



KENYA POWER AND LIGHTING COMPANY LIMITED



**Environmental and Social Management Plan for the Proposed Mombasa-
Nairobi 400 kV Transmission Line**

KPLC1/17ABMSA-NBI400Kv/TL-2

Final Report



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LIST OF ABBREVIATIONS

AfDB	African Development Bank
AFD	Agence Francaise de Development
AIDS	Acquired Immune Deficiency Syndrome
ASALS	Arid and Semi Arid Lands
EMF	Electro-Magnetic Fields
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental Management Plan
EU	European Union
HIV	Human Immunodeficiency Virus
KPLC	Kenya Power and Lighting Company Limited
KCAA	Kenya Civil Aviation Authority
kV	Kilo volt – 1,000 volts
KWS	Kenya Wildlife Service
MW	Megawatts
NEMA	National Environmental Management Authority
OTHL	Overhead Transmission Lines
PAPs	Project Affected Persons
RAP	Resettlement Action Plan
ROW	Right of Way
WB	World Bank
ILO	International Labour Organizations
KRU	KPLC Resettlement Unit

EXECUTIVE SUMMARY

Purpose

This Report has been prepared following a request by the Client-*Kenya Power and Lighting Company Limited*, to the consultant *Log Associates*, to develop an Environmental and Social Management Plan (ESMP) for the 400 kV Mombasa - Nairobi Transmission.

Background

The Government of Kenya is expecting to receive funds from Agence Francaise de Development (AFD), European Investment Bank, and African Development Bank, to finance the construction of approximately 462km of 400kV transmission line from Rabai Substation in Mombasa to the proposed Isinya substation to the South East of Nairobi, establishment of substation bays for future installation of the necessary transformers at the two ends of the line and extension of a 24km of 220kV line.

The study conducted conformed to the requirements of the AFD, EU and AfDB environmental and social policies, guidelines and assessment procedures in addition to those of National Environment and Management Authority (NEMA).

Objective

The objective of the assignment was to preparation a detailed ESMP to address the anticipated negative environmental and social project impacts of the project.

Scope

The scope of services undertaken by the Consultant included the preparation of the ESMP whose purpose was to define and reach an agreement with project sponsors concerning the following:

- Mitigation and enhancement programs
- Monitoring programs
- Consultations
- Complementary initiatives
- Responsibilities and institutional arrangements
- Estimated costs
- Implementation schedules and reporting

Methodology

The consultant adopted a participatory methodology during the study. Several consultative meetings were conducted with KPLC, the communities and other stakeholders. The consultant further reviewed various legal issues relevant to the exercise. The existing Environmental Impact Assessment Report was reviewed in detail by the consultant. The following section provides a brief of the key findings.

Legislative Framework

Chapter Two of this project report outlines several legislative issued that were considered during the exercise. This is to ensure that the proposed project compliers with the relevant legislative and planning requirements of Kenya. They generally comprise of legislations that encompass laws relating to environment, agriculture, water, public health and land. KPLC land acquisition procedure has also been discussed in detail for both low and high voltages.

The project in question generally conforms to the legal requirements outlined in Chapter Two and subject to the ESMP proposed in Chapter Six of this report.

Major environmental and social impacts

a) Adverse Impacts:

Distribution network systems extension can be expected to have minor direct and indirect impacts on villages where the proposed lines will pass. The potential for negative direct impacts might be in any social and cultural interaction between the contractor's workers and local populations. There may also be minor effects on agriculture, if there would be a restriction on land use in the right of way to the areas where distribution lines pass, and, in any involuntary resettlement requirement. Issues addressed in the ESMP include negative impacts with respect to the biophysical environment, the main aspects analyzed are the impacts of the project on water resources, tree cutting, local land degradation and soil erosion, slope stability, aesthetics and visual impact and ecological issues. The site for the proposed sub-station in Isinya has already been procured by Kenya Power and Lighting Co Ltd (KPLC) and is not yet fenced off. No negative environmental impact is expected. They are in the process of procuring another site in Mariakani.

b) Positive Impacts

The major positive impacts are related to job opportunities. The direct and indirect job opportunities that will be provided by the project can be considered as a positive aspect. The local people will be directly employed to work at the construction sites. Some

individuals may gain skills that can be applied in other transmission line construction projects.

The benefits of the project for domestic supply and use in small-scale businesses and in access to electric power for schools and public services are evident. Potential beneficiary enterprises affected by and contributing to regional socio-economic transformation will be small industries like saw mills and joineries, grain mills and other agricultural processing and storage businesses. Data management with computers is enabled along with communication facilities such as the internet and charging of mobile phones. Electric lighting adds to security at night and enables extended opportunities for work and study. As a consequence the quality of life and extent of economic opportunity will be transformed.

On the gender side, women should benefit from opportunities to work on the project as a result of project gender policy. Such income and opportunities for trading to salaried project workers and provide services to will help women to start small businesses.

c) Potential Socio-Economic Impacts

Along the road and within the right of way there are housing units, fences of different types, farmland, grazing land and national parks. During the construction period, some of these properties will be affected. This will cause an adverse impact on the socio-economic situation pertaining to the project area communities.

Loss of property is the main socio-economic impact of the Mombasa-Nairobi 400kV transmission line project. The impact on housing units will occur in almost all the towns and villages along the road as individuals have constructed housing units for residence and business activities along the road.

On the basis of a 60 metres right of way in the Peri-urban and rural settings, houses affected were inventoried during the field assessment. A total of 271 and 2,566 houses are situated within the 60 meters right of way respectively throughout the wayleave

Also, farmlands along the wayleave owned by different farmers will be affected by the project. About 218 hectares of farm and grazing land fall within the 60m right of way of the project road. The project intends to mitigate this by minimizing land takes in areas of 60metres ROW where there are farm and grazing land.

Loss of private and public fences will also be one of the potential socio-economic impacts of the project as there are households and institutions whose fences are very close to the way-leave which will be removed in some instances. This will affect the individuals concerned as they would face some degree of insecurity without their fences and need some financial ability to reconstruct the fences.

Furthermore, other important potential socio-economic impacts which need to be managed include: health and safety threats, possible impact of immigrant workers, together with impact on aesthetic values.

Enhancement and mitigation program

Limited if any impacts are anticipated as planning and management for the project follows detailed frameworks developed for the project. Most distribution lines will follow road corridors and there should be very limited compensation requirements. Lines following roads adjacent to conservation areas will accommodate wildlife movement in their design and mitigate visual landscape intrusion and avoid unnecessary tree cutting or displacement of people.

Limited if any significant impacts on conservation, pollution control, plans to mitigate aids transmission risk and accidents, together with management of land loss and compensation arrangements.

Institutional arrangements and capacity building requirements

KPLC will ensure implementation of the project ESMP with the support of its environmental staff. Contractors will be held to account for implementation of their responsibilities in the Project Management Matrix. Figure 1 shows the institutional arrangement for implementation of the ESMP under the project.

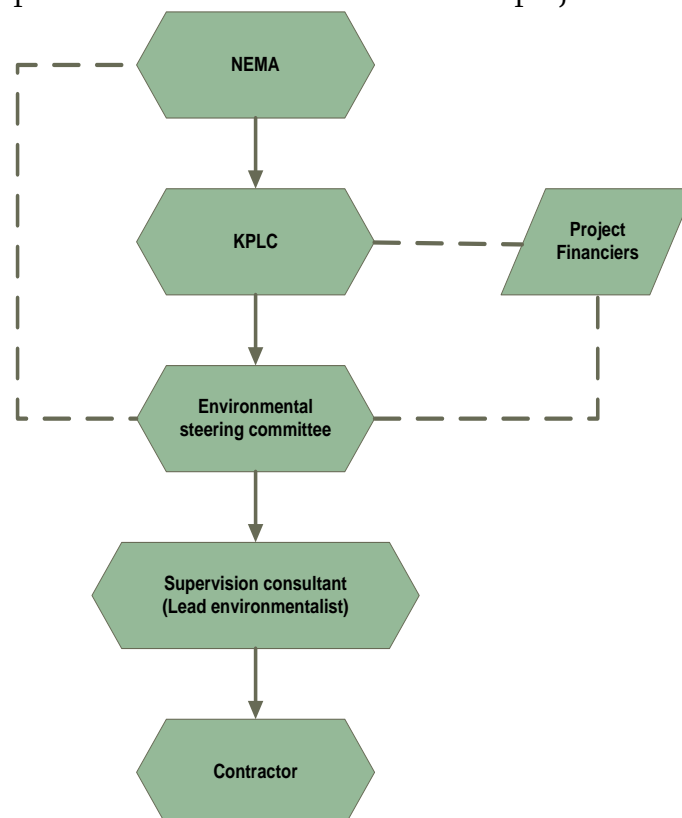


Figure 1: Institutional arrangement for implementation of the ESMP



Public consultations and disclosure requirements

Public consultations have been held with local population in the project area Log Associates and KPLC while preparing the ESMP. Furthermore, the standard procedures will be followed for disclosure in line with guidelines of the National Environmental Management Authority.

Estimated costs

The estimated cost of the environmental management plan is KES 6.4 billion. This includes KES 778 million for Land acquisition, KES 2.5billion for underground cabling, KES 2.5billion for site decommissioning, and an annual conservation fees of KES 32million.

Implementation schedule and reporting

The implementation will be rolled out as required for each project component in line with the construction timetable and frameworks established for surveying and consultation, management and monitoring. KPLC will have responsibility for social and environmental aspects of the projects. Supervision undertaken will also cover these aspects.

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1.0 INTRODUCTION

1.1 Purpose

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1.4 Scope

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- Estimated costs
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2.0 LEGISLATIVE FRAMEWORK

This ESMP has been prepared to fully comply with environmental legislations and procedures in Kenya and with the AfDB, ADB and EU environmental and social safeguard policies.

In this chapter, the key safeguard policies that provide the policy context to the ESMP including AfDB, ADB, EU, and Kenya's legal requirements on environmental assessment have been outlined.

2.1 AfDB Environmental Policies

In January 2004 the Boards approved the new Bank Group Policy on the Environment, which incorporates and redefines the former policy on environmentally sustainable development in Africa. The new policy acknowledges that to sustain economic growth in Africa, there is an urgent need to preserve and enhance the ecological capital that enriches such growth. 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 (RMCs) to build their environmental management capacity and sensitize policymakers on environmental issues and bring about institutional changes to achieve sustainable development;
- Reinforce the existing partnerships with international institutions and network also with regional and sub regional organizations to coordinate interventions in environmental sustainable development.

Two guidelines relevant to the new Policy on the Environment were completed and disseminated in 2004, namely the Strategic Impact Assessment Guidelines (SIA) and the Integrated Environmental and Social Assessment Guidelines (IESA). The IESA Guidelines are designed to ensure that both environmental and social issues are mainstreamed in Bank projects throughout the project cycle.

