the 220 kV line runs between Mabira CFR and Namyoya where steep terrain creates potential for clear views. | No monitoring recommended |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|--|--|--|---|---|
| General Construction Related Issues: Public and Worker Health and Safety | | | | |
| Public safety issues regarding: accidental contact with lines, collision with construction equipment, excavations on ROW, material storage, tower construction | Active Construction Areas | The EPC Contractor will secure equipment and demarcate any excavations in such a way as to prevent accidents when construction not in progress; Keep non-authorized persons away from any construction activities/sites/yards/ equipment; Post warning signs with appropriate text and graphics; Begin educational programmes in schools and communities to educate people of hazards and safe practices when playing and working near high voltage power lines. | Communities are used to the presence of major construction projects in the area; Risk of serious injury or health effects managed to internationally acceptable levels. | UETCL to maintain records of any incidents, investigations and corrective actions. |
| Risk of accidents due to project related traffic | Transportation routes and access roads | UETCL and the EPC Contractor will prepare and implement a Traffic Management Plan (TMP) that contains appropriate strategies for: moving materials, equipment and workers to and from the site, including abnormal loads; and, management of connection points between access roads and main public highways. The TMP will include procedures for: <ul style="list-style-type: none"> • parking and on-site traffic movement; • training and testing of heavy equipment operators and drivers, including vision tests, with records kept of all training; • use of project buses to transport workers to reduce pressure on existing public transport; • all vehicles to be lit front and back and to be properly maintained; • enforcement of maximum load restrictions; • posting and enforcement of speed limits; and, • compliance with all relevant Applicable Laws. | Risk of serious traffic accidents minimised | UETCL to maintain records of all accidents involving project vehicles. UETCL to implement a traffic complaints and corrective action procedure. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|--|--------------------------------------|--|--|--|
| Risk to students and staff of Kawanda Secondary School | 300 m Access road to Kawanda Station | As part of upgrading the access road, UETCL will erect a barrier to separate vehicles and pedestrian traffic. UETCL to post and abide by speed limits on this access road. The EPC Contractor will provide a manned crossing at the beginning and end of the school day, if required UETCL will make a presentation to school staff and students about traffic safety and project scheduling | Risk of accident minimised | UETCL to maintain records of any traffic related incidents, investigations and corrective actions |
| General Construction-Related Issue: Labour and Working Conditions | | | | |
| Adherence to labour standards and well-being of construction workers | Entire IP project site | EPC contractor will be required to adopt policies and procedures that comply with national legislation and address all aspects of labour standards relevant to the project as specified by IFC policies. Sub-contractors will be contractually required to comply with labour and health and safety legislation. | Rights of workers employed during construction phase will be respected | Contractor to keep accurate employment records. On-going monitoring by UETCL of EPC contractor's performance. Investigation and corrective action for reported incidence of labour abuses. |
| Work related injury or health effects | All project areas | UETCL and the EPC Contractor will comply with relevant WB/IFC health and safety requirements, including specific provisions for: <ul style="list-style-type: none"> • Introduction, and use of, poisonous or other chemicals injurious to health; • Handling dangerous goods and specialised waste; • Training; • Provision of potable water; • Working environment committee; • Use of helmets; • Personal injuries and accidents; • Damage to material, equipment and buildings; • Poison treatment, chemical and fire injuries; • Safety audit; • Work done by hired personnel or firms; • Operating cranes; • Working with heat in confined places; | Risk of serious injury or health effects managed to internationally acceptable levels, and to meet all Ugandan standards and WB/IFC guidelines | UETCL to complete Monthly Environmental Inspection report. UETCL to maintain records of inspections, incidents, investigations and corrective actions |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|---|--|---|---|--|
| | | <ul style="list-style-type: none"> • Corrective action; • Protective action; and, • Utilisation of fall arrestors and anti-climbing devices to prevent public injury. | | |
| General Construction Related Issues: Traffic Management | | | | |
| Structural Integrity of Roads | Transportation routes and access roads | Regular inspection of access road conditions Traffic-related construction damage to be repaired as soon as practical. When abnormal loads (e.g. large transformers and turbines) are to be transported, UETCL will, along with the relevant District Engineer or his representative, inspect structures along the roads to be used before and after movement of the load(s). UETCL will make good any damage to structures and road surfaces caused by the transporting of these loads. | Risk of serious traffic accidents minimised. Long term impacts to road structural integrity minimised | UETCL to inspect road conditions weekly |
| Disruption of traffic at access points to access roads | Transportation routes and access roads | No new access roads will be constructed apart from a 100 m extension to the existing access road at Kawanda Substation. Plans for connection of any upgraded access roads to the public highway network will be submitted for approval by the District Engineer or other appropriate Relevant Authority before construction commences. Any proposals for management of highway traffic (such as speed humps or tidal flow) will be submitted for approval to the Ministry of Works, Housing and Communications at the District Engineer level in accordance with the UETCL Interconnection project Environmental Mitigation Plan. It will be demonstrated that any new junction will not be a safety hazard, and that adequate signage, warnings and speed controls will be in place. | Net improvement in road infrastructure and safety due to project upgrades | UETCL to implement a traffic complaints and corrective action procedure |
| Traffic congestion as a result of incremental traffic associated with the project | Main transportation routes | The Kampala to Jinja highway has a high capacity factor. The estimated day-to-day vehicle requirements will not result in significant change in traffic flows or volume on this road. The occasional movement of abnormal loads to the wayleave, substation sites or storage areas may impede traffic flow. Procedures will be included in the Traffic Management Plan to ensure transport of abnormal loads is timed and executed to | No significant traffic congestion is expected | UETCL to implement a traffic complaints and corrective action procedure. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|--|------------------------|--|--|--|
| | | <p>minimise traffic disruption. The Kawanda substation site will be reached via the Kampala-Bombo highway, which is in good condition. Although it is of only single carriageway construction, it is of reasonably high traffic-carrying capacity. The estimate of three vehicles per hour is not considered to represent a change in existing traffic volumes. The selection of local access roads will be made in consultation with local officials to optimise use of roads with adequate capacity. Due to the poor condition of most local access roads, and the low rate of vehicle ownership in villages situated along the interconnection project route, vehicle movements along most access roads are infrequent and speeds are low. Improvements to the condition of access roads will improve their capacity.</p> | | |
| General Construction Related Issues: Management of Hazardous and Contaminating Material | | | | |
| Environmental contamination from spillage or disposal of fuels, lubricants, oils and solvents on the construction site | All construction sites | <p>UETCL and the EPC Contractor shall dispose of materials defined as hazardous waste (e.g. hydraulic oil) in a responsible way, and where reasonable, shall return such materials to the manufacturer for recycling. The risk of release of contaminating material will be reduced through implementation and enforcement of the Pollutant Spill Contingency Procedures of the EPC Contractor's Environmental Action Plan, including:</p> <ul style="list-style-type: none"> • Prohibition of dumping of any contaminating material product into the environment/onto the ground, including waste oils, in accordance with NEMA regulations; • Storage and routine handling of fuels, lubricants, and other potentially contaminating substances in a weather-protected area equipped with a secondary containment system for spills; • Storage areas shall be designed such that they will contain 110% of the largest container/vessel stored in the storage area; • Have available on-site all equipment and materials | Negligible risk of significant contamination | Monthly Environmental Inspection form to be completed. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|--|------------------------|---|--|--|
| | | required to execute a clean-up; <ul style="list-style-type: none"> • All wastes recovered during cleanup operations to be collected and stored for subsequent disposal; • Supply agreement will include responsibility for supplier to take waste oil; • UETCL will verify each supply/disposal subcontractor(s) has adequate arrangements or facilities for proper disposal, treatment or recycling of these wastes; • Personnel will be educated on proper use and disposal of hazardous materials. | | |
| General Construction Related Issues: Management of Solid Waste | | | | |
| Visual impact and environmental contamination from improper disposal of solid wastes. Air pollution from on-site burning of solid waste. | All construction areas | The EPC Contractor will manage solid waste according to its Waste Management Plan. In addition, the following management measures may be implemented: <ul style="list-style-type: none"> • Waste management training for all workers; • The EPC Contractor shall identify a suitable site for the disposal of solid waste from construction activities in general in agreement with the District Council and shall ensure that such a site is used properly; • Wood etc. e.g., cable reels, may be sold for a nominal fee to local persons; • Burning will be used as a last resort and only when material cannot be disposed of at a licensed disposal location. Burning will not occur within the wayleave, but at the hydropower station under controlled combustion; and • Only dry, clean-burning material (wood, cardboard, paper, dry vegetal material) will be burned. | Minor short-term decrease in air quality. Minor incremental impacts on soil, groundwater, and surface water at municipal disposal location due to improper storage | Monthly Environmental Inspection form completed. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|--|---|--|--|--|
| General Construction Related Issues: Soils and Agriculture | | | | |
| Topsoil compaction, rutting and mixing from: grading, excavations and transportation of equipment, concrete and steel to tower sites over access roads and ROW | Areas to be cleared or excavated along transmission lines including tower sites and access tracks | <ul style="list-style-type: none"> • Use existing access roads or tracks wherever available; • Strip and store topsoil separate from subsoil for major tower site excavations; • In agricultural areas, movement of heavy equipment will be restricted during wet-soil conditions to prevent subsoil compaction; • Rehabilitation of exposed soils as soon as practicable. | Short term loss of agricultural productivity of disturbed soils; | Following construction, the EPC Contractor to check for compaction on cultivated soils outside the ROW and remediate as necessary. |
| Erosion of soils on steep slopes disturbed by excavation for tower footings or clearing for access track | Steep slopes along extent of transmission lines | Where practical, steep slopes will be avoided by UETCL and the EPC Contractor during final tower spotting and access tracks will be routed across rather than vertically on steep slopes; Vegetation clearing will be avoided on steep slopes. All exposed soils on steep slopes will be rehabilitated immediately following construction activities; Areas susceptible to erosion shall be properly sloped and compacted to reduce the effect of runoff and shall be seeded immediately; Use lower impact / tracked vehicles for pulling stringing ropes along ROW. | Minor decrease in slope stability due to initial tower site and access preparation; No long-term net effects with proper construction and remediation measures | Periodic inspection by the EPC Contractor of steep slopes during construction and rehabilitation measures following construction. |
| General Construction Related Issues: Water Quality | | | | |
| Potential for microbial contamination of surface water and soil | Active construction sites, Staging Area | <p>A Waste Management Programme will be developed by the EPC Contractor, to include:</p> <ul style="list-style-type: none"> • Provision of an appropriate number of toilets at worksites; • Septic tanks or an alternative sewage system will be designed to accommodate the sewage level at the substation sites; • Provision for on-site treatment of effluent (defined by NEMA as ‘foul water arising from the sanitary system and any process water’) at long-term work sites. Ugandan effluent standards will be met; and | Minimal risk of environmental or human health impacts. GoU and WB/IFC standards for effluent quality will be met. | Effluent shall be monitored at the discharge point of the Site Effluent treatment works by the EPC Contractor. Monthly Environmental Inspection report to be completed by UETCL. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|---|---|--|---|--|
| | | <ul style="list-style-type: none"> • Training of construction employees on project sanitation practices. | | |
| Deposition of eroded soils into watercourses; Disturbance of flows and habitat from installation of culverts and bridges | Throughout the interconnection project | EPC Contractor to ensure towers to be located outside the top-of-bank of all watercourses; Existing bridges to be upgraded, rather than new bridges installed; A vegetated buffer will be maintained along both sides of all watercourse crossings; | Minor, short term effects during construction on water quality and habitat | Periodic inspection of watercourse crossings by SEO |
| General Construction Related Issues: Air Quality | | | | |
| Fugitive dust in the immediate vicinity of construction activities, and along loose surface roadways | Right-of-Way and Access Roads, Kawanda Substation | The following measures may be utilised by the EPC Contractor to control fugitive dust: <ul style="list-style-type: none"> • protect stockpiles of friable material subject to windthrow by wetting, or with a barrier, vegetation, or windscreen; water stockpiles; • cover loads of friable material during transportation; • watering of roadways to reduce dust when necessary, or use biodegradable (e.g. lignin-based) road sealing compounds; • restrict speed on loose surface roads to 25 km/h during dry or dusty conditions; • in sensitive areas, including the sub-stations, suppress dust during dry periods by use of water sprays. | Short-term, localised effects on air quality, primarily in relation to fugitive dust. | Daily inspection by the EPC Contractor of construction areas for excessive nuisance dust UETCL/the EPC Contractor to maintain records of complaints on air quality, and follow-up corrective or measures |
| Impaired air quality from exhaust of heavy equipment, motor vehicles and other equipment with internal combustion engines | Transportation routes, construction sites | The following measures may be utilised by the EPC Contractor to control exhaust emissions: <ul style="list-style-type: none"> • maintain equipment in good running condition – no vehicles to be used that generate excessive black smoke; • enforce vehicle load restrictions to avoid excess emissions from engine overloading; • where practical, switch off engines when not in use. | Short-term, localised effects on air quality | EPC Contractor to make spot visual inspections of exhaust and vehicle loads and complete Monthly Environmental Inspection report. EPC Contractor to maintain records of corrective action taken. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|---|--|---|--|--|
| Smoke from uncontrolled combustion of cleared vegetation and combustible construction waste | Forested sections of wayleaves, Kawanda Substation | <ul style="list-style-type: none"> • Uncontrolled burning of woody debris and constructing waste to be prohibited within the wayleave; • Slash from vegetation clearing to be chipped and left as mulch; • Combustible construction waste to be landfilled or left for removal by residents. | Minimal effects on air quality | Monthly Environmental Inspection report to be completed by UETCL. |
| General Construction Related Issues: Noise | | | | |
| Nuisance noise at adjacent sensitive receptors | Schools and residences along the transmission lines Kawanda Secondary School, located to the west of Kawanda Substation, and ten houses located to the north of Kawanda Substation | <p>Baseline noise readings will be taken by UETCL and the EPC Contractor prior to commencement of construction. Noise management measures and procedures to be adhered to will include:</p> <ul style="list-style-type: none"> • All internal combustion equipment will have properly functioning silencers or mufflers; • Landowners along the routes to be notified about the construction schedule and activities, including blasting, should it be required; • Noise generating activities that take place near residential or sensitive institutional receptors will be restricted to the period between 0600 and 2200 h, which is defined as ‘daytime’ in the draft Ugandan noise standards; • At the Kawanda Substation, noisy activities will be scheduled to avoid noise-sensitive periods at the adjacent school; • The EPC Contractor will comply with Ugandan national noise standards. These standards are 75 dBLAeq during daytime, and 65 dBLAeq at night, measured at a point 15 m from the site boundary. If necessary, measures to be taken to reduce noise emissions from the site will include provision of screens or bunds to absorb noise and deflect it away from receptors. | Transitory short-term nuisance noise effects, primarily during daytime. Noise levels will meet WBG Guidelines and Ugandan Standards. | Liaison by the EPC Contractor with adjacent residents and landowners to identify nuisance noise issues and resolve complaints. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|--|---|--|---|---|
| General Construction Related Issues: Siting and Design of Laydown and Storage Areas | | | | |
| General biophysical and socio-economic disturbance | Staging area to be located in Mukono or Lugazi. | EPC Contractor shall site and construct any laydown or storage area/s, in agreement with the Environmental Manager, who may consult NEMA if required or other Relevant Authorities for the purpose of agreeing on such a site. Mabira FR will not be used for staging area. | Temporary disruption of area in vicinity of laydown or storage area | Monthly Environmental Inspection report to be completed by UETCL. |
| General Construction Related Issues: Archaeological Sites | | | | |
| No archaeological sites identified to date within interconnection project vicinity | A site(s) may be uncovered anywhere along the interconnection project | UETCL will ensure that areas to be disturbed during construction will be examined by an archaeologist. Following detailed design, but prior to construction, test pits will be completed for the tower locations where the foundations will be excavated. The SEO and Environmental Manager will report any relevant finds to the Department of Antiquities, who will advise on measures to be taken to ensure their preservation. | Any discovered archaeological features will be saved | UETCL to ensure workers to receive training on importance of archaeological sites and artefacts and how to identify them. |