In 2004 the Bank developed an Implementation Plan to execute its new Policy on the Environment.

1. Bank Group Policy on the Environment (2004)

The Environmental Policy sets out the broad strategic and policy framework under which all Bank Group lending and non-lending operations will be made to promote environmentally sustainable development in Africa. Its overall goals are two-fold: firstly, to help improve the quality of life of the people of Africa; and secondly, to help preserve

and enhance the ecological capital and life-support systems across the continent of Africa. The development of the policy has been driven by a number of factors, including the recognition and acceptance of sustainable development as the dominant development paradigm for the 21st century; need for a greater focus on pro-poor growth policies and programmes to counter unacceptable impoverishment rates; rapid progress in the inevitable integration of Africa in the globalization process; and the need for an improved governance with a clearer commitment of the majority of African governments to provide the necessary leadership for sustainable development. They use a set of approaches and developing/strengthening procedures and guidelines, with particular focus on the full enforcement of the Environmental and Social Assessment Procedures for all lending operations of the Bank.

2. Integrated Environmental and Social Impact Assessment (IESIA) Guidelines (2003)

The IESIA Guidelines' are tools used in the implementation of the Bank's Environmental and Social Assessment Procedures. The major objective of the IESIA Guidelines' is to provide guidance to the staff of the Bank and RMCs on how to adequately consider crosscutting themes while assessing the environmental and social impacts of a project. These guidelines present the most frequent potential impacts and enhancement/mitigation measures for the considered sub-sector. They also provide a brief summary of external factors and the main hazards that can influence sectoral projects. The guidelines also outline indicators that could be useful for monitoring the considered project as well as series of references for further readings.

3. Bank Group's Handbook on Stakeholder Consultation and Participation (2001)

It provides guidelines and outlines specific actions that Bank staff should take to promote participation at every stage of the Bank's project cycle, including the preparation of Country Strategy Papers (CSPs), and Poverty Reduction Strategies (PRS'). The Handbook explains the concept of stakeholder participation, including a description of different levels of participation, its benefits and risks, and underlying principles. It provides an overview of some of the most frequently used participatory methods, tools, and techniques and also explores some key institutional and resource implications related to mainstreaming participatory approaches in the Bank's work. It also identifies current constraints and recommends specific steps that can be taken in order to translate the Bank's policy commitment to participation into action. Finally, the Annexes provide advice on where staff can go for further information on participation, including references for written materials, relevant web-sites and a variety of African and international institutions with such expertise.

4. Bank Group's Environmental and Social Assessment Procedures for Public Sector Operations (2001)

The main purpose of the Environmental and Social Assessment Procedures (ESAPs) is to improve decision-making and project results by ensuring that Bank-financed projects, plans and programs are environmentally and socially sustainable, and fully in line with Bank's policies and guidelines. The ESAPs describe the various steps that shall be followed to mainstream crosscutting issues along the project cycle, from country programming to post-evaluation. The ESAPs present to Bank staff and KPLC's various instruments for assessing projects to ensure the mainstreaming of environmental and social sustainability issues. These tools include the Strategic Environmental and Social Assessment (SESA), which can be used to assess, from the environmental and social point of view, the plans and programs to be financed by the Bank. The ESAPs also formalise the use of Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP) and Environmental and Social Audits as instruments to enhance project benefits and (in order of priority) to prevent, minimise, mitigate, or compensate for adverse environmental and social impacts.

2.2 ADB Environmental Management Plan Guidelines

ADB places strong emphasis on the preparation of EMPs during project processing and on setting out conditions and targets to be met during project implementation. The terms of reference for an EIA thus require the Borrower or their consultants to prepare an EMP as a major output of the environmental assessment. Where appropriate, the key contents of EMPs are incorporated into the loan agreement, for implementation and monitoring by the Borrower.

ADB requires that an EMP be included as part of the EIAs and IEEs (for Category B projects deemed environmentally sensitive). The EMP is carefully reviewed to ensure environmental safeguard compliance prior to the first MRM. However, at this stage in the project cycle, the specific construction and operational activities may not be well defined. And often it is not possible or practical to provide the details required for an effective EMP. Thus the ADB requires that the Borrower ensure that a revised EMP be prepared at the beginning of the implementation stage.

The contents of complete EMP are:

1. Summary of Potential Impacts
2. Description of Planned Mitigation Measures
3. Description of Planned Environmental Monitoring
4. Description of Planned Public Consultation Process

5. Description of the Responsibilities and Authorities for Implementation of Mitigation Measures and Monitoring Requirements
6. Description of Responsibilities for Reporting and Review
7. Work Plan including staffing chart, proposed schedules of participation by various members of the project team, and activities and inputs of various government agencies
8. Environmental Responsible Procurement Plan
9. Detailed Cost Estimates

2.3 European Investment Bank Environmental Policy Framework for the Non-EU Lending

Environmental protection and improvement, and benefits to people's welfare form key operational priorities for the European Investment Bank, the European Union's long-term lending institution. The EIB's environmental and social safeguard policies are based on the EU approach to environmental sustainability. The principles, practices and standards derived from these policies are highlighted in the Declaration on the European Principles for the Environment (EPE), agreed to by the EIB and four other European multilateral financing institutions in May 2006.

EIB does not have a comprehensive framework for the management of environmental issues-it does not have clear, publicly-available procedures for project screening and due diligence, project implementation and oversight, transparency and public participation in decision-making, enforcing compliance by its borrowers, or evaluation and organizational learning.

To meet the required international standards, a comprehensive E&S management system should include

- A precautionary approach to environmental risks and impacts;
- Clear procedures for environmental and social assessment to identify impacts and risks;
- An environmental and social policy framework that establishes an overall approach and issue- and sector-specific policies;
- Prohibitions on financing particularly risky or harmful activities;
- Clear transparency and participation procedures;
- Effective mechanisms for monitoring and oversight, enforcing compliance, and taking corrective action;
- Effective grievance mechanisms for the public raise compliance issues and to seek accountability and redress;
- Clear procedures for evaluation, organizational learning and improvement; and

- Dedicated staffing, effective training, adequate budgetary support, clear lines of accountability, and an internal incentive structure that rewards environmental excellence.

2.4 Kenya's Environmental Legislation

The preparation of this ESMP has taken into account the requirements for environmental assessment under Kenyan laws, mainly under Section 58 of the Environmental Management and Co-ordination Act, 1999. The section also requires project proponents to obtain an EIA License before the implementation of a project which KPLC have already done. Some of the relevant laws in Kenya are:

1. Environmental Management and Co-ordination Act (EMCA)

The Environmental Management and Co-ordination Act, 1999, is the legislation that governs Environmental Impact Assessment (EIA) studies. Kenya Power and Lighting Company Limited carried out an Environmental Impact Assessment (EIA) as per the second schedule of this act. This schedule lists the projects required to undergo EIA studies in accordance with section 58 (1-4) of the act. Electrical infrastructure is covered in part 10 of this schedule and this includes electrical transmission lines; and electrical sub-stations which is the core of this project. The Proposed Mombasa-Nairobi 400 kV transmission Lines can also be classified as rural and peri-urban development.

The Act provides for the National Environmental Management Authority (NEMA) whose objective and purpose is to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of the Government in the implementation of all policies relating to the environment.

With the introduction of Environmental Impact Assessment and Audit Regulations, 2003 issued through Kenya Gazette Supplement No. 56 of 13 June 2003, the submission of environmental reports became mandatory. According to these regulations no proponent shall implement a project likely to have a negative environmental impact or for which an Environmental Impact Assessment has been concluded and approved in accordance with these regulators.

2. Energy Act, 2006

The Energy Act 2006 became law on 2nd January 2007. The Act establishes an energy commission, which is expected to become the main policy maker and enforcer in the energy sector. This commission among other things shall be responsible for: Issuing all the different licenses in the energy sector

- Prescribing the licensing processes
- Setting and enforcing energy policies
- Collecting and disseminating energy data

- Public education and enforcing energy conservation

With this act, all the different aspects of energy e.g. electricity, petroleum and renewable energy are brought under one ambit unlike the case as was before.

3. The Wildlife (Management and Conservation) Act

The Act deals with areas declared as National Parks, under the Act. The Act controls activities within the park, which may lead to the disturbance of animals. Unauthorized entry, residence, burning, damage to objects of scientific interest, introduction of plants and animals and damage to structure are prohibited.

4. The Agricultural Act

Legislative control over soil conservation and land development are mainly controlled within this Act, and many of the provisions can be generally applied beyond those lands suitable for agriculture.

The Minister administering the Act, after concurrence with the Central Agricultural Board and consultation with the District Agricultural Committee, can impose land conservation orders on lands to control cultivation, grazing and clearing. These controls may be necessary to protect the land against soil erosion, to protect fertility, and to maintain catchments. Local authorities are generally empowered to administer these sections of the Act, and the District Agricultural Committee is entitled to make regulations relating to these controls.

Agricultural Rules are prescribed under the Act, whereby vegetation clearing in steep slopes areas or adjacent watercourses, without authorization, is controlled.

5. Land Acquisition Act

It is possible, under the provisions of this Act, for land to be acquired or granted access to for the purposes of new projects. Acquisition or access must be shown to be in the public benefit and compensation must be provided to the landowners whose land is acquired or damaged.

We have in Kenya a plethora of enactments all governing land and transactions in land. Thus the substantive land law is to be found in two different statutes while the adjectival land law is to be found in five different statutes not forgetting the customary land law of the various tribes in Kenya.

There are two systems of substantive land law, three systems of conveyance and five systems of registration. The two systems of substantive law are under:

- The Indian Transfer of Property Act 1882 as amended by 1959 Amendment Act
- The Registered Land Act

The three systems of conveyance are those applicable to land registered under:

- Government Lands Act Cap 280, part X Laws of Kenya and Land Titles Act Cap 282, Part III Laws of Kenya
- Registration of Titles Act
- Registered Land Act.

a) Registration Systems

The five registration systems are those under:

- The Government Lands Act (G.L.A)
- Registration of Titles Act (R.T.A)
- The Land Titles Act (L.T.A)
- The Registration of Documents Act Cap 285 Laws of Kenya (R.D.A)
- The Registered Land Act (R.L.A)

The Registration of Documents Act is not peculiar to land law, as documents completely unrelated to land are registrable under it.

b) Land Ownership

Absolute or complete ownership can be said to be in the state. Under G.L.A the commissioner of Lands, on behalf of the Republic of Kenya grants leases of town plots for any term not exceeding ninety nine (99) years and of agricultural land for 999 years. The grantee becomes owner and subject to the terms and conditions of the lease he possesses the bundle of rights of ownership. The 999-year leases can be converted into freehold and the 99 years to 999. On conversion or expiry of lease the new grant may be issued under R.T.A or R.L.A. All unalienated land other than trust land and all reversion of government leases are vested in the government. Others whether held on freehold or leasehold are vested in grantees as owners having the rights over them.