| Issue | Location | Mitigation Measures | Net Effects | Monitoring/ Follow-Up |
|--|---|---|--|---|
| Public Safety During Operation | | | | |
| Climbing and Electrocutation Risk | All transmission towers and sub-station sites | All towers will be fitted with warning signs and anti-climbing devices. Sub-stations to be “hurricane” fenced. | Risk of electrocution minimised. | Periodic inspection and repair as necessary. |
| Cumulative Effects | | | | |
| Cumulative effects of the project on ecological and social conditions, aesthetics, and land development patterns | Study Area | UETCL has avoided potentially significant cumulative social effects along the southern “DANIDA” line by routing the 220 kV line through the Mabira CFR. In CFR Lands, wayleave width will be restricted to 35 m. Effects on ecological functions in CFRs will be offset by enrichment planting of forest within the reserve. Enhanced capacity of the system by building a 220 kV capacity line (initially used at 132 kV) now avoids need for construction of additional line as transmission demand grows | No significant unidentified cumulative effects expected. | UETCL report on status of mitigation measures taken for Mabira FR in yearly progress report. |
| Developmental and Community Benefits | | | | |
| Purchase of local goods and services will boost local economy | Project region | The EPC Contractor will investigate Ugandan capacity to supply construction materials, goods and services. Whenever goods or services are available on a competitive basis, the policy will be to purchase locally. | Expanded local economic benefits | UETCL will encourage local business leaders to form a project liaison group to assist UETCL in monitoring local procurement practices |
| Opportunities for employment | Extent of facilities | The EPC Contractor will develop and implement a plan to ensure that local residents are given first priority for job opportunities for which they are qualified, before workers from outside the region are hired. Details of specific job opportunities will be released and information provided on application procedures. | Increased local employment benefits. Reduced potential for schemes to defraud job-seekers. | UETCL to monitor implementation of plan. |

8.0 Social and Environmental Action Planning

The management and monitoring actions proposed to avoid or minimise impacts during construction and operation of the Bujagali Interconnection Project were identified and detailed in Chapter 7 of this SEA. This chapter presents the framework for implementing the management and monitoring requirements within the framework for a Social and Environmental Action Plan (SEAP) that will be developed for the project. The SEAP will be completed in the period between public disclosure of the SEA Report and the start of construction.

At the time this SEA was written, certain detailed planning and design activities relevant to the SEAP were still to be completed. Thus, this section describes the SEAP at the level of detail available at the time of writing. When the detailed activities are completed, they will be integrated within the framework of the SEAP and an update will be prepared by UETCL. Currently, the SEAP framework presented herein addresses the following key components:

- Social and environmental management policies and systems;
- Mitigation plans, procedures, and programmes;
- Monitoring activities;
- Implementation schedules and cost estimates; and,
- Plans for integrating the SEAP within the overall development plan for the project.

8.1 Environmental Management

UETCL is the project sponsor and will have overall responsibility for the design and building of the interconnection system. UETCL has retained Bujagali Energy Limited (BEL) as its Authorised Agent, and as such BEL will be responsible for managing the environmental permitting and construction phases of the interconnection project. A contractor, will construct the transmission system on a turnkey Engineer, Procure and Construct (EPC) basis. This contractor is referred to as “the EPC Contractor” in the remainder of this document.

Upon completion of construction, UETCL will be owner of the interconnection system, and will be responsible for the operation of the system, and for implementing environmental the social and management measures associated with operation of the transmission system.

Both UETCL and BEL are committed to executing their respective responsibilities in an environmentally responsible manner and in compliance with all applicable environmental laws, regulations, and guidelines.

In adopting its environmental policy, UETCL will communicate its principles and intentions to each employee, as well as the nature of their individual environmental

responsibilities. Where appropriate, staff training will be undertaken to ensure employees' continued social and environmental performance. UETCL and BEL are committed to the creation and implementation of programmes to reduce the probability of occurrence of deleterious environmental incidents. Contingency plans will be developed for dealing with such adverse incidents, if they occur.