The power of the state to qualify (extinguish) property rights in the public interest is embodied in Section 75 of the Kenyan Constitution. The section however makes the exercise of that power subject to the process of law. Section 117 of the Constitution further provides that an Act of Parliament may empower a county council to set apart trust land for: The use and occupation of any public body or authority for public purposes; or Prospecting or mining purposes; or The use and occupation of any person or persons for a purpose which is likely to benefit the residents of the area.

c) KPLC Land Acquisition Procedure

Power Lines for Low Voltage

A reconnaissance survey is first done to search for the best possible route. It is KPLC policy to avoid existing structures as much as possible. Once the best route has been established, a meeting between the KPLC staff, the locals and the local administration is arranged. During this meeting KPLC formally requests for permission to survey the area. Once this is agreed upon, the surveyor moves to site and takes detailed profiles of the area and also places pegs where the poles are to be located. The surveyor then prepares a cadastral map of the area showing the plot numbers and the route of the power lines as well as the position of the poles.

The Way leaves section of the KPLC then prepares a wayleaves agreement showing the specific affected plot and the proposed route. The individual owner is then approached with this proposal and his consent is requested. The owner is compensated for buildings or crops that are on the land. However, the owner is not allowed to grow anything higher than 12 feet within five meters of the poles or line.

KPLC also consult with other relevant institutions such as Telkom Kenya, County Councils, Airport Authorities, Kenya Pipeline Company, Kenya Ports Authority, Department of Defence, Kenya Wildlife Service, Conservatoire of Forests and Ministry of Public Works and Housing to ensure that their proposal is in harmony with other proposed developments.

High Voltage Lines

A similar procedure is undertaken in assessing the best route as in the case for the low voltage lines. The land required is of 60 meters width. Once the best route is established the landowner is approached with this proposal and his consent is requested. The owner is compensated for the land through negotiations to agree on a compensation rate. The owner is also compensated for buildings or crops that are on the land

6. The Public Health Act

This Act contains directives regarding regulation of activities that affect human health. There exist provisions within the Act to deal, in a general way, with water, air and noise quality as they pertain to human health. An environmental nuisance is defined, and includes the emission from premises of waste waters, gases, smoke which could be regarded as injurious to health. The owner and/or occupier of premises responsible for such nuisance are liable to prosecution under the Act.

7. The Occupational Safety and Health Act, 2007

This Act applies to all workplaces where any person is at work, whether temporarily or permanently. The purpose of this Act is to secure the safety, health and welfare of persons

at work, and protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work. Some of the areas addressed here are machinery safety, chemical safety and health, safety and welfare special provisions are also provided in the 37 ILO conventions on safety and health in construction recommendation, 1988 R175.

8. Local Government Act

The Local government Act is concerned with a wide range of matters that affect the day to day activities of individuals and organizations. The sections, which have the most direct relevance, are Sections 145 (miscellaneous powers of local authorities), Section 146, Subsection (d) empowers a local authority, with the consent of the Minister, to make grants for the establishment and maintenance of game parks and other related facilities. Section 147, Subsection (d) controls the cutting of timber and the destruction of trees and shrubs.

Section 163, Subsection (e) empowers municipal councils, town councils and urban councils to control or prohibit all businesses, factories and workshops which by reason of smoke, fumes, chemicals, gases, dust, smell, noise or vibration or other cause may be a source of danger discomfort or annoyance to the neighbourhood and to prescribe the conditions subject to which business, factories and workshops shall be carried on.

9. Kenya Electricity Grid Code & Kenya Safety Code

The consultant also reviewed the Kenya Electricity Grid Code, which sets out detailed arrangements for the regulation of the Kenya electricity supply industry and is enforceable under the Energy Act. In addition to the Kenya Electricity Grid Code, the consultant reviewed the Kenya Safety Code, which recognizes the Factories Act, 1962 (Rev.1972) which requires an employee to use any means or appliance provided by the Employer for securing safety and also not willfully to do anything likely to endanger himself or others.

10. The Water Act

The water Act, 2002 provides the legal framework for the management, conservation, use and control of water resources and for the acquisition and regulation of right to use water in Kenya. It also provides for the regulation and management of water supply and sewerage services. In general, the Act gives provisions regarding ownership of water, institutional framework, national water resources, management strategy, and requirement for permits, state schemes and community projects. Part IV of the Act addresses the issues

of water supply and sewerage. Specifically, section 59 (4) of the Act states that the national water services strategy shall contain details of:

- (a) Existing water services
- (b) The number and location of persons who are not being provided with basic water supply and basic sewerage
- (c) Plans for the extension of water services to underserved areas
- (d) The time frame for the plan; and
- (e) An investment programme

11. The Constitution of Kenya

The provisions of Chapter V (Protection of Fundamental Rights and Freedoms of The Individual) shall have effect for the purpose of affording protection to those rights and freedoms subject to such limitations of that protection as are contained in those provisions, being limitations designed to ensure that the enjoyment of those rights and freedoms by any individual does not prejudice the rights and freedoms of others or the public interest. The constitution protects citizens from deprivation of property. No property of any description shall be compulsorily taken possession of, and no interest in or right over property of any description shall be compulsorily acquired, except where it is necessary for public interest.

12. The Forests Act 2005

This applies to all forests and woodlands on state, local authority and private land. Except under a license or permit or a management agreement issued or entered into under this Act, no person shall, in a state, local authority or provisional forest;

- a) Fell, cut, take, burn, injure or remove any forest produce;
- b) Be or remain therein between the hours of 7 p.m. and 6 a.m. unless he is using a recognised road or footpath, or is in occupation of a building authorised by the Director, or is taking part in cultural, scientific or recreational activities;
- c) Erect any building or livestock enclosure, except where the same is allowed for a prescribed fee;
- d) Smoke, where smoking is by notice prohibited, or kindle, carry or throw down any fire, match or other lighted material;
- e) De-pasture or allow any livestock to be therein;
- f) Clear, cultivate or break up land for cultivation or for any other purpose;
- g) Enter any part thereof which may be closed to any person;
- h) Collect any honey or beeswax, or hang on any tree or elsewhere any honey barrel- or other receptacle for the purpose of collecting any honey or beeswax, or enter therein for the purpose of collecting honey and beeswax, or be therein with any equipment designed for the purpose of collecting honey or beeswax;
- i) Construct any road or path;



- j) Set fire to, or assist any person to set fire to, any grass or undergrowth or any forest produce;
- k) Possess, bring or introduce any chain saw or logging tools or equipment;
- l) Damage, alter, shift, remove or interfere in any way whatsoever with any beacon, boundary mark, fence notice or notice board.

13. Trust Lands Act Cap. 288 of 1962 (revised 1970)

This Act applies to all land which for the time being is Trust land. Under section 38 a way leave license may be granted to any person empowering him and his servants and agents to enter upon Trust land vested in the council and to lay pipes, make canals, aqueducts, weirs and dams and execute any other works required for the supply and use of water, to set up electric power or telephone lines, cables or aerial ropeways and erect poles and pylons therefore, and to make such excavations as may be necessary for the carrying out of any such purposes, and to maintain any such works as aforesaid. However compensation for loss of the use of land in any case where the usefulness of the land for agricultural purposes is impaired must be made before the license is awarded.

14. The Land Adjudication Act, Cap. 284 of 1968 (revised 1977)

This Act applies to any area of Trust land where the county council in whom the land is vested so requests; and the Minister considers it expedient that the rights and interests of persons in the land should be ascertained and registered; and where the Land Consolidation Act does not apply to the area.

15. The Physical Planning Act (Cap 286)

An Act of Parliament to provide for the preparation and implementation of physical development plans and for connected purposes enacted by the Parliament of Kenya Under this Act, no person shall carry out development within the area of a local authority without a development permission granted by the local authority under section 33. The local authority concerned shall require the developer to restore the land on which such development has taken place to its original condition within a period of not more than ninety days. If on the expiry of the ninety days notice given to the developer such restoration has not been effected the concerned local authority shall restore the site to its original condition and recover the cost incurred thereto from the developer.

16. Relevant International Conventions and Treaties

Kenya is signatory to several international conventions and treaties that would need to be adhered to in implementing this project. Some of these include;

- 37 ILO Conventions
- Convention on Wetlands or the Ramsar Convention
- Convention on Biodiversity
- Convention on the Conservation of Migratory Species
- United Nations Framework Convention on Climate Change
- United Nations Convention to Combat Desertification
- Important Bird Areas

3.0 METHODOLOGY

3.1 Our Approach

To enrich this review and ensure optimal participation of all the stakeholders, a participatory and collaborative approach was adopted. Emphasis was put on consultations between, KPLC, the communities and other stakeholders. *Log Associates* concisely described the project and its geographic, ecological and general layout of facilities. Additional information on size and capacity of pre-construction activities, construction activities, schedule, support, material/facilities and services and operation and maintenance activities were also taken into account. In addition to environmental and social impacts of the project were identified with subsequent mitigation measures.

3.2 Methodology

3.2.1 Desk Review

The consultant reviewed the following documents as part of this review:

- European Investment Bank/European Union checklists,
- Agence Francaise de Development (AFD) guidelines,
- African Development Bank guidelines,
- World Bank (WB) Environmental Guidelines on Projects and EIA Studies
- Environmental Management and Coordination Act 1999,
- Revised NEMA guidelines
- The Energy Act of 2006
- The Occupational Safety and Health Act, 2007
- Kenya Electricity Grid Code
- The Public Health Act
- The Constitution of Kenya
- The Environmental (Impact Assessment and Audit) Regulations, 2003
- The Occupational Safety and Health Act 2007
- The Water Act 2002
- The Wildlife (Management and Conservation) Act
- The Forests Act 2005
- Government Lands Act, Cap. 280 (revised 1984)
- Chief Authority Act
- Trust Lands Act Cap. 288 of 1962 (revised 1970)
- Local Government Act, Cap. 265 (revised 1986)
- The Land Adjudication Act, Cap. 284 of 1968 (revised 1977)
- Registered Lands Act, Cap. 300 of 1963 (revised 1989)
- Physical Planning Act, Cap. 286
- The Physical Planning Act (Cap 286)

3.2.2 Public Consultation Forum

The consultant organized and convened a public consultation meeting between;

- a) KPLC- To share the project information in terms of its implementation and predicted impacts.
- b) Communities- To convey the consultation theme
- c) Individuals- Project Affected Persons (PAPs)
- d) Other Stakeholders i.e.
 - KWS
 - Provincial administration

4.0 ENVIRONMENTAL AND SOCIAL IMPACTS

This section provides a detailed description of the impacts of the Project.