UETCL and BEL will expect the same level of environmental performance from their agents, suppliers, and sub-contractors and will stipulate this in any legally binding agreements it enters with these parties. The EPC Contractor will be under contractual obligation to UETCL to implement the aspects of the SEAP that apply to it, and to ensure compliance by its own subcontractors. UETCL will ensure, and will require the EPC Contractor to ensure, that appropriate corporate resources, personnel and reporting and accountability systems, are in place for the successful implementation of the SEAP. UETCL and the EPC Contractor will, on a continuing basis, review the objectives of the SEAP as well as each company's success in achieving them. Where objectives are not being achieved, corrective action will be taken. The SEAP objectives will also be modified over the life of the project, as appropriate, to reflect changing environmental laws, regulations, standards, and technologies.

8.2 Relationship of the EAP to other Project Plans

The SEAP is an umbrella plan that is comprised of several components that are to be integrated and implemented by UETCL and its contractors with regard to the IP. These components are shown in Figure 8.1.

While this SEA includes working versions of three of the Sponsor's Action Plans (namely the PCDP, RCDAP and the APRAP), those which are the responsibility of the Contractor, and those of the Sponsors not included herein will be developed after an EPC Contractor has been appointed. However, outline requirements for these action plans are provided in Section 8.3 and 8.4 below.

8.3 Sponsor's Action Plans

UETCL will compile a project-specific Action Plan, outlining the utility's undertakings in its capacity as Project Sponsor. The Action Plan will be completed before mobilisation of the contractor on site. This section outlines the components that have been, or will be, generated.

8.3.1 Management Framework

The introductory section will include relevant policies, regulations, procedures arising from government agencies, lender policies and international treaties, such as those outlined in Chapters 2 and 7 of this SEA. Thus, it will contain all of the

relevant policies and guidelines to be observed to reduce environmental (including social and

Figure 8.1 SEAP Component Plans

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economic) impacts of the project. It will also set out the proposed management framework based on Section 8.0 of this report.

The Management Framework will include a Change Management process, whereby proposed changes to social and environmental management procedures are reviewed and assessed prior to being implemented, and a comprehensive register of such changes is kept. Further detail on the Change Management process is provided in Section 8.6.5 below. This section will also include procedures for revision control of the documents, as individual sections are likely to be amended, from time to time as needed.

8.3.2 Public Consultation and Disclosure Plan (PCDP)

A PCDP (Appendix E) has been developed in order to bring continuity to the consultation and disclosure process that has been completed to date, as described in Chapter 6 of this SEA Report. The PCDP and the results generated by it to date have been used to guide the impact assessment and mitigation measures outlined in Chapter 7.

Specific elements of the PCDP are described in Chapter 6, and will continue to be executed by UETCL, based upon the schedule set out in the PCDP. Where appropriate, the SEAP will be updated by UETCL based upon the outcome of future consultation and disclosure activities.

The EPC Contractor will have a role in the consultation and disclosure process during construction, particularly with regard to disclosure of information in relation to construction scheduling, traffic management, public health and safety, and the results of environmental monitoring. Any changes to environmental management procedures arising from the PCDP process will be incorporated into the Sponsor's and/or the Contractor's Action Plan, as appropriate.

8.3.3 Assessment of Past Resettlement Activities and Action Plan (APRAP)

The Assessment of Past Resettlement Activities (APRAP) for the Kawanda substation, a copy of which is provided as Appendix F to this SEA, includes an assessment of the resettlement activities that were carried out by AESNP, describes any shortcomings, and sets out measures to be implemented by UETCL.

8.3.4 Resettlement and Community Development Action Plan (RCDAP)

Along the route of the transmission lines, the construction and the future operation and maintenance of the transmission lines will require land acquisition and/or temporary occupation. Land acquisition is also needed to build the substation in Kawanda. As a result, present land owners and users of the land to be encumbered or

acquired will be affected. This RCDAP has therefore been developed to mitigate this impact, in accordance with Ugandan law and applicable World Bank Group policies.

The scope of this RCDAP is to provide details on (i) the populations to be affected, (ii) the regulation framework, (iii) the methods used for identification of Project Affected Persons (PAPs), (iv) the methods and scope of consultation with PAPs on resettlement issues, (v) the resettlement and compensation packages, (vi) the methods and planning of resettlement and compensation, (vii) the institutional arrangements for the implementation of the RCDAP, (viii) the cost of the RCDAP, (ix) special assistance to vulnerable PAPs, and (x) external and internal monitoring. A copy of the RCDAP is provided in Appendix G of this SEA report.

8.3.5 Labour Force Management Plan (LFMP)

In order to safeguard workers' rights and implement good practice in relation to labour and working conditions, UECTL will implement a Labour Force Management Plan. This will contain the commitments it will require of the EPC contractor and its sub-contractors in relation to human resource management and compliance with labour standards during the construction phase. The contract and terms of reference to be agreed between UECTL and the EPC contractor will specify labour and occupational health and safety commitments to be observed by the Contractor and sub-contractors, as well as responsibilities for monitoring the implementation of these commitments, which will lie primarily with the EPC contractor. UECTL is committed to reviewing the EPC contractor's procedures and assessing its performance on these issues including ensuring that sub-contractors' contracts commit them to compliance with labour and health and safety legislation.

The LFMP contains requirements in relation to policies and procedures on:

- Human resources policy and information provision to workers;
- Respect for collective agreements and provision of reasonable working conditions and terms of employment;
- Freedom of association and collective bargaining;
- Non-discrimination and equal opportunity;
- Retrenchment;
- Grievance mechanisms;
- Child labour and forced labour;
- Health and safety;
- Non-employee workers;
- Supply chains; and,
- Labour standards-related ToR for EPC contractor.

8.3.6 Environmental Mitigation and Monitoring Plan (EMMP)

This plan will comprise the specific management and monitoring actions that will be implemented in order to mitigate the effects of the project on the bio-physical environment. As such, the EMMP includes environmental actions related to:

- Groundwater;
- Surface water flows;
- Water quality;
- Habitats;
- Ecosystems; and,
- Construction impacts.

8.4 Construction Contractor's Plans

The controlling documents for all of the EPC Contractor's activities (including environmental responsibilities) will be its Action Plans. While the Sponsor's Action Plans are reasonably well developed at the time of writing, the EPC Contractor has not yet been appointed, and thus the Contractor's Action Plans are conceptual. This framework is described in the sections that follow. It is intended that once the EPC Contractor has been appointed, this framework will be taken and developed into a stand-alone Action Plan which will be complementary to the Sponsor's Action Plan. The EPC Contractor's Action Plan will be comprised of a set of method statements covering all critical construction and environmental management tasks.

The key components of the Contractors Action Plan(s) are outlined in the following sections.

8.4.1 Environmental Mitigation and Monitoring Plan (EMMP)

Within this plan, the EPC Contractor will specify the mitigation and monitoring measures and monitoring procedures to be implemented in relation to the interconnection component of the project.

The Monitoring section of the EMMP will identify the construction-related monitoring objectives and specify the type of monitoring required to achieve the obligations set out in this SEA, as well as the obligations specified in the EPC Contract, and the appropriate locations and equipment to be used. Specifically, it will identify:

- Environmental issues;
- Parameters to be monitored;
- Monitoring methodology including locations, equipment, timing etc;
- Threshold limits that trigger corrective action;

- Reporting procedures; and,
- Responsibility for monitoring (within EPC team).

The EPC Contractor will monitor the parameters set out in the Monitoring Plan to ensure that the performance of the Works complies with the threshold limits which trigger intervention, including relevant Ugandan standards (e.g. noise limits), performance standards of key lenders and internal corporate performance standards.

8.4.2 Traffic/Access Management Plan (TMP)

The EPC Contractor will produce a Traffic Management Plan (TMP) that contains appropriate strategies for moving materials and persons to and from construction areas, including abnormal loads. It will also contain provisions for management of connection points between site access roads, the wayleave and the main public highways, and for any upgrading work to be carried out on the wayleave or access routes to the site. The TMP will incorporate any actions specified by UETCL and the NFA to address long-term access along the transmission line, such as use of temporary bridges rather than permanent bridges, and security gates and checkpoints.

The TMP will also specify the procedures for monitoring construction-generated traffic movements, and environmental problems arising therefrom.

8.4.3 Waste Management Plan (WMP)

The EPC Contractor will produce a Waste Management Plan (WMP), for dealing with waste generated as a result of construction. The WMP will specify provisions for disposal, re-use or recycling of solid waste, hazardous waste, foul and process water. Specific waste management measures will include, but not be limited to, those provided in Chapter 7.

8.4.4 Pollutant Spill Contingency Plan (PSCP)

The EPC Contractor will produce a Pollutant Spill Contingency Plan, which will set out the procedures for proper handling of potential pollutants and procedures to be taken in the event of a pollutant spill. It will also specify equipment procurement and training of construction personnel. Specific pollution management measures will include, but not be limited to, those provided in Chapter 7.

8.4.5 Health and Safety Management Plan (HSMP)

A Health and Safety Management Plan will be prepared that addresses all Ugandan Health and Safety Standards, as well as the Health and Safety guidelines of the World Bank Group, including:

- Workplace noise;

- Workplace air quality;
- Electrical safety in the workplace;
- Working in confined spaces;
- Handling hazardous substances;
- General health and safety; and,
- Personnel training.

The procedures will include internal incident tracking and a corrective action programme to prevent recurrence of any incidents that may occur. The EPC Contractor will be responsible and accountable for the actions of its company and employees. These responsibilities will be incorporated into the contract documents consistent with the recommendations of the SEAP.

8.4.6 Labour Force Management Plan (LFMP)

The EPC contractor will ensure that labour standards are respected during the project, as set out in the EPC contractor ToR. The contractor will take into account the capacity of sub-contractors to achieve sound labour management in its assessment of potential sub-contractors.

The EPC contractor will ensure a contractual commitment on the part of labour providers to comply with all relevant aspects of Ugandan national labour law, including the establishment of formal employment relationships with labourers – ensuring legal protection on form and frequency of pay, working hours.

The EPC contractor will:

- Commit, where requested, to provide a copy of employment registers and records including details of hours/overtime worked, wages paid and the employment status of workers, both those employed directly and indirectly;
- Assume primary responsibility for day-to-day monitoring of the implementation of labour standards requirements placed by project financiers on the Project Proposer (UECTL) and thereby designate a manager who is responsible for ensuring labour and health and safety legislation is complied with, both in the direct and indirectly-employed workforce (namely, sub-contracted labour);
- Provide or ensure that training is carried out on health and safety issues with regard to all workers, direct and indirectly-employed;
- Put in place a mechanism for checking the age of workers;
- Carry out risk assessments in relation to all employees who are under the age of 18;
- Put in place a worker grievance mechanism and details of any complaints lodged under the procedure in the last year;
- Undertake to inform UECTL – and thereafter the project financiers – of all serious accidents that take place in relation to the project; and,

- Provide UECTL – and thereafter the project financiers – with sample copies of payslips for direct and sub-contracted workers indicating payment of wages and social security contributions

8.5 Implementation of the Social and Environmental Action Plan

This section outlines the commitments of UETCL and the EPC Contractor in relation to the staff resources, team structures and reporting lines required to implement the SEAP. It also outlines the system for internal and external reporting and auditing in relation to environmental matters, and the proposed Change Management System that will be used to assess and manage the environmental impacts of future changes in project scope.

8.5.1 UETCL's Commitments and Resourcing

In order to discharge its commitments with respect to management of biophysical impacts of the project, UETCL will designate a suitably qualified and experienced Environmental Manager. The Environmental Manager's key responsibilities will include the following:

- Point of contact for the Construction Contractor's Site Environmental Officer;
- Ensuring that all environmental protection procedures are followed as planned;
- Review and approval of the Environmental components of the Construction Contractor's Project Plan;
- Audit the EMMP;
- Liaise with members of the public, local organisations and governmental and non-governmental organisations;
- Liaise with other businesses potentially affected by the project; and,
- Report results of mitigation and monitoring activities to NEMA, the lenders and other relevant parties.

The Environmental Manager shall report directly to UETCL's Implementation Manager, Construction Manager, or equivalent, and will be provided with sufficient support staff and facilities to allow all of UETCL's environmental commitments to be discharged appropriately. The Environmental Manager and his team will be members of the overall Implementation Team for the project. An outline structure for the Sponsor's overall Implementation Team is provided in Figure 8.2. Further details of the staff required for implementation of compensation, resettlement, cultural property management and community development plans will be provided in the relevant subsections of the SEAP.

Figure 8.2 Sponsor's Implementation Team Structure (Indicative)

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The Biophysical Team will be charged with management of issues in relation to the biophysical environment. With regard to the interconnection system, these fall into two broad areas: the construction environment, and forests/wetlands. A Task Manager will be appointed to deal with each of these. Construction environment issues are those short-term issues arising directly from construction activities, e.g. traffic, noise, air quality and waste issues. The Forest/Wetlands Task Manager will be responsible for management of long-term impacts on the three CFRs and on seasonal or permanent wetlands. Staffing requirements for management of hydropower issues are outlined in the separate volume for the hydropower component of the project. However, it is anticipated that as UETCL's Authorised Agent for the Interconnection Project, BEL will provide staff with environmental management responsibilities during the construction and commissioning phases. It is possible that these will be mobilised as part of a Social and Environmental Team covering both the hydropower and interconnection projects.

Details of activities to be carried out by the Resettlement/Compensation and Community Development/Cultural Property teams are provided in the RCDAP which is provided as Appendix G.