4.1 Positive Impacts

Kenya Power and Lighting Company considered and investigated several alternative routes for the development. The proposed route was identified as the best for transmission lines through an analysis of alternatives taking into account constraints on social and natural environment. The proposed route is likely to have the following positive impacts;

1) Employment Opportunities

Employment opportunities will be offered to the construction workers and any other person who will be hired to provide her/his services during the construction phase. The project is envisaged to create approximately 400 jobs during construction phase (i.e 6 months).

2) Additional Power Capacity

With the additional substations and power lines, Kenya Power and Lighting Company Limited will be able to increase its electric power reliability and power supply capacity. This additional capacity would have a positive impact on the increasing power demands across the areas, in terms of economic empowerment, because KPLC would be able to supply more electric power.

4.2 Negative Impacts

The main potential negative impacts have been identified on the basis of whether they occur during pre-construction, construction, operation or decommissioning phase in the following section. This is to facilitate implementation of mitigation measures which are outlined in the Environmental Management Plan included in Section 6

4.2.1 Pre-Construction Phase

Displacement of People

The proposed development will displace people within the wayleave, and will be forced to relocate their buildings. KPLC will acquire the wayleaves using the company's policy on land acquisition which is based on mutual agreement with the affected land owners. Kenya Power and Lighting Company will compensate all affected persons adequately,

taking into consideration the following for those who may be required to relocate to another different location:

- Compensation for land and assets lost to people developing land for resettlement,
- logistical provision for resettling the people
- Compensate the people in terms of earnings (loss of current earnings)

The consultant however noted that majority of the persons affect by the wayleave will just move their buildings within their own pieces of land without need for relocating to another site altogether.

According to the World Bank OP 4.12 on Involuntary Resettlement, displaced persons may be classified in one of the following three groups:

- (a) Those who have formal legal rights to land (including customary and traditional rights recognized under the laws of the country);
- (b) Those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets--provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan and
- (c) Those who have no recognizable legal right or claim to the land they are occupying.

Persons covered under (a) and (b) above are provided compensation for the land they lose, and other assistance as necessary. Persons covered under (c) are provided resettlement assistance in lieu of compensation for the land they occupy, and other assistance, as necessary, to achieve the objectives set out in this policy, if they occupy the project area prior to a cut-off date established by the borrower and acceptable to the Bank. Persons who encroach on the area after the cut-off date are not entitled to compensation or any other form of resettlement assistance. All persons included in (a), (b), or (c) are provided compensation for loss of assets other than land.

Expectations of Improvement in Livelihood

These are associated with expectations of the residents of villages along the transmission alignment. In the Project area, the information about the Project raised hopes of the villagers of power supply to their villages and anticipation of improvement in their lives. Some started to think of converting flour mills with electricity supply reducing costs of fuel. They also anticipated a rise in trading activities as a result of construction and temporary or permanent employment.

4.2.2 Construction Phase

Power transmission lines characteristically generate impacts such as acquisition and maintenance of the right of way, clearing of vegetation from sites and line corridor; construction of access roads, tower pads, and substations are the most obvious sources of construction-related impacts. The construction phase is the period where most disturbances to the environment will occur. Broadly, key negative impacts of the development are likely to include:

Impacts on Flora and Fauna

It is well known that transmission lines induce physical hazard to birds and climbing animals. Bird strikes and mortality will be of concern in the areas of their high densities and those areas with large birds such as waterfowl colonies and migratory bird species. This is likely to be of concern during the operation stage of the project but can be mitigated by use of reflectory conductor wire types which improve visibility for the birds.

The impact of a transmission line on fauna is limited. Except for birds, most animals are not disturbed by the transmission line. However, the cleared way-leave creates a specific biotope in areas with denser vegetation. This biotope is similar to a natural meadow, although obviously much longer in extent, that acts as an open grazing area for herbivores, and hence as a hunting ground for carnivores. According to information from KWS and KPLC, elephants have not been shown to have any interest in, or problem with, existing transmission lines, for instance in Tsavo national park. Monkeys, such as baboons, climb the towers, but soon learn to avoid the conductors.

The construction of the proposed substation at Isinya on a 100 acre land will have negative impact on both livestock and wildlife grazing in the area. The figure 4.1 shows animals affected by the proposed substation in Kajiado district. Since the land belongs to KPLC, the owners of the livestock will look for an alternative grazing area.



Fig.4.1. Sheep grazing at proposed substation at Isinya in Kajiado district.

Birds occasionally collide with the transmission lines, and birds nesting in the towers pose a danger both to themselves and to the safe operation of the power line. This is because large nests eventually fill with droppings that can reach the conductors and cause electric shocks or burns. The effect is more severe for birds with long generation times, and for large birds, such as eagles.

Vegetation is affected in the way-leave, in the sense that higher trees and shrubs are cleared, creating an open stretch in woodland and shrub land. The most intense effect is during the construction phase, when in addition to clearing, vehicles and machines move in the way-leave for tower construction and stringing. These impacts will be completely negligible in the case of line construction because only tower/pole holes will be dug.



Fig.4.2. Vegetation along the wayleave in Tsavo West.



Impacts on Drainage, Surface Waters and Water Resources

Transmission lines may have both short-term and long-term impacts on water resources. Earthworks might release suspended particles in the water which could have temporary detrimental effect on water organisms. However, the main concern aside from these short-term impacts during construction work is the effect from tower pads and maintenance roads on the hydrological functions of wetlands or water resources which are also of minimal nature.

No water will be used for technological purposes. The OTHL route crosses some few rivers. The towers will be placed so as to leave a protection zone of 15 m when crossing rivers and streams with the span ranging of 10-15 m, and 5 m when crossing any drainage channels. Wastewaters from construction camps will be collected in mobile containers and discharged into approved sewer systems.

Electric Power Lines

- *Electric and Magnetic Fields*

Electric overhead lines are considered a source of power frequency, electric and magnetic fields, which may have a perceived health effect. The strength of both electric and magnetic fields is a function of the voltage, distance from the conductors to the ground and the lateral distance from the line to the receptor. Many studies published during the last decade on occupational exposure to Electro-Magnetic Fields (EMF) have exhibited a number of inconsistencies and no clear, convincing evidence exists to show that residential exposures to electric and magnetic fields are a threat to human health. However, the EMF decrease very rapidly with distance from source and there should be no potential health risks for people living outside the 60 m wide way leave corridor.

- *Vibration*

Kenya Power and Lighting Company will install anti-vibrating devices over the entire over head transmission line (OHTL) length to damp vibration caused by the conductors exposed to the dynamic load of wind.

Impacts on Natural Vegetation

To a large extent, the transmission line will pass through shrubland and savanna grasslands used for ranching and grazing purposes. The predominant vegetation forms are shrubland and savannah with scattered trees and shrubs. Most of the woodland is open and with low trees and bushes. While the passage through the border line of the two Tsavo National parks will inevitably take up some land, this will affect similar types of land, and is generally not expected to cause substantial impacts on the flora and fauna. While impact on woody vegetation is going to be permanent, impact on grasses and herbs is mostly transient.

In order to minimize the environmental impact it is recommended that clearing is done manually as much as possible with no burning of the cleared vegetation. In order to reduce the impact of firewood used in the worker's camps it is recommended that wood from the clearings is transported to the camp sites. It is important to reiterate that, vegetation clearance through the Protected Areas will be done with the guidance of KWS staff.

Impact on Biodiversity and Loss of Habitat

The consultant reviewed the Wildlife Act and noted that the proposed development will not cause significant adverse effects on the park that will be affected. The construction activities may cause temporary and limited damage to local flora and fauna. Tree and bush

clearance will be limited as most tree/shrubs within the wayleave are less than 12 ft in height, the maximum allowed. The cleared vegetation will be recovered by planting small trees and plants. The OHTL does not interfere with any major bird migration routes. In areas of known bird flight paths, warning spheres will be placed on the OHTL.

Land Excavation, Access Roads Construction and Camp Sites

In order to minimize the need for construction of access roads, the transmission line is located relatively near to existing roads or line corridors. Access roads for heavy equipment that will be used only during the construction phase should be removed after completion of the work. Depots and working camps should be located in such a way that they can either be used for other purposes after the time of construction (i.e. in conjunction with local plans), or be removed without trace.

Erosion may be a problem during construction, especially in areas with thin soil layers. Great care should be exercised when constructing the lines in slopes to avoid loss of soil and low vegetation that protect from erosion.

Noise, Ozone and Corona

During the construction, permissible/acceptable human noise levels can be temporarily exceeded due to the operation of lorries and equipment in the working zone of the OHTL site. Noise abatement measures will be taken in the zones crossing the residential areas, including adequate work scheduling.

Corona or electrical discharges into the air are produced around high voltage power lines. It is sometimes visible on a humid night or during rainfall and can produce noise and ozone. Both the noise levels and ozone concentrations around power lines have no health consequence and are localized impacts.

4.2 Social Impacts

The project areas immediately outside the Tsavo and Nairobi National Parks are not densely populated. At the Rabai section the population is much denser to the South West, and most of the area is characterized by small-scale farming and peri-urban type of settlements. There will likely be large negative impacts due to; dense population in the route corridor, presence of ranches, farms and related private properties and institutions.

Some of the social structures affected by the project include:

- GreenHill primary school where the power line traverses through playground. The school needs complete relocation since the proposed line traverses the only available playing ground available for the children. The relocation of the school will cause

social impact to the community since the community will lack a school in its vicinity. The school should be relocated to a nearby land to minimize social impacts to the community.



Fig 4.3: *GreenHill academy in Taita Taveta district*

- PEFA church: the proposed line traverses right above the church hence complete relocation is recommended. Therefore, since the church members will not be relocated with the church, it will result to depriving the community a place of worship or cause negative social impact. KPLC should consult with church members to ensure proper relocation is done to minimize social impacts to the community.



Fig 4.4: *PEFA church in Taita Taveta district*

- Kaunguni primary school: the proposed line passes through the edge of the playing field hence, depriving the students playing space since it is dangerous for them to play below the lines. KPLC should fence along the line section crossing the field.



Fig.4.5. *Affected Kaunguni primary school play ground in Kibwezi district*

- A.C.K church: the proposed line passes through the grave yard of the church. The members are not in agreement for any form of compensation and needs the grave to remain untouched. KPLC should ensure that no excavation of graves is done during construction.



Fig.4.6. *Affected A.C.K church graveyard in Taita Taveta district*

Other specific social concerns on the project include fragmenting cultivated lands thereby compromising productivity and incomes, loss of crops and fruit trees. Project impacts such as importation of labour into the areas coupled with establishment of workers camp sites and temporary access roads as well as the right of way are likely to bring negative impacts to the areas. While attention will be focused on loss of income due to temporary disturbance to crops or grazing areas, and on health conditions related to the influx of workers from outside the area (HIV/AIDS being the major concern), positive opportunities to Project Affected Persons may be presented in form of temporary employment, as well as through income generated by the sale of food to immigrant

workers. The implementation of the Resettlement Action Plan will address all major key concerns relating to social issues.