A detailed plan for the tasks to be undertaken by the Environmental Department is shown in Section 8.4.

8.5.2 EPC Contractor's Commitments and Resourcing

The EPC Contractor will be required to designate an appropriately qualified Site Environmental Officer (SEO) who will be responsible for implementation of the measures set out in the CEMMP. The SEO's key responsibilities will include the following:

- Ensuring that all environmental protection procedures are followed;
- Co-ordination of environmental monitoring of site-related activities required to discharge the EPC Contractor's obligations;
- Liaison and reporting with the Environmental Manager;
- Monitoring of hazardous substances on site to ensure that the possibility of accidental release is minimised;
- Ensuring, where appropriate, that monitoring equipment required for the execution of the obligations of the EPC Contractor is calibrated and maintained as required;
- Promoting on-site environmental awareness;
- Liaison with other businesses and industry; and,
- Maintaining an Environmental Management System based on ISO 14001.

There may be occasions where EPC Contractor considers that outside bodies are required for specialist monitoring, training or consultation purposes. The SEO shall co-ordinate any site-related monitoring conducted by those outside bodies and all monitoring results provided to the EPC Contractor shall be reported directly to UETCL's Environmental Manager.

The proposed structure of the EPC Contractor's Environmental Department (to be headed by the SEO) is outlined in Figure 8.3. The Environmental Field Inspectors will be appointed during the mobilisation phase, and will be local staff with relevant environmental/engineering experience, who are fluent in local languages. The number of field inspectors may be adjusted upwards according to the environment on-site.

The SEO will have overall responsibility for the activities of the Contractor's Environmental department. On a day-to-day basis the emphasis of his work will be upon liaison with UETCL's Environmental Manager, and with relevant authorities, local residents and NGOs on environmental issues (i.e. external liaison). The responsibility for day-to-day management of the field team will be devolved to the Environmental Field Co-ordinator. The field team will comprise Field Inspectors, supported by drivers and labourers. The Field Inspectors will maintain a permanent presence on site, carrying out routine checks of operating procedures and environmental monitoring as specified in Chapter 7.

8.5.3 Reporting Lines and Decision-making

Reporting the results of environmental monitoring allows the responsible agencies to identify if any mitigation measure is not effective and will enable corrective action to be taken. During construction, UETCL will have the ultimate responsibility to ensure environmental reporting procedures are being undertaken.

The monitoring programme described in Chapter 7 and the EMMPs require recurrent and *ad hoc* inspections and surveys for different parameters. A set of *pro forma* report documents will be drawn up and used by the Environmental Manager and SEO for recording the findings of these, and if necessary, reporting any exceptions to NEMA and project lenders. These documents may be inspected and/or audited by NEMA and project lenders from time to time.

On a quarterly basis, the SEO will provide to the Environmental Manager a report containing monitoring results (and a summary of these), a synopsis of environmental issues encountered, and the efficacy of solutions to these issues. The Environmental Manager will use these as the basis for UETCL's quarterly environmental reports. UETCL's quarterly reports will also include commentary on the implementation and efficacy of environmental mitigation actions implemented by UETCL.

Figure 8.3 EPC Contractor’s Environmental Team Structure (Indicative)

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The Environmental Manager will develop annual environmental reports suitable for submission to NEMA (as a requirement of the Ugandan Environmental Impact Assessment Regulations) and to other stakeholders as appropriate. This will provide the opportunity for NEMA and stakeholders to comment both on the impacts of the project itself and the efficacy of the SEAP. Where necessary, the SEAP will be updated.

Hard copies of the quarterly reports will be made available to local stakeholders at UETCL's Jinja and Kampala offices. All monitoring and reporting documents will be kept on file for the life of the project, and will not be disposed of without permission from NEMA.

8.5.4 Environmental Auditing

Auditing of the environmental compliance of the project will be carried out at two levels: internal and external.

UETCL will specify procedures for annual internal audits as part of the SEAP, and any other environmental requirements, such as those imposed by NEMA and/or the international lenders. The responsibility for implementing these audits will lie with the Environmental Manager, who may elect to employ external Consultants.

External audits of EPC Contractor's environmental compliance will be carried out by UETCL, and potentially by representatives of NEMA and the AfDB.

It is a requirement of NEMA and the AfDB that annual environmental reports ('self-auditing') be submitted for review. The Environmental Manager will be responsible for compiling and submitting these reports, and will consult with NEMA to determine any additional mitigation measures or monitoring that is considered to be required. Self-audit reports will be compiled from internal and external audits carried out by both UETCL and EPC Contractor. It should be noted that the EIA Regulations require the names and qualifications of persons carrying out 'self-auditing' to be approved by the Executive Director of NEMA. Therefore the Environmental Manager and the SEO will have to be approved by NEMA before official appointment.

8.5.5 Change Management

During the implementation of the project, change may be required to address unforeseen or unexpected conditions or situations. A change management process will be applied to ensure environmental and social issues are addressed as part of any significant changes to project procedures, processes, design or activities. Both UETCL and the EPC Contractor will be responsible for managing changes within their respective areas of responsibility. UETCL will incorporate into its Actional

Plan, and the EPC Contractor will incorporate into its Action Plan, a change management process similar to the following.

1. Identification of item/situation potentially requiring change.
2. Preparation of a Change Request Document that:
 - a. Outlines the nature of the item/situation requiring change;
 - b. Outlines impacts of the change (e.g., cost, schedule, safety, operability); and,
 - c. Identifies potential biophysical, socio-economic, or health concerns.
3. Review of the Change Request for Compatibility with UETCL’s or the EPC Contractor’s Action Plan, as applicable:
 - a. At the task manager level for minor changes;
 - b. By the Environmental Review Panel for significant changes; or,
 - c. Review and approval by NEMA and international lenders for significant changes, to confirm it will not compromise ongoing compliance with Ugandan regulations, nor with lender policies and performance standards.
4. Documentation of the approval or rejection of the change request.
5. Application for, and receipt of, any approvals required to effect the change under Ugandan Law.
6. Implementation of the approved change, including communication to appropriate parties concerning the nature, scope, and timing of the change.
7. Summary of project changes and status to be included in quarterly reports to the Environmental and Social Review Panel.

8.6 Responsibilities for Social and Environmental Mitigation Measures

Table 8.1 below outlines the overall package of environmental mitigation measures that will be implemented in relation to the IP (as outlined in detail in Chapter 7). The table also assigns general responsibilities for implementing each group of mitigation measures, and provide budget estimates and locations for each. A detailed implementation schedule will be developed once the EPC Contractor is selected and it will be published as part of the regular SEA updates.

Consistent with the IP’s contracting strategy of integrating environmental protection and mitigation activities into the EPC Contractor’s Scope of Work, the specifications for many of the activities will be included in the bid package upon which the EPC Contractor will develop its base rates.

Table 8.1: General Responsibilities for Social and Environmental Mitigation Measures

| Issue | Action/s | Timing | Responsibility | Estimated Cost (USD) |
|----------------------------------|----------------------------------|----------------------------------|--------------------------------|----------------------|
| Staffing for SEAP Implementation | Recruit SEAP Implementation Team | Months 1-3 after Financial Close | UETCL - Implementation Manager | 250,000 |

| Issue | Action/s | Timing | Responsibility | Estimated Cost (USD) |
|--|-------------------------------|----------------------------------|-----------------------------------|---|
| Resettlement Corrective Actions | Implement APRAP | Year 1 after Financial Close | UETCL – Social Unit | 40,000 |
| Community Development | Implement RCDAP | Preconstruction and Construction | UETCL - Social Unit | 300,000 |
| Land Acquisition and Resettlement | Implement RCDAP | Preconstruction | UETCL - Social Unit | 16,643,663 |
| Public Consultation/Community Liaison | Implement PCDP | Throughout Construction Phase | UETCL - Community Liaison Manager | Included in salary for SEAP implementation team |
| Labour Force Management | Develop Sponsor's LFMP | Months 1-3 after Financial Close | UETCL – H&S/HR Managers | 20,000 |
| Labour Force Management | Develop EPC Contractor's LFMP | Months 1-3 after appointment | EPC Contractor | Within EPC contract price |
| Mitigation of biophysical impacts – not construction-related | Implement Sponsor's EMMP | Preconstruction | UETCL (Environmental Manager) | 150,000 |
| | | Construction Phase | UETCL (Environmental Manager) | 25,000 |
| | | Operations Phase (first 2 years) | UETCL (Environmental Manager) | Within above salaries |
| Mitigation of biophysical impacts – construction-related | Implement Contractor's EMMP | Throughout Construction Phase | EPC Contractor (SEO) | Within EPC contract price |

8.7 Responsibilities for Environmental Monitoring Measures

The accompanying SEMP outlines the overall package of environmental monitoring that will be carried out in relation to the Bujagali electricity transmission system (as outlined in detail in Chapter 7). The SEMP also assigns responsibilities for each monitoring activity, and proposes parties who are capable of carrying out the monitoring, on behalf of the responsible body.

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9.0 References

- Anderson, H.P. 1994. *Local Resource Utilisation in Rural Uganda*. University of Oslo, Resource Geography Group.
- Aryamanya-Mugisha. National Environment Management Authority, Chief. Personal communication. 1998 and 2006. Uganda.
- Bujagali Implementation Unit. 2005. *Updating the Resettlement Action Plan of the Bujagali Hydro Power Project Transmission Line - Preliminary Report*. October 2005.
- Carl Bro International. 2000. *Determination of Line Route for Electric Supply Line (Bujagali-Kawanda-Mutundwe) Final Report*. Uganda
- Central Intelligence Agency. 1999. *The World Factbook 1999 – Uganda*. <http://www.cia.gov/cia/publications/factbook/ug.html>
- Davenport, T.; Howard, P. and Baltzer, M. (eds.). 1996. *Mabira CFR Biodiversity Report No. 13*.
- Energy Information Administration. 2004. *Country Analysis Brief for Great Lakes Region: Burundi, Kenya, Rwanda, Tanzania, and Uganda*. February 2004. Department of Energy, USA.
- Energy Sector Management Assistance Programme (ESMAP). 1999. *Rural Electrification Strategy Study*. September, 1999. World Bank. Washington, D.C.
- ESKOM. 1998. <http://www.eskom.co.za/annreport/chair.htm>. 2006.
- ESG International Inc. and WS Atkins International. 2000. *Environmental Impact Statement – Transmission Line. Bujagali Hydropower Project*. December 2000. Uganda.
- ESG International Inc. and WS Atkins International. 2001. *Environmental Impact Assessment. Bujagali Project Hydropower Facility – Uganda*. March 2001.
- ESG International Inc. and WS Atkins International. 2001. *Addendum to March 1999 Environmental Impact Statement*. March 2001.

- Energy Information Administration. 2004. *Country Analysis Brief for Great Lakes Region: Burundi, Kenya, Rwanda, Tanzania, and Uganda. February 2004.* Department of Energy, USA.
- Federal-Provincial Working Group. 1998. *Health Effects and Exposure Guidelines Related to Extremely Low Frequency (ELF) 50/60 Hz Electric and Magnetic Fields: An Overview. Canadian Working Group of the Federal-Provincial Territorial Radiation Protection Committee.*
- Forest Department. 1999. *Forestry Nature Conservation Master Plan.* Kampala.
- Forest Department. Correspondence from Deo Byarugaba, Acting Commissioner For Forestry, to AESNP. Kampala, Uganda. Personal communication November 13, 2000.
- Forest Department. Undated. *Forest Management Plan for Mabira CFR: July 1, 1997 to June 30, 2007.* Republic of Uganda.
- Fountain Publishers Ltd. 1999. *Uganda Primary Atlas for Social Studies.* Harper Collins. Uganda.
- Howard, P.C. 1991. *Nature Conservation in Uganda's Tropical Forests.* IUCN, Gland, Switzerland.
- Kamuhangire Dr., Commissioner for Antiquities and Museums. Personal Communication. Ministry of Tourism, Wildlife and Antiquities, Government of Uganda. Kampala. 1998.
- Kiyemba, E. Personal communication. January, 2006.
- Knight Piésold and Merz and McLellan Consulting Engineers. 1998. *Bujagali Hydropower Project Feasibility Study: Volume 1, Main Report.*
- ICNIRP. 1998. Guidelines for Limiting Exposure to Time-varying Electric, Magnetic, and Electromagnetic fields (up to 300 GHz). *Health Physics*, **74** (4): 494-522, April 1998.
- International Finance Corporation (IFC). 2006. *International Finance Corporation's Sustainability Policy and Performance Standards.* Public Release Draft, September 22, 2005.
- International Finance Corporation (IFC). 2006. <http://www.ifc.org/>.