Cultural Impacts

The selected route is not expected to cause any damage to historical, archeological and cultural sites. Kenya Power and Lighting will consult widely and monitor the OHTL throughout the works period to ensure no archaeologically valuable areas will be disturbed.

In the event that an archeological resource is discovered during the construction process a Chance Find Procedure will be implemented. A Chance Find Procedure, as described in Performance Standard 8 of IFC, is a process that prevents archeological sites from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements of PS8 are implemented. It is a project-specific procedure that outlines what will happen if previously unknown physical resources are encountered during project construction or operation. The procedure includes record keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds. In accordance with this Procedure, work will cease on a site where archaeological material is found. The site Environmental Officer will inspect and secure the site, and will then contact Museums of Kenya for advice and arrange for a survey or salvage work as appropriate.

Impact on Agriculture, Settlements and Community facilities

Most of the impact on social life along the transmission line will be during the construction period. The impacts will be both positive and negative. Positive impacts include temporary markets for goods and services, including sources of employment for certain tasks during construction. Some of the recreation requirements of the work force are likely to cause negative impacts. Use of alcohol among the working crew may affect the local population negatively through increased violence and abuse of local women. There will also be an increased risk for spreading of sexually transmitted diseases among them HIV/AIDS in the project area.

Impact on Ambient Air

The air emissions from construction machinery and traffic will be minor and they will have negligible impact on ambient air quality.

Solid Waste

There will be loss of existing under growth during the clearing of the wayleaves in

readiness for the stringing work. There will also be solid waste generated from the excavation works. Some of the excavated soil will be reused as backfill while the rest will be disposed of to the designated areas. Solid topsoil wastes from the sites will be the main form of solid waste. Other solid wastes will include metallic pieces, wooden planks, and stone debris. All the wastes will be disposed of according to the legislation guiding the same.

Health Issues

Some of the significant health concerns associated with new projects include shortage of facilities like toilets and catering facilities for construction workers. In this instance the constructor remains the only responsible party to ensure that his or her workers are provided with the required facilities. These facilities could either be put in place before the construction of lines commences or arrangement could be done such that the personnel working along the line could get the facilities from the neighbouring communities.

The control building for equipment and control facility will be supplied with portable water and shall have sanitation and wastewater facility. Periodical investigations and maintenance and remedy of failures and accidents will be performed by specifically trained staff.

Safety Issues

During the construction phase, the work will involve the use of sharp objects, noisy machineries and dusty environment. The constructor will be required to provide his workers with the relevant protective gears like boots, gloves, protective clothing dust masks and earmuffs. These should be provided for in the project budget. The ground will also be made wet to prevent dust. Warning signs will be expected to be displayed next to dangerous points and machines so as to restrict the movement of unauthorised personnel on site during construction and to warn heavy load vehicles that will be at the site against possible danger. All litter and debris will be picked up and disposed in a central disposal site so as to avoid subsequent injuries during and after the construction work is complete. A safety officer will be at the construction site during the construction phase, at all times. The safety officer will make sure a first aid kit is always available and that the skilled workers are aware of the safety rules.

The immediate surrounding will experience an increase in human traffic and noise during ground preparation. In a construction site noise is likely to be produced by the construction machinery excavator and lorries during the civil works. Noise is also most likely to emanate from the regular masonry operations such as stone dressing.

The machine operators and workers who will be in close proximity to the machinery will be required to wear protective gears such as earmuffs during the construction period.

There will be significant amounts of dust during the excavation and civil works. A high fence of about 3.0m with a gate should be done first before most of the other civil works to minimize the dust being blown off by the winds especially if construction will be done during dry spells. This should be done especially for the sub-stations.

Workers must wear safety gears like gumboots, helmets, safety belts (harness), dust musks and approved welding glasses for welders. Other safety precautions are stipulated in the Kenya Safety Code and in the Factory Act.

4.2.3 Operation Phase

Impacts on Aviation and Communication

Aircraft navigation and communication facilities may be affected by the project. A survey was performed by the Kenya Civil Aviation Authority, which proposed changes to the location of the line near Nairobi, and a restriction on the height of towers, which should not exceed 35 m for any of the line. This is due to the many small airstrips along the line, in addition to Jomo Kenyatta International Airport and Wilson Airport in Nairobi. Furthermore, the conductors shall be marked with visibility markers according to the conditions of the KCAA.

The KPLC overhead power lines are designed to limit corona discharges. The corona noise levels or ozone concentrations have negligible interference on the radio and television signals. Kenya Power and Lighting Company will also incorporate appropriate buffer zones as a further precaution.

Waste Generated

The expected liquid waste after commissioning might result from leakages of oil from the transformers during its normal operation and in the two terminal substations. However, careful handling can prevent this during refilling and proper maintenance to avoid leakages.

Noise

Overhead transmission lines will produce noise. The noise is characterized by a crackling sound (corona effect). During operation phase, the corona effect around live conductors will generate some noise, which will have limited impact on the health and comfort of people who live in the immediate vicinity (within 100 m) of the OHTL. The effect will be

minimal and/or reduced by ensuring the lines are engaged all the time as the noise is as a result of the lines being idle.

Landscape and Visual Impacts

The visual impact of the power line is an effect on a socio-cultural level. From the perspective of a tourist seeking pristine natural environments, any infrastructure reminding of industrial society is disturbing. However, from the perspective of rural populations, it may be seen as a sign of development, of hope that things will change for the better. Both these views are present in the development of infrastructure in Africa. Which of them shall prevail depends on political decisions, and on economic reasoning.

The proposed development will also have minimal effects on the landscape. The OHTL route was established so as to meet the co-inhabitation requirements imposed by the natural landscape, objects, buildings, and facilities in the neighborhood, assuring it's framing into the existing landscape and with an impact on as limited land areas as possible.

Risk of Bird Collision

Once established, the transmission line may cause increased risk of collision of birds in flight, however this risk is expected to be minimal as the line doesn't pass through any documented important bird area.

4.2.4 Decommissioning Phase

The lifespan of the proposed transmission line is expected to be long. At the end of its lifespan, decommissioning of the project would occur. This is because, as with any project, the facilities, such as towers and cables used in this Project will have a lifetime after which they may no longer be cost effective to continue operation.

During decommissioning, all transmission line structures and equipment would be dismantled and removed. The physical removal of the line and pylons will be the reversal of the construction process. All areas disturbed by the proposed project would be restored to pre-project conditions and/or to conditions acceptable to the NEMA.

At least two years prior to the anticipated cessation of operations, a decommissioning plan for permanent closure of the project would be developed in cooperation with KPLC and NEMA. This plan would identify specific actions and a schedule for decommissioning of the project, identify steps and procedures to restore the project area to acceptable conditions and also provide measures to minimize effects to the surface water, groundwater, and other resources during decommissioning, and identify how project materials would be recycled.

The disposal of materials from the decommissioned Transmission line is not seen as a high-risk matter. Much of the material would be recyclable (steel structures and cabling) or inert (insulators, concrete foundations, etc.). These materials would however, need to be disposed of at a formal waste disposal or recycling centre.

The components of negative environmental mitigation that will be addressed will include, risk management analysis and emergency response. Implementation and monitoring of environmental, health, and safety issues with regards to legislations outlined in the legislative framework in chapter two of this report.

Potential environmental impacts caused during decommissioning which will be mitigated as per the provided environmental management and social plan, are dust and noise to the surrounding environment and public safety. Some of the impacts are:

Transmission Line Removal

During decommissioning, all transmission line structures and equipment would be dismantled and removed, and the project area restored to pre-project conditions or to conditions acceptable to NEMA. After the transmission line is deactivated, the transmission line conductors would be disconnected. The conductors would then be removed from the support poles, the support poles would be taken down, and pole footings would be removed.

The recycling or reuse of materials, such as scrap metal, would depend on the market and existing technology. Roads implemented for the project to access the transmission line would be closed and restored, as directed by the NEMA.

Structural Foundation Removal

When towers are removed from their foundations, the foundations need to be removed too so as to enable re-vegetation of the land. The concrete and steel in the foundations will be broken-up and removed to appropriate depth. Shallow foundations (like that for buildings) will be removed in their entirety. All concrete and steel debris will be removed from the site.

Public safety

A safety officer, hired by the contractor, will have the authority or responsibility of keeping all members of the public away from the decommissioning zone, especially if members of the public choose to ignore posting signs or requests for them to keep some distance from the decommissioning zone. Some of the threats to public safety may include:

- i. **Dust Impacts:** Temporary and localized impacts from dust would occur from the decommissioning phase as a result of vehicular traffic, and other soil disturbances.
- ii. **Noise Impacts:** Local noise levels will be affected temporarily by decommissioning activities (such as equipment movement), but for the remote nature of the sites no impacts are anticipated to residences or businesses. Impacts during decommissioning are expected to be limited to workers on-site.

Fire and Oil Spill Prevention

Fire will be prevented during decommissioning by ensuring that there are adequate availability of fire extinguishers onsite. The personnel undertaking the removal of the equipment will have to be trained on fire fighting and if possible, reasonable fire drills will have to be done to enhance awareness and safety. In case of oil spills, all the equipment and machines that will have the potential of spilling or leaking oil will be checked regularly. If oil spills/leaks are discovered, then capping or any other necessary actions will be taken immediately to prevent the spill/leak from dropping onto the ground. However, careful handling will be done to avoid spilling at all times.

5.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This Chapter contains a description of mitigation measures for adverse impacts, measures for enhancing the beneficial effects, and the cost of mitigation against the impacts. KPLC will implement an Environmental and Social Management Plan (ESMP), which has been developed for the project. The EMP will also ensure compliance with applicable environmental standards during both the construction and operation of the over head transmission line (OHTL). The ESMP includes measures for waste management and disposal, noise abatement, maintenance, emergency response planning as well as monitoring and informing public on the environmental and safety impacts of the project.

The ESMP is to be availed to prospective bidders in order to ensure that normal environmental mitigation costs are factored into construction costs. The Contractor is expected to prepare work plans for environmental management in line with the ESMP. The costs of incorporating the recommended mitigation measures, including compensation for property and crops and relocation activities, as well as costs for unforeseen/additional mitigation and environmental and social monitoring are presented below and subject to confirmation at appraisal.

KPLC will be responsible for reviewing civil works contracts in accordance with the ESMP report; coordinating the implementation of the ESMP by the contractor, local environmental authorities (e.g. District Councils and Village Development Committees); monitoring the implementation of the ESMP and the civil works contracts in collaboration with NEMA; and, preparing annual environmental progress reports.