- Jackson G.M &H.G. Laventhall. 1985. *Noise in the Home*. The Noise Handbook, Ed
W Tempest Press. 1985.
- Kityo, R.M. & Pomeroy, D.E. 2000. Draft Report on the Assessment Study in
Mwola Forest.
- Kityo, R.M. & Pomeroy, D.E. 2006. *Biodiversity of Key Sections of the Proposed
New Bujagali to Kampala Transmission Line*. Makerere University.
September 2006.
- Langdale-Brown, I. Osmaston, H.A. & Wilson, J.G. 1964. *The Vegetation of
Uganda
and its Bearing on Land Use*. Entebbe: Government of Uganda.
- Litterick, Dr. National Wetlands Conservation Management Programme,
Technical Advisor. Personal communication. Kampala, Uganda. November
30, 1998.
- MacDonald, R. Department of Geological Survey. 1966. *Uganda Geology Map
scale 1:500,000*.
- Makerere University Institute of Environment and Natural Resources. (MUIENR). 2000.
*Bujagali Hydropower Project: Terrestrial Ecological Assessment (Plants,
Birds, and Mammals)*.
- Makerere University Institute of Environment and Natural Resources. (MUIENR).
2006. *Bujagali Hydropower Project: Terrestrial Ecological Assessment
(Plants, Birds, and Mammals)*. Prof. Derek Pomeroy, Robert Kityo, Paul
Ssegawa. May 2006.
- Multilateral Finance Institutions Working Group on Environment. 2005. *A Common
Framework for Environmental Assessment – A Good Practice Note*.
- National Environment Management Authority (NEMA). Undated. *Environmental
Standards and Preliminary Environment Impact Assessment for Water Quality
and Discharge of Effluent into Water and Land in Uganda*. Kampala, Uganda.
- National Environment Management Authority (NEMA). 1997. *Guidelines for
Environmental Impact Assessment in Uganda*. July 1997.
- National Institute of Environmental Health Services and US Department of Energy.
1995. *Questions and answers about EMF*. Washington, DC.

- National Research Council. 1997. *Possible Health Effects of Exposure to Residential Electric and Magnetic Fields*. National Research Council, Committee on the Possible Effects of Electromagnetic Fields on Biologic Systems. National Academy of Sciences Press, Washington, DC.
- NEMA. 2004. *Control of Smoking in Public Places*. <http://www.nemaug.org>. 2006.
- NEMA. 1997c. *Draft Environmental Standards and Preliminary Environment Impact Assessment for Control of Noise Pollution*. First Edition, January 1997. Kampala.
- NEMA. 2001. *Minimum Standards for Management of Soil Quality Regulations*. <http://www.nemaug.org>. 2006.
- NEMA. 1999. *National Environment (Wetlands, Riverbanks, and Lake Shores Management) Regulations*, <http://www.nemaug.org>. 2006.
- NEMA. 1999. *National Environment (Waste Management) Regulations*, <http://www.nemaug.org>. 2006.
- NEMA. 2003. *National Environment (Conduct and Certification of Environmental Practitioners) Regulations*. <http://www.nemaug.org>. 2006.
- Nyirinkindi, E. 2003. *Uganda's Electricity Sector in Transition: Paving the Ground for Future Demands*. In: ESI Africa. http://www.esi-africa.com/last/esi_2_2003/032_30.htm.
- Oluka-Akileng et.al. 2000. *Agroforestry handbook for the banana-coffee zone of Uganda: farmers' practices and experiences*. TH No. 21. 96 + 9 pp.
- Ornis Consult. 1994. *Environmental Impact Assessment: Power Transmission Line from Owen Falls to Kampala*. Uganda.
- Pomeroy D.E, Kityo R.M. & Ssegawa P. 2006. *Environment Impact Assessment study for Bujagali Hydropower Proposed Dam site (Terrestrial Biodiversity component)*.
- Roberts, Andy. 2000. *Analysis of Future Options for Forest Department Eco-Tourism Development*. Forest Department, Uganda.
- Shoemaker, Darryl J. 1994. *Cumulative Environmental Assessment*. Waterloo: University of Waterloo, Department of Geography.
- Siemens Power Transmission and Distribution Inc. (Siemens PTI). 2006. *Bujagali Hydroelectric Power Project Transmission Interconnection Study System Analysis Report*.

- Swaine, M.D. & Whitmore, T.C. 1988. On the definition of ecological species groups in tropical rain forests. *Vegetation*, **75**, 81±86.
- Uganda, Government of. 1992. *1991 Population and Housing Census (District Summary Series) Mpigi District, Kampala District, Mukono District*. Statistics Department, Ministry of Finance and Planning.
- Uganda, Government of. 1995. *Constitution of the Republic of Uganda*. <http://129.194.252.80/catfiles/0819.pdf>. 2006.
- Uganda, Government of. 1998. *The Environmental Impact Assessment Regulations, 1998*.
- Uganda, Government of. 1995. *National Environment Statute*. Statute No. 4. Kampala.
- Uganda, Government of. 2002. *Statistical Abstract*
- Uganda, Government of. 2004. *Environmental Legislation of Uganda, Volume 1*.
- Uganda Ministry of Agriculture, Animal Industries and Fisheries. 2003. *Guidelines for Beach Management Units in Uganda*. July 2003.
- Uganda, Ministry of Health. 1998. *HIV/AIDS Surveillance Report: March 1998*.
- Uganda Ministry of Health. 1996. *Uganda Health Bulletin September- December 1996*
- Uganda, Government of. 2000. *Employment Act*.
- Uganda, Government of. 1964. *The Factories Act, Cap. 198*.
- Uganda, Government of. 1998. *Ministry of Agriculture, Animal Industry and Fisheries Statistics*.
- Uganda, Government of. 1999. *The Sewerage Regulations*.
- Uganda, Government of. 1998. *Statistical Abstracts*.
- Uganda, Government of. 1998. *The Water (Waste Discharge) Regulations*.
- Uganda, Government of. 1995. *The Water Act Cap. 152*.
- Uganda, Government of. 1999. *The Water Supply Regulations*.

Uganda, Government of. 2000. *Workers' Compensation Act*.

Uganda, Government of. 2000. Uganda Wildlife Act Cap. 200.

U.S. CEQ. 1997. *Environmental Quality - The World Wide Web: The 1997 Annual Report of the Council on Environmental Quality*. Washington DC, The White House, Council on Environmental Quality.

Vector Control Unit (VCU) and Ministry of Health. 1998. *Pollution Prevention and Abatement Handbook*. Washington, D.C. August 1988.

Water Resources & Energy Management International (WREM)/NORPLAN Uganda. 2004. *Study on Water Management of Lake Victoria: Lake Victoria Decision Support Tool (LVDST). Draft Technical Report*. Report for Uganda Ministry of Energy and Mineral Development.

World Bank Group (WBG). 2006. <http://www.worldbank.org/>.

The World Conservation Union. 2004. *IUCN Red List of Threatened Species*. <http://www.iucnredlist.org/search>. 2006.

World Health Organisation (WHO). 1980. *Environmental Health Criteria 12-Noise*. Geneva.

World Health Organisation. 1993. *Guidelines for Drinking Water Quality 2nd edition. Vol. I*. Geneva, WHO.

WS Atkins International Ltd (WSAI), Development Consultants International Ltd., and African Development and Economic Consultants Ltd. 1999. *Bujagali Hydroelectric Power Project: Environmental Impact Statement, Final Report, Volume 1-3*.

WS Atkins International Ltd (WSAI). 1999b. *Bujagali Hydroelectric Power Project, Connection to the 132 kV Transmission Network: Interim Draft Report*.