5.1 Mitigation of Impact on Local Population

The consultant recommends that where the property or productive assets are to be infringed upon, they should be sufficiently and promptly compensated. KPLC has guidelines for this and incorporates rates provided for by the Ministry of Agriculture on matters of crop and trees value.

5.2 Environmental and Social Management Plan Cost

Table 5.1 below shows a detailed ESMP

The following table details the impacts identified by LOG Associates and proposed mitigation measures.

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
					Mitigation and Monitoring
Pre Construction Phase					
Community Consultation	Inform all communities along transmission route of schedule of implementation of Project and their rights to compensation	Properly convened meetings	Before the commencement of construction	Contractor and KPLC	1 million
Land Acquisition <ul style="list-style-type: none"> Loss of land due to construction of temporary and permanent access routes leading to the transmission lines, tower sites and sub-stations Permanent loss of land to the establishment of 	Complete all necessary land acquisition in accordance with RAP and entitlement Framework prior to the commencement of any construction works.	Completed acquisition process	Before the commencement of construction	KPLC	778 million

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
					Mitigation and Monitoring
<p>towers</p> <ul style="list-style-type: none"> Temporary loss of land during establishment of the ROW 					
Training	Organise environmental management and safety training All Contractors and Supervising Consultant Field Supervisor/s shall attend the training		On site At least 1 month prior to commencement of construction	Contractor	30,000
Public & Occupation Health and Safety	Preparation of a Health and Safety Plan for workers and impacted communities addressing issues including: <ul style="list-style-type: none"> Education of workers and impacted communities Provision of personal protective equipment to workers during construction Use of child labour to be prohibited 	Protected workers at sites Consultation with public Workers using	Before commencement of construction	Contractor	1,060,000
<ul style="list-style-type: none"> Accidents resulting 					

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
					Mitigation and Monitoring
from sharp and falling objects	Provision of protective gear(gloves, gumboots, helmets and raincoats)	gloves, gumboots, helmets and raincoats			
Work site Survey and Pegging	Survey the proposed line with a level and peg. Jointly inspect the surveyed alignment	Surveyed line with marked boundaries	Before commencement of construction	KPLC	11,850,000
Construction Phase					
Solid soil waste and stone debris	Transportation of waste from site & safe disposal	Clean site and disposal certificate	Project Duration	Contractor and KPLC	2 million
People falling in dug holes	Cover tower holes and pole holes immediately and always at night	Covered holes especially at night	During construction	KPLC and Contractor	
Sloping areas	Level the ground and provide proper drainage systems to avert drainage problems	Levelled ground		Contractor	
Lack of toilets for site workers	Use mobile toilets as the contractor is on site. Use available toilets/ latrines within the area	Availability of toilets	During construction	Contractor	2 million

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
					Mitigation and Monitoring
Visual character of local landscape	<ul style="list-style-type: none"> All transmission towers should be erected away from residential areas Use common corridors/way leaves to minimise impacts on undisturbed areas The transmission lines should be as straight as possible Straightness and symmetry during line construction 	<p>Residential to be at least 50 m from the towers</p> <p>Lack of zigzag transmission line</p> <p>Straight and symmetrical power lines.</p>	Project lifetime	KPLC and Contractor KPLC and contractor	Nil
Noise levels during construction and operations	Provision of Ear plugs	Use of ear plugs	Throughout construction period	Contractor	40,000
Loss of aesthetic values	Plant trees at 10 trees per hectare	Undisturbed environment	Throughout the project duration	Contractor	625,000
Ecological Impacts. (disturbance of existing habitats and land uses)	<p>Restrict wayleave width and avoid unnecessary vegetation disturbance/ clearing</p> <p>Replanting trees</p>	<p>More trees planted</p> <p>Restored undisturbed vegetation cover</p>	Throughout the project duration	KPLC	1million

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
					Mitigation and Monitoring
Destroyed fields, trees and crops	Compensation for destroyed trees and crops and replanting of trees	Adequately compensated PAPs and more trees planted	Throughout construction	KPLC	15 million
Drainage	<ul style="list-style-type: none"> In sections along water courses, earth and construction waste will be properly disposed of so as to not block rivers and streams, resulting in adverse impact on water quality. All necessary measures will be taken to prevent earthworks from impeding cross drainage at rivers/ streams, canal/existing irrigation and drainage systems Use of overhead cabling as much as possible 	Properly disposed waste	Near cross drainage structures	Contractor Contractor	1.million

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
					Mitigation and Monitoring
Socio-environmental issues	<ul style="list-style-type: none"> Advise the local community of project plans in advance of construction, and involve them in the site / construction planning process Identify culturally sensitive areas and avoid disturbing them Avoid disturbances near residential areas where possible Control run-off and manage sediment near residential areas 	<p>Public participation meetings</p> <p>Culturally sensitive sites identified</p>	<p>-Prior to commencement of works and throughout construction</p> <p>Throughout construction</p>	Contractor, KPLC and Community	1 million
	<ul style="list-style-type: none"> Arrange for local people to be employed and trained Include women, poor & vulnerable groups in the implementation of the Project activities Negotiate and agree on with community about disposal areas and stockpile sites Hire additional site for damping 	Public consultation meetings	Prior to commencement of works and throughout construction	Contractor, KPLC and Community	2 million

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
					Mitigation and Monitoring
	<ul style="list-style-type: none"> Water provision 	Boreholes Water pans	Project life	Contractor, KPLC and Community	150 million
	<ul style="list-style-type: none"> Rural electrification 	Access to electricity	Project life	Contractor, KPLC and Community	135million
Operation Phase					
Safety from electrocution	<ul style="list-style-type: none"> Cordoning the the substations site from unauthorised personnel 	Absence of unauthorised personnel	Project life	KPLC and Contractor	50.0 million
	<ul style="list-style-type: none"> “Danger / Hatari” warning signs and cable makers around risky places and cable routes respectively and substations 	Warning signs and markers	Project life	KPLC	2 million
	<ul style="list-style-type: none"> Putting anti-climbing barbed wires on towers and poles 	Anti- climbing barbed wire	Project life	KPLC	10million
Wild animals and/or birds safety	<ul style="list-style-type: none"> Appropriate/standard cable spacing Installation of anti-climbs and deflectors 	Presence of fixed anti-climbs and spaced power cables	Project life	KPLC	10 million

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
					Mitigation and Monitoring
Growth of grass and weeds in the substations	Spreading ballast chips all over the switchyard at the substations	Ballast on the switch yard	Project life	KPLC	15. million
	Using paving blocks for parking and walkways where necessary	Paving blocks on parking bay and walkways	Project life	KPLC	10 million
Degradation of the National park	Enhanced Conservation activities	Number of trees planted	Project life	KPLC and KWS	32 million p.a
Perceived dangers of electrostatic and magnetic force	<ul style="list-style-type: none"> Organise awareness creation workshops/ rallies (Education) regularly Discourage permanent residence in the high voltage right of way (wayleave) 	More informed community	Project life	KPLC	1million p.a
		Approved standards	Project life	KPLC	
People walking under the power line	Protect the people by constructing the power lines within the recommended standard height	Lines constructed within standard height	Project life	KPLC and contractor	Nil
Corona sound effect from high voltage lines	<ul style="list-style-type: none"> Adequate wayleave Ensure the height is standard 	Reduced and lower corona effect sound	Project lifetime	KPLC	Nil

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
					Mitigation and Monitoring
Vibration	Installation of ant-vibrating devices, appropriate cable and tower spacing & sagging	Installed ant-vibrating devices	Project duration	Contractor and KPLC	25 million
Hazard to low flying aircrafts	Towers should be clearly marked and should be of recommended height as provided by KCAA Construction of underground cables in areas near airports	Properly marked towers	Throughout project life	Contractor	2.5 billion

Possible Impacts	Mitigation Measures	Monitoring Indicators	Timing	Responsible Party	Costs (Ksh.)
Decommissioning Phase					
Site decommissioning	<ul style="list-style-type: none"> • Tower removal and disposal • Electrical system removal • Re-vegetation <p>Establish a site revegetation plan. Where possible involve local community to provide materials and implement revegetation</p> <p>The revegetation plan shall include:</p> <ul style="list-style-type: none"> • Name(s) of contact landowner/community group • Summarised outcome of discussions, and decisions on what will be planted; and • List of seedlings/stock to be provided and by whom 	Towers and all conductors and related line infrastructure removed from site Vegetation growth in the area	End of economic life of the project	Contractor, KPLC and Community	2.5 billion

NB

- The estimated number of workers on site is 200

5.3 Monitoring

The overall objective of environmental and social monitoring is to ensure that mitigation measures are implemented and that they are effective. Environmental and social monitoring will also enable response to new and developing issues of concern. The activities and indicators that have been recommended for monitoring are presented in the ESMP.

Environmental monitoring will be carried out to ensure that all construction activities comply and adhere to environmental provisions and standard specifications, so that all mitigation measures are implemented. The contractor shall employ an officer responsible for implementation of social/environmental requirements. This person will maintain regular contact with KPLC's Principal Environmental Officer and the local District Environmental Officers. The contractor and KPLC have responsibility to ensure that the proposed mitigation measures are properly implemented during the construction phase.

The environmental monitoring program will operate through the preconstruction, construction, and operation phases. It will consist of a number of activities, each with a specific purpose with key indicators and criteria for significance assessment. The following aspects will be subject to monitoring:

- Encroachment into protected and sensitive areas
- Vegetation maintenance around project work sites, workshops and camps
- Works safety elements, including a log of accidents
- HIV/AIDS programme implementation and levels at local health centres

Monitoring should be undertaken at a number of levels. Firstly, it should be undertaken by the Contractor at work sites during construction, under the direction and guidance of the Supervision Consultant who is responsible for reporting the monitoring to the implementing agencies. It is not the Contractor's responsibility to monitor land acquisition and compensation issues. It is recommended that the Contractor employ local full time qualified environmental inspectors for the duration of the Contract. The Supervision Consultant should include the services of an international environmental and monitoring specialist on a part time basis as part of their team.

Environmental monitoring is also an essential component of project implementation. It facilitates and ensures the follow-up of the implementation of the proposed mitigation measure, as they are required. It helps to anticipate possible environmental hazards and/or detect unpredicted impacts over time. Monitoring includes:

- Visual observations;

- Selection of environmental parameters at specific locations;
- Sampling and regular testing of these parameters.

Periodic ongoing monitoring will be required during the life of the Project and the level can be determined once the Project is operational.

5.3.1 Internal Monitoring

It is the responsibility of the KPLC proponent to conduct regular internal monitoring of the project to verify the results of the Contractor and to audit direct implementation of environmental mitigation measures contained in the ESMP and construction contract clauses for the Project. KPLC also have the direct responsibility to implement and monitor land acquisition and compensation issues as outlined in the RAP. Their Project teams should include an environmental monitoring and management specialist as well as a sociologist experienced in land acquisition and compensation issues. The monitoring should be a systematic evaluation of the activities of the operation in relation to the specified criteria of the condition of approval.

In undertaking the same, KPLC through KRU will be responsible for implementing resettlement and compensation activities and it will therefore be their responsibility to undertake regular internal monitoring of the process.

The objective of internal monitoring and audit will be:

- a. To find out any significant environmental hazards and their existing control systems in force.
- b. Meeting the legal requirements as stipulated in the Environmental Management & Coordination Act, EMCA-1999.

The responsibility for mitigation monitoring during the operation phase will lie with the Environmental Section in KPLC. Environmental monitoring of the following parameters is recommended as a minimum for the Project.

1. Noise Levels Monitoring

Although noise during construction is not expected to be a problem with the Project, periodic sampling of Contractor equipment and at work sites should be undertaken to confirm that it is not an issue. Noise level monitoring could be supplemented by consulting with Project Affected People in the first instance to identify the level of monitoring required.

2. Air Quality Protection

The Construction Contractor shall monitor wind velocity and site dust levels during earthmoving activities. The Construction Contractor shall also monitor emissions from vehicles. If excessive dust is generated, the Construction Contractor shall immediately water down areas generating dust or, if this is not effective, cease the activities generating dust. Stop all excavation work if wind threshold velocity has been exceeded.

3. Soil Erosion Monitoring

The excavation of earth for the establishment of towers, temporary and permanent access roads, work camps and storage facilities will exacerbate soil erosion. It will, therefore, be the responsibility of the Contractor's environmental inspectors to ensure the implementation and effectiveness of erosion control measures. Focus should be given to work sites where soil is disturbed and its immediate environ as well as along the ROW during and after vegetation clearing.

4. Monitoring of Vegetation Clearing

Unique stands of indigenous trees should not be removed for the establishment of towers. The Contractor's environmental inspectors should make sure that the unique tree stands identified during the present study should not be removed.

5. Monitoring Rehabilitation of Work Sites

The Contractor's environmental inspectors should ensure that areas used as temporary campsites for workers are progressively rehabilitated as they are no longer required. Once a site is rehabilitated it should be "signed off" by KPLC environmental staff.

6. Monitoring of Accidents/Health

The Contractor's environmental inspectors must make sure that appropriate signs are posted at appropriate locations/positions to minimise/eliminate risk of electrocutions.

In addition the environmental inspectors should make sure that:

- Measures to create awareness regarding sexually transmitted diseases, primarily HIV/AIDS, and other diseases such as malaria re taken;
- Preventive measures to reduce/eliminate malarial, infections where/when ever appropriate are put in place;

- Periodic health surveys are carried out along the transmission route;

KPLC will have overall responsibility to oversee that all environmental measures are put in place and that regulations are enforced. The construction supervision consultant should assist KPLC in this process in order to make sure that contractors fulfill the environmental requirements.

The following parameters could be used as indicators:

- Presence of posted visible signs on towers, etc;
- Presence of sanitary facilities at campsites;
- Level of awareness of communities pertaining to dangers/risks associated with power lines;
- Presence/absence of unique stands of indigenous trees along the power line establishment route; and
- Accident reports. Records on actual accidents associated with the establishment of the transmission line could be compiled with the help of local peasant association officials, teachers/students of local schools.

7. Waste Management Monitoring

The Construction Contractor shall regularly monitor the management of wastes to ensure that;

1. All stores waste shall be contained within construction sites;
2. Solid waste: all site waste is to be collected and disposed of in an approved registered landfill. Where possible segregation of waste (paper, glass, metal) should be undertaken and recycling opportunities identified.
3. Compost or use as animal food all green or organic wastes; and
4. Sewage shall be disposed of into sealed pit latrines or into a septic tank system, or other approved sanitation devices.

8. Workforce Training

The Construction Contractor shall ensure that all workers have been inducted. The Construction Contractor shall regularly monitor that occupational health and safety requirements are implemented. KPLC's representative shall audit that all requirements are met. Where occupational health and safety requirements are not being implemented relevant workers shall immediately be trained and instructed to implement these requirements.

5.3.2 External Monitoring and Evaluation

The Consultant recommends that a consultant should be hired to carry out Annual Environmental Audits in line with NEMA requirements.

NEMA has the overall responsibility for issuing approval for the Project and ensuring that their environmental guidelines are followed during Project implementation. Its role therefore is to review environmental monitoring and environmental compliance documentation submitted by the implementing authorities and they would not normally be directly involved in monitoring the Project unless some specific major environmental issue arose.

KPLC through the consultant will therefore provide NEMA with reports on environmental compliance during implementation as part of their annual progress reports and annual environmental auditing reports. Depending on the implementation status of environmentally sensitive project activities, NEMA will perform annual environmental reviews in which environmental concerns raised by the project will be reviewed alongside project implementation.

The Consultant recommends that relevant representatives from the AfDB, AFD and EU should be incorporated. The project affected persons should be represented through relevant PC and public participation forums should be held during the audits.

Table 5.2 Monitoring Plan

Environmental Component	Parameter	Standard	Location	Frequency	Duration	Implementation	Supervision
Pre-Construction Phase							
Land Acquisition and Compensation	Ensure compensation paid as per RAP	RAP	Along ROW for all PAPs	Monthly until its complete		KPLC	Supervision Consultant
Construction Phase							
Noise levels	Noise levels on dB (A) scale	NEMA guidelines	Noise level meter kept at a distance of 15m from edge of ROW	As directed by the supervision consultant	Readings to be taken at 15 second interval for 15 min every hr and then averaged	Contractor	Supervision Consultant
	Noise levels on dB (A) scale	NEMA guidelines	At equipment yards	Monthly as required by the supervision consultant		Contractor	Supervision Consultant
Soil Erosion	Turbidity in stormy water	NEMA guidelines	As identified by KPLC	During and after the rainy seasons		Contractor	Supervision Consultant
Vegetation Clearing	Monitor clearing to ensure consistent with ESMP	ESMP	Along ROW and works area	As required		Contractor	Supervision Consultant
Rehabilitation of work sites	Monitoring to ensure all work sites are progressively rehabilitated	ESMP	Work camps, material storage sites, along ROW	As required		Contractor	Supervision Consultant
Accidents	Safety training for	ESMP	Along ROW	Monthly		Contractor	KPLC



	workers, accident reports, community consultations						
Health	Signs, posters displayed, health awareness lectures, mosquito nets in malarial areas for each worker, health checks for workers.	ESMP	Along ROW, work camps and surrounding areas	Monthly		Contractor	KPLC

Table 5.3 Budget Estimate for Monitoring

Component	Item	Unit cost (KSh)	Quantity	Total Cost (KSh.)
Noise levels	At equipment yards, along ROW	1,200	100 samples	120,000
Soil erosion	Measurement of turbidity	1,000	100 samples	100,000
Contractor staff	Environmental Inspectors	12,000/person/month	2 full time equivalent staff for duration of project	288,000 p.a
KPLC staff	Environmental monitoring staff	16,000/month	1 full time equivalent staff for duration of project	192,000 p.a
Training	As per training program		Transport, equipment etc	150,000

5.4 Public Consultations and Public Disclosure

Community participation and consultation were undertaken among people living along the proposed transmission line corridor and area of influence as an integral part of the ESMP study. These meetings enabled interested and affected parties to contribute their concerns (views and opinions on the proposed development) which might have been overlooked during the scoping exercise. A synopsis of the views of the project affected people as well as representatives of the Local Councils in the districts through which the project traverses; who will be interviewed in predicting impacts and the development of the ESMP.

The consultant particularly gave close attention to persons within the proposed wayleave trace. The views of these stakeholders were considered and their names, identification numbers and contacts taken for future references as required by NEMA.

During the study, the consultant and KPLC further explained to the public and relevant stakeholders that the proposed development would involve construction of 462 km of 400kV transmission line from Mombasa to Nairobi and also answered any questions that the public sought to know about the project.

5.5 Training

The Table 5.4 outlines the proposed training for KPLC staff as well as employees of the Contractor. The training is aimed at the practical aspects of environmental monitoring and management.

Table 5.4: Training and Monitoring

No	Training Recipients	Mode of Training	Environmental Aspects to be Covered	Training Conducting Agency
1	KPLC Environmental Staff	Lecture System Workshops Group Discussion Visit to Case Study	-Environmental overview -Environmental regulations and acts -Environmental management plans -Environmentally sound construction management	Environmental and social experts, Supervision Consultant
2	KPLC Operation/Maintenance Staff	Seminar Workshop Lectures	-Environmental Management Plan implementation -Environmental pollution associated with transmission projects -Best environmental practices	Environmental and social experts, Supervision Consultant KPLC Environmental Department
3	Contractor's Staff	Seminar Workshop Lectures	-Environmental overview -Environmental Impact Assessment -Environmental regulations and acts -Environmental management plans -Environmental pollution associated with transmission projects -Transmission projects and environmental issues	Environmental and social experts, Supervision Consultant KPLC Environmental Department

5.6 Institutional Arrangements

The following institutional arrangement will be responsible for project implementation.

The National Environmental and Management Authority (NEMA): will ensure that all the relevant rules and regulations concerning the environment are adhered to in line with the EMCA, 1999 and the Regulations 2003.

Kenya Power and Lighting Co (KPLC): It has been vested with the overall responsibility for the coordination, planning and implementation of the Project.

Environmental steering committee: This committee will comprise representatives from KPLC, NEMA, Financing institutions (AfDB, ADB and EIB), KWS, KCAA, Civil society and the community. This will ensure that the actual implementation of the environmental monitoring and management is carried out.

Supervision Consultant: This shall be a lead environmentalist and will supervise and ensure that the contractor complies with the relevant laws.

Contractor: The contractor will be responsible for actual construction work.

Figure 5.1 summarizes the institutional arrangements.

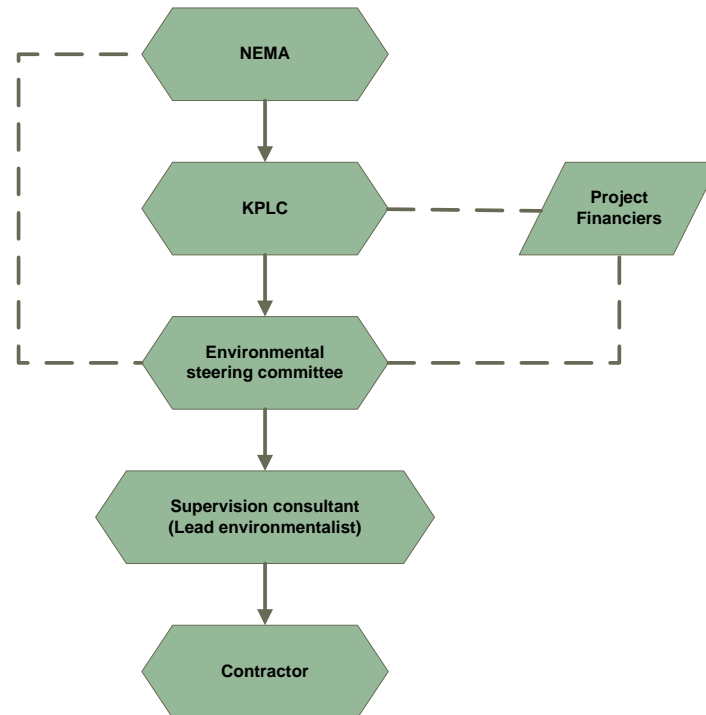


Figure 5.1: Summary of institutional arrangements

5.7 Complementary Initiatives

5.7.1 Conservation Measures

This activity will mitigate and respond to the potential impacts of the project on protected areas. It will review the approach and methodology for the conservation campaigns and monitor the effectiveness of the proposed mitigation measures. The activity will take place during construction and operation, and will recommend new mitigation measures where those proposed are not effective. Emphasis on collaboration with the Kenya Wildlife Service and local communities will ensure success of the proposed conservation measures.

5.7.2 HIV/AIDS Component

The activity will involve implementation of the proposed HIV/AIDS Awareness/Prevention Campaign. There will be a review of mid-term likely effectiveness of the approach and methods adopted in case new approaches and strategies are deemed appropriate. The activity will thus be re-oriented as necessary to achieve its full potential in lasting benefits to project affected communities by the end of the construction period.



5.8 Estimated cost

The estimated cost of the environmental management plan is KES 6.4 billion. This includes KES 778 million for Land acquisition, KES 2.5 billion for underground cabling, KES 2.5billion for site decommissioning, and an annual conservation fee of KES 32 million.

5.9 Implementation schedules and reporting

The implementation will be rolled out as required for each project component in line with the construction timetable and frameworks established for surveying and consultation, management and monitoring. KPLC will have responsibility for social and environmental aspects of the projects. Supervision undertaken will also cover these aspects.

6.0 APPENDICES

APPENDIX 1: TERMS OF REFERENCE FOR ENVIRONMENTAL AUDIT

Conducting of the Environmental Audit will ensure KPLC is compliant with Environmental Management and Coordination Act, 1999 (Part VII) and the Environmental (Impact Assessment & Audit) Regulations, 2003-Part V. the bidder will be expected to carry out an Environmental Audit and prepare an Environmental Audit report for submission to NEMA pursuant to section 68 of EMCA, 1999 and in accordance with the environmental impact assessment and audit regulations of 2003.

Objectives

An Environmental audit is a systematic, documented, periodic and objective process in assessing an organization's activities and services in relation to:

1. Assessing compliance with relevant statutory and internal requirements
2. Facilitating management control of environmental practices
3. Promoting good environmental management
4. Maintaining credibility with the public
5. Raising staff awareness and enforcing commitment to departmental environmental policy
6. Exploring improvement opportunities
7. Developing an Environmental Management and mitigation plan complete with mechanisms for monitoring and evaluating compliance including cost of mitigation measures and time frame for implementing the measures.

Scope

The scope of services to be undertaken by the Consultant shall include the following:

Task 1: Detailed Description: The Consultant is to concisely describe the project, its geographic, ecological, general layout including maps at appropriate scale where necessary.

Task 2: Description of the baseline environment: The Consultant is required to collect, collate and present baseline information on the environmental characteristics of the existing situation along the transmission line and the two terminal sub-stations. This description involves;

- a) *Physical environment* (topography, geology climate and meteorology, air quality, hydrology etc.,

- b) *Biological environment* (i.e., flora types and diversity, endangered species, sensitive habitats etc.
- c) *Social and cultural environment*, including present and projected, where appropriate (i.e., population, land use, planned development activities, community structure, employment and labour market, sources and distribution of income, cultural properties.

Task 3: Legislative and Regulatory Framework: The Consultant shall identify and describe the pertinent regulations and standards governing the environmental quality, health and safety, protection of sensitive areas, land use control at the national and local levels and ecological and socio-economic issues.

Task 4: Determination of impacts of the transmission line and the two terminal sub-stations: The Consultant will analyse and describe all significant changes brought about by the project. These would encompass environmental, ecological and social impacts, both positive and negative, as a result of each facility intervention that are likely to bring about changes in the baseline environmental and social conditions discussed in Task 2. The Consultant will make a prioritization of all concerns identified and differentiate between short, medium and long-term impacts. A detailed outline and discussion of specific conditions that might affect the environment which are unique to the type of project being audited should be provided.

Task 5: Occupational health and safety concerns: The Consultant will analyse and describe all occupational health and safety concerns brought about by the operations of the substations and the line. The Consultant will make recommendations on corrective and remedial measures to be implemented under the environmental management plan.

Task 6: Development of management plan to mitigate negative impacts: The Consultant will develop a comprehensive environmental management plan. The plan should recommend a set of mitigation, monitoring and institutional measures to eliminate, minimise or reduce to acceptable levels of adverse environmental impacts and/or maximise socio-economic benefits. The Consultant should provide cost outlays for the proposed measures as well as their institutional and financial support.

Task 7 Development of monitoring plan: The Consultant is required to give a specific description, and technical details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, definition of thresholds that will signal the need for corrective actions as well as deliver a monitoring and reporting procedures. The Consultant should provide a time frame and implementation mechanism, staffing requirements and cost outlays.

Task 8: Environmental Audit Report: The main output will be an Environmental Audit Report. The report shall be in the English Language and has to be clear and concise. The report should be in a format acceptable to NEMA. The Consultant shall present the report to NEMA for approval in the required number of copies.

Format for Environmental Audit report

1. **Executive Summary:** - Brief description of Key finding/impacts and consultant's findings/recommendations/lessons learnt)
2. **Description of the Project:** - Rationale, genesis, constraints/opportunities, accomplishments, problems, way forward for project implementation and approach
3. **Audit purpose and Methodology:** - Types and sources of evidence and methodologies employed to complete the environmental audit
4. **Findings:** - Presentation of findings with supporting evidence as regards issues in the audit and other pertinent matters that should arise during the course of audit
5. **Recommendations:** - Presentation and synthesis of pertinent recommendations from project participants/stakeholders as they regard ongoing planning, management and implementation of the project, and matters of long-term sustainability and impact
6. **Lessons Learnt:** - Description and documentation of lessons learned from the project to date. Consideration will be given to internal project aspects, i.e. planning, design, management and implementation and external factors such as policy contexts, other country/regional/global factors that have been constraining or supportive
7. List of documents reviewed, organizations and persons contacted, workshops held, and workshop briefs/proceedings

APPENDIX 2: COPY OF NEMA LICENCE

Application Reference No EIA/310

Registration No: **0002149**

For official use

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

**THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESSMENT LICENCE**

is to certify that the Project Report/Environmental Impact Assessment Study Report received from
KENYA POWER & LIGHTING COMPANY LIMITED (Name
of individual/firm) P.O. BOX 30099-00100, NAIROBI (Address)
submitted to the National Environment Management Authority in accordance with the Environmental Impact
Assessment & Audit Regulations regarding PROPOSED MOMBASA - NAIROBI TRANSMISSION
LINE 330 KV & 330/220/132 KV SUBSTATION IN NAIROBI
(title of project) whose objective is to carry on CONSTRUCTION OF A TRANSMISSION LINE
TO TRANSPORT POWER FROM COAST TO NAIROBI

(briefly describe purpose) located
at FROM RABAI TO ISINYA AND EXTENSION TO EMBAKASI AND DANDORA
(locality and district)

has been reviewed and a licence is hereby issued for implementation of the project, subject to attached
conditions.

Dated this 11TH day SEPT of 20 08

Signature: 

(SEAL)

Director General
The National Environment Management Authority

CONDITIONS OF LICENCE

1. This licence is valid for a period of 24 MONTHS (time within which the project should commence) from the date hereof.
2. The Director-General shall be notified of any transfer/variation/surrender of this licence.

3. The proponent shall adhere to routing alternative B (less national parks, more populated areas).
4. The proponent shall ensure the erection of appropriate signage in Kiswahili, English and local languages to serve as warning signs around risky places and cable routes. The proponent shall further carry out community sensitization programmes on the same.
5. The proponent shall ensure that the power line is restricted within the way leave width to avoid vegetation disturbance/clearing. Revegetation programme should be undertaken to restore disturbed vegetation.
6. The proponent shall before commencing construction, liaise with Kenya Wildlife Services so that routing of the power line does not adversely affect wildlife especially when it passes through the Tsavo East National Park.
7. The proponent shall before commencing constructions, liaise with Kenya Civil Aviation Authority to ensure that the proposed routing of the power line does not compromise air navigation safety.
8. The proponent shall ensure that compensation and resettlement plan is developed and agreed up with all the stakeholders in cases where impacts of power line rerouting causes property demolition and or homestead relocation.
9. The proponent shall ensure strict adherence to the Environmental Management Plan developed throughout the project cycle.
10. The proponent shall collaborate with the EIA Expert(s) and the contractor(s) to ensure that proposed mitigation measures are adhered to during the construction phase and where necessary appropriate mending-up activities undertaken and a report of the same submitted to NEMA. Emphasis must be given to control of dust, noise, vibrations, occupational hazards and provision of sanitary accommodation to construction workforce.
11. The proponent shall comply with the relevant principal laws, by-laws and guidelines issued for development of such a project within the jurisdiction of Ministry of Energy, Ministry of Lands, Ministry of Roads and Public Works, Kenya Wildlife Services Energy Regulatory commission and other relevant Authorities.
12. The proponent shall ensure that during the construction phase, the operations adhere to Legal Notice No. 40, The Factories (Building, Operations and Work of Engineering Construction) Rules, 1984.
13. The proponent shall ensure that environmental protection facilities or measures to prevent pollution and ecological deterioration such as restricting transmission line to common corridors/way leave, adhering to recommended standards height of the power line, installation of anti-climb and defectors to ensure wildlife and bird safety are designed, constructed and employed simultaneously with the proposed project.
14. The proponent shall ensure that records on conditions of licences/approval and project monitoring and evaluation shall be kept on the project site for inspection by NEMA's Environmental Inspectors.
15. The proponent shall submit an Environmental Audit Report in the first year of occupation/operation/commissioning to confirm the efficacy and adequacy of the Environmental Management Plan.
16. The proponent shall comply with NEMA's improvement orders throughout the project cycle.



APPENDIX 3: FIELD PHOTOGRAPHS